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EDITED BY

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Explorate solum: sic fit via certior ultrà.

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IN CONTINUATION OF THE ZOOLOGICAL RECORD, COMMENCED IN 1865).

Extract from the Rules adopted at the General Meeting, held 16th March, 1871.

"1. This Association shall be called the ZOOLOGICAL RECORD ASSOCIATION, and its object shall be to continue the publication of the 'Record of Zoological Literature.'

"2. The *Association* shall consist of *Members* and *Subscribers*.

"3. *Members* are entitled to receive a copy of the Annual Volume, and are liable to the extent of £5, in the event of the funds from all other sources not being equal to meet the Annual Expenditure. When this amount of £5 has once been reached, Members can either withdraw or renew their Membership, and thereby incur a fresh liability.

"4. *Subscribers* shall pay annually on the 1st of July *Twenty* shillings, but incur no other liability; in return for this they receive the Volume containing the 'Record of Zoological Literature' of the preceding year, as soon as it is published."

By a recent vote of Council of the ZOOLOGICAL RECORD ASSOCIATION, it has been resolved "to offer to each Member and to each Subscriber who has paid his subscription (£1) the issue of the next volume of the 'Zoological Record' in Parts as fast as printed, should they so prefer it."

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PREFACE.

I HAVE again the pleasure of acknowledging a grant of £100 from the British Association for the Advancement of Science, in aid of this undertaking; and of thanking the Recorders who continue their valuable assistance. Having been enabled by their efforts to bring out this volume within a few months of its predecessor, the Record of the Zoological Literature of one year is now published during the next one, for the first time since 1870. I have confidence that this rate of issue will henceforth be maintained, and I can only express the hope that it may not be at the expense of accuracy and completeness. This earlier appearance has prevented the application to the Royal and Zoological Societies for those annual grants in aid which it has hitherto been my duty and pleasure to acknowledge, and which I trust will nevertheless be extended to us as before.

EDWARD CALDWELL RYE.

ROYAL GEOGRAPHICAL SOCIETY,
1, Savile Row, Burlington Gardens, London,
December, 1881.

Communications, Papers, and Memoirs intended for this work should be addressed *solely* to "The Editor of the Zoological Record, care of Mr. Van Voorst, 1, Paternoster Row, London." It is earnestly requested that in the case of separately-printed copies of papers so forwarded, the *original pagination* be indicated.

LIST OF THE

PRINCIPAL ABBREVIATED TITLES OF JOURNALS, &c.,

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Abh. Ges. Görlitz—Abhandlungen der naturforschenden Gesellschaft in Görlitz.

Abh. Ges. Halle—Abhandlungen der naturforschenden Gesellschaft, Halle.

Abh. schw. pal. Ges. — Abhandlungen der schweizerischen paläontographischen Gesellschaft (Bâle).

Abh. senck. Ges.—Abhandlungen herausgegeben von der senckenbergischen naturforschenden Gesellschaft (Frankfurt-am-Main).

Abh. Ver. Brem.—Abhandlungen herausgegeben vom naturwissenschaftlischen Verein zu Bremen.

Abh. Ver. Hamb.—Abhandlungen aus dem Gebiete der Naturwissenschaften des Vereins für naturwissenschaftliche Unterhaltung zu Hamburg.

Act. Soc. Helv.—Actes de la Société Helvétique des Sciences Naturelles (= *Verh. schw. Ges.*).

Act. Soc. L. Bord. (4)—Actes de la Société Linnéenne de Bordeaux. Quatrième série.

Am. Ent.—The American Entomologist. New Series. (Riley & Fuller: New York.)

Am. J. Micr.—American Journal of Microscopy (Hale : Chicago).

Am. J. Sci. (3)—American Journal of Science and Art. Third series. (New Haven.)

Am. Micr. J.—American Monthly Microscopical Journal (Hitchcock : New York).

Am. Nat.—American Naturalist (Boston, U.S.A.).

An. cient. Arg.—Anales cientificos Argentinos (Buenos Aires).

An. hidrogr. Mar. Chile—Anuario hidrográfico de la Marina de Chile (Santiago).

Ann. Ent. Belg. — Annales de la Société entomologique de Belgique (Brussels).

Ann. Mus. Belg.—Annales du Musée Royal d'Histoire Naturelle de Belgique (Bruxelles).

Ann. Mus. Caen—Annales du Musée d'Histoire Naturelle de Caen.

Ann. Mus. Genov.— Annali del Museo civico di Storia naturale di Genova.

Ann. N. H. (5)—Annals and Magazine of Natural History. Fifth series (London).

Ann. Rep. Geogr. Explor. W. of 100*th Merid.*—G. M. Wheeler's Annual Report upon the Geographical Explorations and Surveys west of the One Hundredth Meridian, in California, &c. (Washington).

Ann. Sci. Nat. (6)—Annales des Sciences Naturelles. 6me série (Paris).

Ann. Soc. Agric. Lyon—Annales de la Société d'Agriculture, Histoire naturelle, et Artes utiles de Lyon.

Ann. Soc. Ent. Fr. (5)—Annales de la Société entomologique de France. 5me série (Paris).

Ann. Soc. L. Lyon (*n.s.*)—Annales de la Société Linnéenne de Lyon. Nouvelle série.

Ann. Soc. mal. Belg.—Annales de la Société malacologique de Belgique (Bruxelles).

Ann. Soc. Mod.—Annuario della Società dei Naturalisti di Modena.

Ann. Soc. Arg. = *Ann. Cient. Arg.*

An. Soc. Esp.—Anales de la Sociedad Española de Historia Natural (Madrid).

Arb. z. Inst. Wien—Arbeiten des zoologischen Instituts in Wien.

Arch. Anat. Phys.—Archiv für pathologische Anatomie und Physiologie (Berlin).

Arch. biol.—Archives de Biologie (Van Beneden & Van Bambeke: Gand).

Arch. f. Nat. (2)—Archiv für Naturgeschichte. Neue Folge (Berlin).

Arch. ges. Phys.—Archiv für die gesammte Physiologie des Menschen und der Thiere (Bonn).

Arch. Math. Naturvid.—Archiv for Mathematik og Naturvidenskab (Christiania).

Arch. mikr. Anat.—Archiv für mikroskopische Anatomie (Bonn).

Arch. Mus. R. Jan.—Archivos do Museu Nacional do Rio de Janeiro.

Arch. Nat. Liv.—Archiv für die Naturkunde Liv-, Ehst-, und Kurlands (Dorpat).

Arch. path. Anat. = *Arch. Anat. Phys.*

Arch. Ver. Mecklenb.—Archiv des Vereins der Freunde der Naturgeschichte in Mecklenburg.

Arch. Z. expér.—Archives de Zoologie expérimentale et générale (Paris).

Assoc. Fr. = *Bull. Ass. Sci. Fr.*

Atti Ac. Linc. = *Atti Ac. Rom.*

Atti Acc. Nap.—Atti dell' Accademia di Scienze fisische e mathematiche di Napoli.

Atti Acc. Rom.—Atti della R. Accademia dei Lincei (Rome).

Atti Acc. Tor. — Atti della R. Accademia delle Scienze di Torino (Turin).

Atti Ist. Venet.—Atti del R. Istituto Veneto di scienze, &c. (Venice).

Atti Soc. Ital.—Atti della Società Italiana di Scienze naturali (Modena).

Atti Soc. Pad.—Atti della Società Veneto-Trentina di Scienze naturali (Padua).

Atti Soc. Tosc.—Atti della Società Toscana di Scienze naturali residente in Pisa.

Beitr. Russ. Reiches (2)—Beiträge zur Kenntniss des Russichen Reiches und der angrenzenden Länder Asiens. Neue Folge (St Petersburg).

Ber. Ges. Freib.—Berichte über die Verhandlungen der naturforschenden Gesellschaft, Freiburg.

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Ber. Ver. Innsbr.—Berichte des naturwissenschaftlich - medicinischen Vereins, Innsbruck.

Ber. Vers. Naturf.—Amtlich Bericht über die Versammlungen deutscher Naturforscher und Aertze.

Bidr. Finl. Nat.—Bidrag till Finlands Naturkännedom, Etnografi och Statistik (Helsingfors).

Bol. Ac. Arg.—Boletin de la Academia Nacional de Ciencias de la Republica Argentina (Cordoba).

Boll. scient.—Bollettino scientifico (Giovanni: Milan).

Boll. Soc. Adr.—Bolletino dellà Società Adricatica di Scienze naturali (Trieste).

Botan. JB.—Botanischer Jahresbericht (Just: Berlin).

Bull. Ac. Belg. (2)—Bulletin de l'Académie Royale des Sciences de Belgique. 2me série (Brussels).

Bull. Agric. Cochinchine—Bulletin du Comité agricole et industrial de la Cochinchine (Paris).

Bull. Ass. Sci. Fr.—Bulletin de l'Association française pour l'avancement des Sciences.

Bull. Brooklyn Soc.—Bulletin of the Brooklyn Entomological Society.

Bull. Ent. Ital.—Bullettino della Società Entomologica Italiana (Florence).

Bull. Ess. Inst.—Bulletin of the Essex Institute (Salem, U.S.A.).

Bull. Mosc.—Bulletin de la Société impériale des Naturalistes de Moscou.

Bull. Mus. C. Z.—Bulletin of the Museum of Comparative Zoology of Harvard College (Cambridge, U.S.A.).

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Bull. Soc. Neuch.—Bulletin de la Société des Sciences Naturelles de Neuchâtel.
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Bull. Soc. Pyrén.—Bulletin de la Société agricole, scientifique, et littéraire des Pyrénées Orientales (Perpignan).
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Bull. U. S. Nat. Mus.—Bulletin of the United States National Museum (New York).

Canad. Ent.—Canadian Entomologist (Bethune : Montreal).
Canad. Nat. (*n.s.*)—The Canadian Naturalist and Quarterly Journal of Science. New series (Montreal).
CB. Ver. Regensb.—Correspondenz-Blatt des zoologisch-mineralogischen Vereins in Regensburg (Ratisbon).
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CB. Ver. Riga—Correspondenz-Blatt des naturforscher Vereins zu Riga.
Cist. Ent.—Cistula Entomologica (Janson: London).
Conchol. Mitth.—Conchologische Mittheilungen (Von Martens: Cassel).
C. R.—Comptes rendus des séances hebdomadaires de l'Académie des Sciences (Paris).
CR. Ent Belg.—Comptes rendus des séances de la Société entomologique de Belgique (Brussels).

Dan. Selsk. Skr.—K. Danske-Videnskabernes Selskabs Skrifter (Copenhagen).
Denk. Ak. Wien—Denkschriften der k. Akademie der Wissenschaften zu Wien (Vienna).
Denk. poln. Ges. exact. Wiss. Paris, = Parnietnik Towarzystwa Nauk Scislych w Paryzu.
Deutsche E. Z.—Deutsche entomologische Zeitschrift (Berlin).

Ent.—The Entomologist (London).
Ent. M. M.—The Entomologist's Monthly Magazine (Douglas, McLachlan, Rye, Saunders, & Stainton: London).
Ent. Monatsbl.—Entomologische Monatsblätter (Kraatz: Berlin).
Ent. Nachr.—Entomologische Nachrichten (Katter: Putbus).
Ent. Tidskr.—Entomologisk Tidskrift, på föranstaltande af Entomologiska Föreningen i Stockholm (Spångberg: Stockholm).

Feuill. Nat.—Feuilles des jeunes Naturalistes (Mülhausen).
Forh. Selsk. Chr.—Forhandlinger i Videnskabs-Selskabet i Christiania.

Geol. Mag.—Geological Magazine (Woodward: London).
Guide Nat.—Guide du Naturaliste. Revue bibliographique des Sciences naturelles (Bouvier: Paris).

Hor. Ent. Ross.—Horæ Societatis Entomologicæ Rossicæ (St. Petersburg).

Ibis—The Ibis (Salvin: London).

J. Ac. Philad.—Journal of the Academy of Natural Sciences of Philadelphia.
J. Anat. Phys.—Journal of Anatomy and Physiology (Humphry: London).
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JB. Anat. Physiol.—Jahresberichte über die Fortschritte der Anatomie und Physiologie (Hofmann & Schwalbe: Leipzig).
JB. geol. Reichsanst.—Jahrbuch der k.-k. geologischen Reichsanstalt (Wien).
JB. Karpath. Ver.—Jahrbuch des Ungarischen Karpathen-Vereines (Roth: Késmark).
JB. mal. Ges.—Jahrbuch der deutschen malakozoologischen Gesellschaft (Frankfurt-a.-M.).
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J. Cincinn. Soc.—Journal of the Cincinnati Society of Natural History.
J. de Conch.—Journal de Conchyliologie (Paris).
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Jen. Z. Nat.—Jenaische Zeitschrift für Medecin und Naturwissenschaft (Leipzig).
J. f. O.—Journal für Ornithologie (Cabanis: Leipzig).

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J. L. S.—Journal of the Linnean Society, Zoology (London).
J. Microgr.—Journal de Micrographie (Paris).
J. Micr. Soc. Vict.—Journal of the Microscopical Society of Victoria.
J. Mus. Godeffr.—Journal des Museum Godeffroy ; geographische, ethnographische und naturwissenschaftliche Mittheilungen (Hamburg).
J. N. China Soc.—Journal of the North China Branch of the Royal Asiatic Society (Shanghai).
J. of Conch.—Journal [formerly Quarterly ditto] of Conchology (London).
J. Quek. Club—Journal of the Quekett Microscopical Club (London).
J. R. Dubl. Soc.—Journal of the Royal Dublin Society.
J. R. Micr. Soc.—Journal of the Royal Microscopical Society (London).
J. Sc. Lisb.—Jornal de Sciencias da Academia de Lisboa (Lisbon).
J. Soc. Arts—Journal of the Society of Arts (London).

Kosmos—Kosmos: Zeitschrift für angewandte Naturwissenschaften (Leipzig).

L'Ab.—L'Abeille (De Marsuel: Paris).
Leitf. zool. Stat. Neap.—Leitfaden für die Aquarien der zoologischen Station zu Neapel.
Le Nat.—Le Naturaliste (Paris).
Leop.—Leopoldina (Dresden).

Mal. Bl.—Malakozoologische Blätter (Cassel).
MB. Ak. Berl.—Monatsberichte der k. Akademie der Wissenschaften zu Berlin.
Medd. Soc. Fenn.—Meddelanden af Societatis pro Fauna et Flora Fennica (Helsingfors).
Mél. biol.—Mélanges biologiques tirés du Bulletin de la Classe physico-mathématique de l'Académie impériale des sciences de St. Pétersbourg.
Mém. Ac. Belg.—Mémoires de l'Académie Royale des Sciences de Belgique (Bruxelles).
Mem. Acc. Bologn.—Memoire dell' Accademia di Scienze dell' Istituto di Bologna.
Mem. Acc. Tor.—Memoire della R. Accademia della Scienze, Torino (Turin).
Mem. Bost. Soc.—Memoirs of the Boston Society of Natural History.
Mém. cour. Ac. Belg.—Mémoires couronnés publiés par l'Académie Royale des Sciences de Belgique (Brussels).
Mem. Geol. Surv. Ind.—Memoirs of the Geological Survey of India (= *Pal. Ind.*), Calcutta.
Mém. Pétersb. (7)—Mémoires de l'Académie impériale des Sciences de St. Pétersbourg. 7me série.
Mém. Soc. Cannes—Mémoires de la Société des Sciences naturelles, &c., de Cannes.
Mém. Soc. Cherb.—Mémoires de la Société des Sciences naturelles de Cherbourg.

Mém. Soc. Phys. Genèv.—Mémoires de la Société de Physique et d'Histoire naturelle de Genève.

Moleschott's Untersuch.—Untersuchungen zur Naturlehre des Menschen und der Thiere (Moleschott : Frankfurt-a.-M.).

Morph. JB.—Morphologisches Jahrbuch : eine Zeitschrift für Anatomie und Entwickelungsgeschichte (Gegenbauer : Leipzig).

MS. deutsch. Ver. Schutze Vogelw.—Monatschrift des deutschen Vereins zum Schutze der Vogelwelt.

MT. aarg. Ges.—Mittheilungen der aargauischen naturforschenden Gesellschaft (Aarau).

MT. african. Ges.—Mittheilungen der africanishen Gesellschaft in Deutschland (Berlin).

MT. Ges. Bern—Mittheilungen der naturforschenden Gesellschaft in Bern.

MT. Münch. ent. Ver.—Mittheilungen des Münchener entomologischen Vereins (Munich).

MT. orn. Ver. Wien—Mittheilunges des ornithologischen Vereins in Wien.

MT. schw. ent. Ges.—Mittheilungen der schweizerischen entomologischen Gesellschaft (Schaffhausen).

MT. z. Stat. Neap.—Mittheilungen der zoologischen Station in Neapel (Leipzig).

Nachr. Ges. Götting.—Nachrichten von der k. Gesellschaft der Wissenschaften zu Göttingen.

Nachr. mal. Ges.—Nachrichtsblatt der deutschen malakozoologischen Gesellschaft (Frankfurt-a.-M.).

N. Am. Ent.—North American Entomologist (Grote : Buffalo).

N. Arch. Mus. (2)—Nouvelles Archives du Muséum d'Histoire Naturelle (2me série). Paris.

Nat. Arg.—El Naturalista Argentino (Buenos Aires).

Nat. Canad.—La Naturaliste Canadien (Provancher : Montreal).

Nat. Mex.—La Naturaleza (Mexico).

Nat. Tids.—Naturhistorisk Tidsskrift (Schiödte : Copenhagen).

Naturaliste = *Le Nat.*

Nature—Nature (London).

Niederl. Arch. Zool.—Niederländisches Archiv für Zoologie (Hoffmann : Haarlem).

N. Mém. Mosc.—Nouveaux Mémoires de la Société Impériale des Naturalistes de Moscou.

N. Mag. Naturv.—Nyt Magazin for Naturvidenskaberne (Sars & Kjerulf : Christiania).

Notes Leyd. Mus.—Notes from the Royal Zoological Museum of the Netherlands at Leyden (Schlegel).

Nouv. et faits—Nouvelles et faits divers (De Marseul : Paris).

Nova Acta Ac. L.-C. Nat. cur.—Nova Acta physico-medica Academiæ Cæs. Leopoldino-Carolinæ Naturæ curiosorum [= *Verh. L.-C. Ak.*] (Leipzig).

Œfv. Ak. Förh.—Œfversigt af k. Vetenskaps Akadamiens Förhandlingar (Stockholm).

Onderz. phys. Lab. Utrecht.—Onderzoekingen gedaan en het physiologisch Laboratorium der Utrechtsche Hoogeschool.
Orn. Centralbl.—Ornithologisches Centralblatt (Berlin).
Overs. Dan. Selsk.—Oversigt over dat k. Danske Videnskabernes Selskabs Forhandlinger (Kjöbenhavn).

P. Ac. Philad.—Proceedings of the Academy of Natural Sciences of Philadelphia.
Pal. Soc.—[Publications of the] Palæontographical Society (London).
P. Am. Ass.—Proceedings of the American Association for the Advancement of Science.
P. Am. Phil. Soc.—Proceedings of the American Philosophical Society (Philadelphia).
P. A. S. B.—Proceedings of the Asiatic Society of Bengal (Calcutta).
P. Belfast Soc.—Proceedings of the Belfast Natural History and Philosophical Society.
P. Bost. Soc.—Proceedings of the Boston Society of Natural History (Boston, U.S.A.).
P. Cambr. Phil. Soc.—Proceedings of the Cambridge Philosophical Society.
P. Davenp. Ac.—Proceedings of the Davenport Academy of Natural Science (Davenport, Iowa).
Periód. Zool. Argent.—Periódico Zoológico, Organo de la Sociedad Entomológica Argentina (Buenos Aires).
P. E. Soc.—Proceedings of the Entomological Society of London.
P. Geol. Ass.—Proceedings of the Geologists' Association (London).
P. Linn. Soc. N. S. W.—Proceedings of the Linnean Society of New South Wales (Sydney).
P. Liverp. Soc.—Proceedings of the Literary and Philosophical Society and Natural History Society of Liverpool.
P. Manch. Soc.—Proceedings of the Manchester Literary and Philosophical Society.
P. N. H. Soc. Glasg.—Proceedings of the Natural History Society of Glasgow.
P. N.-Scot. Inst.—Proceedings and Transactions of the Nova-Scotian Institute of Natural Sciences (Halifax).
Pop. Sci. Rev.—Popular Science Review (Dallas: London).
P. Phys. Soc. Edinb.—Proceedings of the Royal Physical Society of Edinburgh.
P. R. Dubl. Soc.—Proceedings of the Royal Dublin Society.
P. R. Geogr. Soc. (n.s.)—Proceedings of the Royal Geographical Society. 2nd series (London).
Prodr. Zool. Vict.—Prodromus of the Zoology of Victoria (McCoy: Victoria).
P. R. Soc.—Proceedings of the Royal Society (London).
P. R. Soc. Edinb.—Proceedings of the Royal Society of Edinburgh.
P. R. Soc. Tasm.—Monthly Notices and Proceedings of the Royal Society of Tasmania (Hobarton).
Przyr. Przem.—Przyroda i Przemsyl [A Natural History Magazine] (Warsaw).

P. Soc. Manch.—Proceedings of the Literary and Philosophical Society of Manchester.

Psyche—Psyche: Organ of the Cambridge [U.S.A.] Entomological Club.

P. U. S. Nat. Mus.—Proceedings of the United States National Museum (New York).

P.-v. Soc. Belge Microsc.—Procès-verbaux de la Société Belge de Microscopie (Bruxelles).

P. Z. S.—Proceedings of the Zoological Society (London).

Q. J. Micr. Sci.—Quarterly Journal of Microscopical Science (London).

Q. J. Micr. Soc. Vict.—Quarterly Journal of the Microscopical Society of Victoria.

Rend. Acc. Bologn.—Rendiconto dell' Accademia di scienze dell' Istituto di Bologna.

Rend. Ist. Lomb.—Rendiconti del R. Istituto Lombardo di scienze, &c. (Milan).

Rep. Brit. Ass.—Report of the British Association for the Advancement of Science.

Rep. E. Soc. Ont.—Report of the Entomological Society of the Province of Ontario.

Rep. Geol. Surv. Canada—Report of the Geological Survey of Canada.

Rep. Geol. Surv. Ohio—Report of the Geological Survey of Ohio (Columbia).

Rep. Ins. Illin.—Annual Report on the Noxious Insects of the State of Illinois.

Rep. U. S. Geol. Surv.—Report of the United States Geological and Geographical Survey of the Territories (Haydon: Washington).

Rev. Bord.—Revue Bordelaise.

Rev. Int. Sci.—Revue Internationale des Sciences (Paris).

Rev. Montp.—Revue des Sciences Naturelles (Montpellier).

Rev. Sci. Nat.—Revue des Sciences Naturelles (Dubreuil: Paris).

R. Z. (3)—Revue et Magasin de Zoologie pure et appliquée. 3me série (Guérin-Méneville: Paris).

SB. Ak. Wien—Sitzungsberichte der mathematisch-naturwissenschaftlichen Classe der k. Akademie der Wissenschaften (Vienna).

SB. böhm. Ges.—Sitzungberichte der k. böhmischen Gesellschaft der Wissenschaften (Prague).

SB. Ges. Dorp.—Sitzungsberichte der Dorpater Naturforscher Gesellschaft (Dorpat).

SB. Ges. Isis—Sitzungsberichte der naturwissenschaftlichen Gesellschaft 'Isis' (Dresden).

SB. Ges. Marb.—Sitzungsberichte der Gesellschaft zur Beförderung der gesammten Naturwissenschaften zu Marburg.

SB. Nat. Fr.—Sitzungsberichte der Gesellschaft naturforschender Freunde zu Berlin.

SB. z.-b. Wien—Sitzungsberichte der zoologische-botanischen Gesellschaft in Wien (Vienna).

Schr. Ges. Danz.—Neueste Schriften der naturforschenden Gesellschaft zu Danzig.

Schr. Ges. Königsb.—Schriften der k. physikalisch-ökonomischen Gesellschaft in Preussen (Königsberg).
Schr. Ver. Schlesw. Holst.—Schriften des naturwissenschaftlichen Vereins für Schleswig-Holstein (Kiel).
Sci. for All—Science for All (Brown: London).
Sci. Gos.—Science Gossip (Taylor: London).
Scot. Nat.—The Scottish Naturalist (White: Perth).
S. E. Z.—Stettiner entomologische Zeitung (Dohrn: Stettin).
Sm. Misc. Coll.—Smithsonian Miscellaneous Collections (Washington).
Str. Feath.—Stray Feathers (Calcutta).
Sv. Ak. Handl. — K. Svenska Vetenskaps Akadamiens Handlingar (Stockholm).

TB. Vers. Naturf.—Tagblatt der Versammlung der deutschen Naturforscher und Aertze.
Term. füzetek—Természetrajzi füzetek: az állat-, növény-, ásvány-, és földtan Köréből (= Naturhistorische Hefte: Vierteljahrsschrift für Zoologie, Botanik, Mineralogie, und Geologie). Pesth.
Tijdschr. Ent.—Tijdschrift voor Entomologie (The Hague).
Tijdschr. Nederl. Dierk. Ver.—Tijdschrift der Nederlandsche Dierkundige Vereeniging (The Hague and Rotterdam).
Tr. Ac. St. Louis—Transactions of the Academy of Sciences of St. Louis.
Tr. Am. Ent. Soc.—Transactions of the American Entomological Society (Philadelphia).
Trav. Lab. hist. Coll. France—Travaux du Laboratoire d'histologie du Collège de France (Ranvier: Paris).
Tr. Birmingh. Soc.—Report and Transactions of the Natural History and Microscopical Society of Birmingham.
Tr. Conn. Ac.— Transactions of the Connecticut Academy of Sciences (New Haven, U.S.A.).
Tr. Devon. Ass.—Report and Transactions of the Devonshire Association for the Advancement of Science (Plymouth).
Tr. E. Soc.—Transactions of the Entomological Society of London.
Tr. Hertf. Soc.—Transactions of the Hertfordshire Natural History Society and Field Club [continuation of *Tr. Watford Soc.*] (Hopkinson: Watford).
Tr. Indiana Hortic. Soc.—Transactions of the Indiana Horticultural Society (Indianapolis).
Tr. Norw. Soc.—Transactions of the Norfolk and Norwich Naturalists' Society (Norwich).
Tr. N. Z. Inst.—Transactions and Proceedings of the New Zealand Institute (Wellington).
Tromsö Mus. Aarsh.—Tromsö Museum's Aarshefter.
Troudy Ent. Ross. = Transactions of the Russian Entomological Society (St. Petersburg).
Tr. R. Soc. Adelaide—Transactions of the Royal Society of Adelaide.
Tr. R. Soc. Edinb.—Transactions of the Royal Society of Edinburgh.
Tr. R. Soc. Vict.—Transactions of the Royal Society of Victoria (Melbourne).

Tr. S. Afr. Phil. Soc.—Transactions of the South African Philosophical Society (Cape Town).

Tr. Yorksh. Nat. Union—Transactions of the Yorkshire Naturalists' Union (Leeds).

Tr. Z. S.—Transactions of the Zoological Society (London).

U. S. geol. Surv. Misc. Publ.—Miscellaneous Publications of the United States Geological and Geographical Survey of the Territories (Washington).

Vall. Nat.—The Valley Naturalist (St. Louis).

Verh. Ak. Amst. — Verhandelingen der koninklijke Akademie van Wetenschappen (Amsterdam).

Verh. geol. Reichsanst.—Verhandlungen der k.-k. geologischen Reichsanstalt (Wien).

Verh. Ges. Würzb. — Verhandlungen der physikalisch-medicinischen Gesellschaft in Würzburg.

Verh. L.-C. Ak.—Verhandlungen der königl. Leopoldinisch-Carolinisch deutschen Akademie der Naturforscher (Dresden).

Verh. siebenb. Ver.—Verhandlungen des siebenbürgischen Vereins für Naturwissenschaften (Hermannstadt).

Verh. St. Gall. Ges.—Verhandlungen der St. Gallischen naturwissenschaftlichen Gesellschaft.

Verh. Ver. Brünn—Verhandlungen des naturforschenden Vereins in Brünn.

Verh. Ver. Hamb.—Verhandlungen des Vereins für naturwissenschaftliche Unterhaltung zu Hamburg.

Verh. Ver. Rheinl.—Verhandlungen des naturhistorichen Vereins der preussichen Rheinlande und Westphalens (Budge: Bonn).

Verh. z.-b. Wien—Verhandlungen der zoologisch-botanischen Gesellschaft in Wien (Vienna).

Versl. Ak. Amst.—Verslagen en Mededeelingen der k. Akademie van Wetenschappen (Amsterdam).

Veter.—The Veterinarian (London).

Vid. Medd.—Videnskabelige Meddelelser fra den naturhistoriske Forening (Copenhagen).

Württ. nat. JH.—Württembergische naturwissenschaftliche Jahreshefte (Stuttgart).

Z. Ferd.—Zeitschrift des Ferdinandeums (Innsbruck).

Z. geol. Ges.—Zeitschrift der deutschen geologischen Gesellschaft (Berlin).

Z. ges. Naturw. (3)—Zeitschrift für die gesammten Naturwissenschaften. Dritte Folge (Giebel: Berlin).

Zool. (3)—The Zoologist. Third Series (Harting: London).

Zool. Anz.—Zoologischer Anzeiger (Carus: Leipzig).

Zool. Gart.—Der zoologische Garten (Weinland, Bruch, & Noll: Frankfurt-a.-M.).

Zool. JB. Neap.—Zoologischer Jahresbericht. Herausgegeben von der zoologischen Station zu Neapel (Carus: Leipzig).

Zool. Rec.—The Zoological Record (Rye: London).

Z. wiss. Zool.—Zeitschrift für wissenschaftliche Zoologie (Siebold & Kölliker: Leipzig).

ERRATA.

AVES.

P. 3, line 26, for "de" read "da."

P. 8, for "PODICEPIDÆ" read "PODICIPIDÆ."

P. 22, line 10, for "sp. n.," read "g. & sp. nn."

P. 30, line 43, after *Malia grata*, for "sp. n.," read "g. & sp. nn."

P. 45, line 23 (*Pteroclidæ*), add "Order *Heteroclidæ* proposed for *Pteroclidæ* and *Thinocoridæ*, id. l. c."

P. 46, line 21, for "Sanghi," read "Sanghir."

P. 48, line 31 (*Spheniscidæ*), after "beak," add "— Mulvany, P. Z. S. 1880, p. 2."

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PISCES. By G. A. Boulenger.

* This volume is 5 pages longer than its predecessor, without reckoning the 25 pages of *Arachnida* contained in the latter and belonging to 1878.

MOLLUSCA. By Prof. Eduard von Martens, M.D., C.M.Z.S.

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ZOOLOGICAL RECORD

FOR 1880.

MAMMALIA.

BY

W. A. Forbes, B.A., F.L.S., F.G.S., Prosector to the Zoological Society.

Like 1879, the year 1880 has added much to our knowledge of the *Mammalia*, both from a general and from a special point of view. The completion of Van Beneden & Gervais's great work on the Osteology of the *Cetacea* (p. 3), with the appearance of Allen's Monograph of the North American Pinnipeds (p. 2), are, perhaps, the most important features in the year's work. Burmeister's work on the *Mammalia* of the Argentine Republic (p. 3) may also be noted here; whilst the finely illustrated works of Elliot (p. 5) and of Salvin & Godman (p. 6) have quite sustained the reputation of their authors.

Amongst fossil *Mammalia*, important discoveries have been made by Filhol (p. 5) in Europe, and by Cope (p. 4) and Marsh (pp. 29 & 30) in America, the discoveries of the latter necessitating, in his opinion, the formation of two new Mammalian orders.

The labours of Alston (p. 2) and of Garrod (p. 5) have, unfortunately for science, ceased; but the study of the embryology, anatomy, and classification of the *Mammalia* is being carried on as energetically as ever by Balfour (p. 2), E. van Beneden (p. 2), Hoffmann (p. 6), Huxley (p. 7), Krueg (p. 7), Sabatier (p. 8), and others.

THE GENERAL SUBJECT.

Acconci, L. Di una caverna fossilifera scoperta a Cucigliana, e di alcuni resti fossili appartenenti ai generi *Hyæna* e *Felis*. Atti Soc. Tosc. 1880, Proc. Verb. pp. 30 & 31.

——. Continuazione dello studio dei resti fossili vinvenuti della caverna di Cucigliana, ordine dei Carnivori, familia dei Canidi. *L. c.* pp. 41 & 42.

[See also *Canidæ*.]

Albrecht, P. Über den Proatlas, einen zwischen dem Occipitale und dem Atlas der amnioten Wirbelthiere gelegenen Wirbel. Zool. Anz. iii. pp. 450–454, 472–478.

[See also *Carnivora*, *Glires*, *Ungulata*, and *Edentata*.]

Allen, H. On some Homologies of Bunodont Dentition. P. Ac. Philad. 1880, pp. 226–228.

——. On the Temporal and Masseter Muscles of Mammals. *L. c.* pp. 385–396.

——. [See also *Chiroptera* and *Trichechidæ*.]

Allen, J. A. History of North American Pinnipeds: a Monograph of the Walruses, Sea-lions, Sea-bears, and Seals of North America. U. S. Geol. Surv. Misc. Publ. No. 12. Washington: 1880, 8vo, pp. 1–785.

A most valuable and complete history of these animals, especially of those found in North America, of their distribution and pursuit, with full synonymy, and copious tables and references. The history of the species of the group generally is also discussed, with remarks on their synonymy and distribution. The more important points are noted below. [*Otariidæ*, *Trichechidæ*, *Phocidæ*].

Alston, E. R. [See *Dasyuridæ*. See also F. D. Godman, and C. G. Danford.]

Balfour, F. M. A Treatise on Comparative Embryology. London: 1880, 8vo, vol. i. pp. 1–492.

In the first volume of this most important work the Invertebrata are mainly treated of. In the first three chapters, however (pp. 1–108), several features of the development of the spermatozoon, and of the ovum and its segmentation, in *Mammalia*, are described (pp. 45, 47, 49, 51, 52, 53, & 76).

Bastian, H. C. The Brain as an Organ of Mind. International Scientific Series, vol. xxix. London: 1880, 8vo, pp. 1–708.

An account, with woodcuts, of the principal forms of the brain in *Mammalia*, occupies pp. 254–306.

Beneden, E. van. Contribution à la connaissance de l'ovaire des Mammifères. Arch. Biol. i. pp. 475–550, pls. xx. & xxi.

——. Recherches sur l'embryologie des Mammifères. La formation des feuillets chez le lapin. *L. c.* pp. 136–224, pls. iv.–vi.

Beneden, E. van, & Julin, C. Observations sur le maturation, la fécondation, et la segmentation de l'œuf chez les Chiroptères. *L. c.* pp. 551–571, pls. xxii. & xxiii.

——, ——. Recherches sur la structure de l'ovaire, l'ovulation, la fécondation, et les premières phases du développement chez les Chiroptères. Bull. Ac. Belg. (2) xlix. pp. 628–655.

——, P. J. van. [See *Cetacea.*]

—— ——, & Gervais, P. Ostéographie des Cétacés, vivants et fossiles, comprenant la description et l'iconographie du squelette et du système dentaire de ces animaux, ainsi que des documents relatifs à leur histoire naturelle. Paris: 1880, pp. i.–viii. & 1–634, with an atlas of 64 pls.

This important work, commenced in 1868 [*cf.* Zool. Rec. v. p. 5] and so long in progress [*op. cit.* xiii. *Mamm.* p. 14], has been at length completed. The various species of *Cetacea*, whose osteology is figured in it, are noticed in detail below.

Bergonzini, C. [See *Myoxidæ.*]

Bose, P. N. [See *Carnivora*, *Felidæ.*]

Brass, —. On the Female Generative Organs of the *Mammalia*. Z. ges. Naturw. (3) v. pp. 672 & 673.

——. [See also *Marsupialia.*]

Brunn, A. von. Zur Kenntniss der physiologischen Rückbildung der Eierstockseier bei Säugethieren. Nachr. Ges. Götting. 1880, pp. 155 & 156.

Burmeister, H. Description Physique de la République Argentine. iii. Animaux vertébrés. Pt. 1. Mammifères vivants et éteints. Buenos Ayres: 1879, 8vo, pp. 1–555.

A full account of the Mammals, living and extinct, of the Argentine Republic. Some new genera and species are described [see *Equidæ*, *Brontotheriidæ*]. This volume will be accompanied by an atlas of plates, which, however, has not yet appeared.

Cadiat, A. De la formation des ovules et des ovaires chez les Mammifères et les Vertébrés ovipares. C. R. xc. pp. 371–373.

Chapman, H. C. [See *Simiidæ*, *Elephantidæ.*]

Chudzinski, T. Anatomia porównawcza zwojów nerwowych, (Vergleichende Anatomie der Gehirn-Windungen) in Pamietnik Towarzystwa Nauk Scislych w Paryzu. (Denkschr. poln. Gessel. exact. Wiss. zu Paris) x. pp. 1–95, 29 woodcuts and 9 pls.

[Not seen by the Recorder: *cf.* Zool. Anz. iii. p. 364.]

Clarke, B. A New Arrangement of the Classes of Zoology, founded on the position of the oviducts and ovaries, including a new mode of arranging the *Mammalia*. London: 1879, pp. 1–20, with tables.

Cope, E. D. Letter from, as regards the names *Dinoceras* and *Brontotherium*. Le Nat. i. p. 3. [Omitted from Zool. Rec. xvi.]

[Cope, E. D.] On the Foramina perforating the posterior part of the squamosal bone in *Mammalia*. P. Ac. Philad. xviii. pp. 452–461.

Altogether seven foramina exist in the part indicated; of these none may be present, or as many as five co-exist. A table is given, with the names of the different genera (116 in number) examined arranged according to the nature of these foramina.

——. Second Contribution to a Knowledge of the Miocene Fauna of Oregon. P. Am. Phil. Soc. xviii. pp. 370–376.

13 species of *Mammalia* are mentioned, 10 being new, 3 of which are referred to new genera. [See *Felidæ*, *Canidæ*, *Glires*, *Sciuridæ*, *Muridæ*, *Oreodontidæ*, *Suidæ*.]

——. [See also *Carnivora* and *Felidæ*.]

Coues, E. Sketch of Progress of Mammalogy in the United States in 1879. Am. Nat. xiv. pp. 161–166.

A useful summary of the principal advances in our knowledge of the American *Mammalia*, fossil and recent, made in 1879.

D'Albertis, L. M. New Guinea: What I Did and what I Saw. 2 vols. London: 1880.

In these two volumes Signor D'Albertis gives an account of his expeditions in New Guinea, in the Arfak Mountains, on the South-east coast, and up the Fly River. Allusions are made to the habits of several *Mammalia* observed [*Cuscus*, *Dorcopsis*, &c.].

Danford, C. G., & Alston, E. R. On the Mammals of Asia Minor. Part ii. [for Part i. *cf.* Zool. Rec. xiv. *Mamm.* p. 3]. P. Z. S. 1880, pp. 50–64, pl. v.

Gives an account of the *Mammalia* collected by Danford in the south-eastern provinces of Asia Minor, and a list of all the species yet known with certainty to inhabit that country. 46 species are mentioned, and critical notes given on some of the less-known forms; one is new. [See *Bovidæ*, *Muridæ*, *Felidæ*, *Leporidæ*.]

Dawkins, W. Boyd. Early Man in Britain, and his place in the Tertiary Period. London: 1880, pp. i.–xxiii. & 1–537.

A good general account of the *Mammalia* of the Tertiary period in Britain, as regards their relation to geological and historical events, is contained in this work, the scope of which is sufficiently indicated in the title. In an appendix (pp. 501–514) useful lists of the Tertiary mammals of Britain, France, Italy, &c., are given.

——. The Classification of the Tertiary Period by means of the *Mammalia*. J. G. S. 1880, pp. 379–405.

An important paper, with classified lists of the principal forms of *Mammalia* characteristic of the various smaller divisions of the Tertiary rocks. The Tertiary period must be considered to extend to the present day.

Dobson, G. E. [See *Chiroptera.*]

Elliot, D. G. [See *Felidæ.*]

Filhol, H. Sur la découverte de Mammifères nouveaux dans les dépôts de phosphate de chaux du Quercy. C. R. xc. pp. 1579 & 1580.

Several new genera and species from these deposits are briefly characterized. [See *Lemuridæ*, *Erinaceidæ*, *Felidæ*, *Viverridæ*, *Anthracotheriidæ*, and *Macrotheriidæ.*]

——. Découverte de Mammifères nouveaux dans les dépôts de phosphate de chaux du Quercy (éocene supérieur). C. R. xci. pp. 344–346.

Describes 5 new species of *Carnivora*, one being referable to a new genus. [See *Canidæ*, *Mustelidæ*, *Carnivora.*]

——. Note sur des Mammifères fossiles nouveaux provenant des phosphorites du Quercy. Bull. Soc. Philom. (7) iii. pp. 120–125.

Describes 6 new species of fossil *Mammalia* from these deposits, some of which are referable to new genera. [*Lemuridæ*, *Erinaceidæ*, *Felidæ*, *Rhinocerotidæ*, *Macrotheriidæ*, and *Marsupialia.*]

Flower, W. H. [See *Canidæ*, *Delphinidæ.*]

Forbes, W. A. [See *Cebidæ*, *Antilocapridæ*].

Friès, S. [See *Mustelidæ.*]

Fuchs, T. Über neue Vorkomnisse fossiler Säugethiere von Jeni Saghra in Rumelien und von Ajnácsö in Ungarn, nebst einigen allgemeinen Bemerkungen über die sogenannte ' pliocäne' Säugethierfauna. Verh. geol. Reichsanst. 1879, pp. 49–58.

——. Neue Säugethierreste aus den sarmatischen Cerithienschichten von Mauer. *L. c.* pp. 58 & 59.

(2 species, a *Listriodon* and an *Antelope* are mentioned.)

——. Beiträge zur Kenntniss der pliocänen Säugethierfauna Ungarns. *L. c.* pp. 269–271.

Garrod, A. H. [See *Hippopotamidæ.*]

Gaudry, A. Résumé sur les enchainements des Mammifères tertiaires. Arch. Z. expér. viii. pp. 67–77, pls. v.–viii.

A succinct account of the conclusions arrived at in his larger work on the same subject. (*Cf.* Zool. Rec. xv. *Mamm.* p. 4.) [See also *Bovidæ.*]

Gervais, P. [See Beneden, P. J. van.]

Giglioli, H. H. Elenco dei Mammiferi, degli Uccelli, e dei Rettili itti ofagi appartenenti alla Fauna italica, &c. Firenze: 1880, 8vo, pp. 1–55.

16 species of *Mammalia* are included in this catalogue, all but 4 being *Cetacea.*

Godman, F. D., & Salvin, O. Biologia Centrali-Americana.

Of this work (*cf.* Zool. Rec. xvi. *Mamm.* p. 5) six more parts (iii.–viii.) have been issued, [the late] E. R. Alston nearly bringing to a conclusion his treatise on the *Mammalia*; the *Insectivora* are finished, and then the

remaining groups treated of as far as the genus *Didelphys* amongst the *Marsupialia*. Several species are well figured (see *Soricidæ*, *Procyonidæ*, *Manatidæ*, *Tapiridæ*, *Dicotylidæ*, *Bovidæ*, *Sciuridæ*, *Muridæ*, *Geomyidæ*, *Dasyproctidæ*, *Leporidæ*, *Dasypodidæ*, *Didelphyidæ*).

Graff, K. Lehrbuch der Gewebe und Organe der Haus-säugethiere. Jena: 1880, pp. 1–184, and woodcuts.

[Not seen by the Recorder; *cf.* Zool. Anz. iv. p. 76.]

Gruber, W. Über den anomalen Canalis Basilaris Medianus des Os Occipitale beim Menschen, mit vergleichend-anatomischen Bemerkungen. Mém. Pétersb. xxvii. No. 9, pp. 1–19, pls. i. & ii.

Günther, A. Notes on some Japanese *Mammalia*. P. Z. S. 1880, pp. 440–443.

5 species are mentioned, 1 being new (*Talpidæ*). [See also *Ursidæ* and *Otariidæ*.]

Harting, J. E. British Animals Extinct within Historic Times, with some account of the British Wild White Cattle. London: 1880, pp. 1–258, and woodcuts.

Besides the cattle, the species treated of are *Ursus arctos*, *Castor fiber*, *Rangifer tarandus*, *Sus scrofa*, and *Canis lupus*, an account of the extinction of these in historic times in the British Islands being the object of the work.

Hartmann, R. Der Gorilla. Zoologisch-zootomischen Untersuchungen. Leipzig: 1880, pp. 1–160, pls. i.–xxi. and woodcuts.

An exhaustive treatise on the external characters and osteology of the Gorilla, with comparisons with its nearest allies. The plates illustrate chiefly the cranial characters.

——. [See also *Manatidæ*.]

Hoffmann, C. K. Beiträge zur vergleichenden Anatomie der Wirbelthiere. xii. Zur Morphologie der Schultergürtels und des Brustbeines bei Reptilien, Vögeln, Säugethieren und dem Menschen. Niederl. Arch. Zool. v. pp. 31–106, pls. iii.–x.

The part devoted to the description of these parts in the *Mammalia* extends over pp. 31–75, with figures on pls. iii.–vii.

Hönigschmied, J. Kleine Beiträge betreffend die Vertheilung der Geschmacksknospen bei den Säugethieren. Z. wiss. Zool. xxxiv. pp. 452–459.

Howes, G. B. [See *Delphinidæ*.]

Huxley, T. H. On the application of the laws of Evolution to the arrangement of the *Vertebrata*, and more particularly of the *Mammalia*. P. Z. S. 1880, pp. 649–662.

The three chief existing groups of *Mammalia*, of which the leading features are concisely given, are named *Eutheria*,* *Metatheria*, and

* Of these terms, *Eutheria* and *Hypotheria* are apparently put forward as new; the former was employed by Cope in 1872 as a sub-class of Mammals.—Ed.

Prototheria, and are considered to have been originally derived from a group, *Hypotheria*, which has left no living descendants, and which in turn is supposed to have been developed from an Amphibian-like form.

[Huxley, T. H.] [See also *Canidæ*.]

Julin, C. [See *Balænidæ*; also Beneden, E. van.]

Kölliker, A. Die Entwickelung der Keimblätter des Kaninchens. Zool. Anz. iii. pp. 370–375, 390–395.

Koster, W. [See *Primates*.]

Krueg, J. Ueber die Furchen auf der Grosshirnrinde der Zonoplacentalen Säugethiere. Z. wiss. Zool. xxxiii. pp. 595–672, pls. xxxiv.–xxxviii.

An important memoir on the cerebral convolutions in the *Carnivora*, *Hyraces*, and *Proboscidea*, illustrated by numerous diagrammatic figures, in continuation of the author's similar paper on those of the *Ungulata* [*cf.* Zool. Rec. xvi. *Mamm.* p. 6].

Langer, C. [See *Simiidæ*.]

Leche, W. [See *Insectivora*.]

Loewe, L. Beiträge zur Anatomie und zur Entwickelungs-geschichte des Nerven-systems der Saügethiere und des Menschen. Berlin: 1880, pp. 1–126, pls. i.–xviii.; Zool. Anz. iii. p. 77.

Loewis, O. Die wildlebende Haarthiere Livlands. Zool. Gart. 1880, pp. 135–142, 171–175, 196–201, 261–267, 303–311.

Gives an account of the *Mammalia* found wild in Livonia, 48 species being mentioned.

Lydekker, R. A Sketch of the History of the Fossil *Vertebrata* of India. J. A. S. B. xlix. pt. 2, pp. 8–40.

A useful summary of the fossil *Vertebrata* hitherto found in India, the *Mammalia* occupying pp. 23–33. A list is also given of all the well-established species of Indian and Burman fossil *Vertebrata*.

Macleod, J. Notice sur le squelette cartilagineux de la glande de Harder du Mouton. Arch. Biol. i. pp. 57–60.

——. Contribution à l'étude de la structure de l'ovaire des Mammifères. *L. c.* pp. 241–278, pls. viii. & ix.

Masquelin, H., & Swaen, A. Premières phases du développement du placenta maternal chez le lapin. Arch. Biol. i. pp. 25–44; and Bull. Ac. Belg. (2) xlviii. pp. 45–69.

Meyer, E. Die Spermatogenese der Säugethieren. Mém. Pétersb. xxvii. No. 14, pp. 1–15, pls. i. & ii.

Murie, J. [See *Manatidæ*.]

Nehring, A. Fossilreste kleiner Säugethiere aus dem Diluvium von Nussdorf bei Wien. JB. geol. Reichsanst. xxix. [1879], pp. 475–492.

8 species are mentioned.

Newton, E. T. Notes on the *Vertebrata* of the Pre-glacial Forest-bed series of the East of England. Part i. *Carnivora*; Geol. Mag. (2) vii. pp. 152–155. Part ii. *l. c.* pp. 424–427, pl. xv. Part iii. *Ungulata*; l. c. pp. 447–452.

——. [See also *Mustelidæ*, *Bovidæ*, *Cervidæ*.]

Nuel, J. P. Recherches microscopiques sur l'anatomie du limaçon des Mammifères. Mém. cour. Ac. Belg. 4to, xlii. pp. 2–76, pls. i.–iv.

Olivier, E. Essai sue la faune de l'Allier, ou Catalogue raisonné des animaux sauvages observés jusqu'à ce jour dans ce Département. 1ere Partie, Vertébrés. Moulins & Paris: 1880, pp. 1–84.

The *Mammalia* occupy pp. 1–23. 39 species are mentioned. A "Supplement" to it is published, Le Nat. ii. p. 298.

Owen, R. [See *Tachyglossidæ*.]

Peters, W. [See *Chiroptera*.]

Pritchard, U. [See *Ornithorrhynchidæ*.]

Rauber, A. Neue Fundstellen Vater-Pacinisher Körperchen am Menschen und Säugethiere. Zool. Anz. iii. pp. 365 & 366.

Regalia, E. [See *Chiroptera*.]

Robin, —. [See *Pteropodidæ*.]

Sabatier, A. Comparaison des ceintures et des membres antérieurs et postérieurs dans la série des Vertébrés. Montpellier & Paris: 1880, pp. 1–437, pls. i.–ix.

A full account, with excellent plates, of the structure of the limb-girdles of the Vertebrata above *Pisces*. The osteology of the two girdles is first described, and then their myology is compared; finally the relations of the two girdles in question are considered.

St. John, H. C. Notes and Sketches from the Wild Coasts of Nipon. Edinburgh: 1880, 8vo, pp. 1–392.

Contains some field-notes on some of the more conspicuous Japanese *Mammalia*. Those on *Capricornis crispus* (pp. 96–98, &c.) may be particularly noticed.

Salensky, W. Beiträge zur Entwickelungs-geschichte der knorpeligen Gehör-knöchelchen bei Säugethieren. Morph. JB. vi. pp. 415–431, pl. xx.

Discusses the mode of formation of the malleus, incus, and stapes, as observed in a series of embryos of the Pig and Sheep. The author's results differ considerably from the views of Parker & Huxley on the same subject.

Salvin, O. [See Godman, F. D.]

Schäfer, E. A. On the Structure of the Immature Ovarian Ovum in the common Fowl, and in the Rabbit. To which is appended some observations upon the mode of formation of the discus proligerus in the Rabbit, and of the ovarial glands, or "egg-tubes," of the Dog. P. R. Soc. xxx. pp. 237–250, pls. ii.–iv.

Schmidt, Max. On the Duration of Life of Animals in the Zoological Garden at Frankfort-on-the-Main. P. Z. S. 1880, pp. 299–319.

The tables devoted to the *Mammalia* occupy pp. 301–308. Of 205 Mammals observed, the mean duration of life was nearly three years and ten months.

Steel, J. H. Preliminary Notes on Individual Variations in *Equus asinus*. P. Z. S. 1880, pp. 2–8.

Describes the individual variations, very often considerable, of the various organs in a large number of Donkeys dissected by the author —a much needed kind of observation.

Swaen, A. [See Masquelin, H.]

Thomas, O. On Mammals from Ecuador. P. Z. S. 1880, pp. 393–403.

41 species are mentioned, several being interesting as extending the range of species, and one being new. [See *Cebidæ*, *Mustelidæ*, *Procyonidæ*, *Sciuridæ*, *Bradypodidæ*, *Dasypodidæ*; also *Chiroptera*.]

Trouessart, E. L. Catalogue des Mammifères vivants et fossiles. [*Cf.* Zool. Rec. xvi. *Mamm.* p. 8.]

Three more parts of this catalogue have been issued, containing the *Insectivora*, and the *Glires* as far as the *Octodontidæ* (as arranged by Alston). The part containing the *Insectivora* was published in R. Z.; the first of those with the Rodents in Bull. Soc. Angers, 1880, p. 58 *et seq.*, whilst the remaining one is apparently published separately.

——. [See also *Chiroptera* and *Insectivora*.]

Turner, W. [See *Bovidæ* and *Cetacea*.]

Viallanes, H. [See *Tachyglossidæ*.]

Wallace, A. R. Island Life, or the Phenomena and Causes of Insular Faunas and Floras, including a revision and attempted solution of the problem of Geological Climates. London: 1880, pp. i.–xvii. & 1–526.

After an introductory part on the general phenomena of the distribution of organized beings, and on the question of glacial epochs, their origin and age, a general account of the faunas and floras of certain selected islands is given, and their origin explained on the principles enunciated in part i. *Mammalia* (except bats) are absent from all true oceanic islands; on other islands (classed as "recent continental," "ancient continental," and "anomalous") they are present. Lists of the *Mammalia* of Borneo (p. 351), Japan (p. 306), Formosa (p. 374), and are given, and those of Madagascar and Celebes treated of. Particular attention is also called to a supposed Mammal indigenous to New Zealand, said to have been seen several times (p. 446).

Wilson, H. S. [See *Physeteridæ*.]

Woldrich, J. N. Diluviale Fauna von Zuzlawitz, bei Winterberg im Böhmerwalde. SB. Ak. Wien, lxxxii. Abth. 1, pp. 7–66, pls. i.–iv.

The remains found belong to two faunæ, a glacial and a post-glacial one. The plates represent bones of various species of *Lepus*, *Myodes*, *Arvicola*, *Cricetus*, *Fœtorius*, and *Canis*.

Young, A. H. [See *Viverridæ*, *Elephantidæ*, and *Marsupialia*.]

A. Carruccio has notes on some species of *Mammalia* new to the Modenese fauna; Ann. Soc. Mod. 1879, pp. 185–195.

H. W. Feilden notes 4 species of *Mammalia* from Port Leopold (73° 50′ N.); Zool. (3) iv. p. 482.

W. A. Forbes notices a singular cause of death observed in a Leopard (*Felis pardus*); P. Z. S. 1880, p. 358.

W. Peters enumerates 14 species of *Mammalia* collected by J. M. Hildebrandt in Madagascar and Nossi-Bé; MB. Ak. Berl. 1880, p. 508.

E. B. Poulton has notes on some remains of *Mammalia* (*Equus*, *Rhinoceros*, *Elephas*, and *Bos*) found in quaternary sands at Reading; J. G. S. 1880, pp. 296–306.

A. Römer has notes on the *Mammalia* of Nassau; JB. Nass. Ver. 1880, pp. 245–250. [Not seen by the Recorder; *cf.* Zool. Anz. iii. p. 560.]

L. Schwendler gives an account of an Entellus Monkey having been trained to pull punkhas; P. A. S. B. 1880, pp. 55 & 56.

W. Stricker has some notes on species of *Mammalia* from Mecklenburg; Zool. Gart. 1880, pp. 218 & 219.

F. H. Waterhouse gives the exact dates of publication of the parts of Sir Andrew Smith's "Illustration of the Zoology of S. Africa"; P. Z. S. 1880, pp. 489–491.

FAUNÆ.

America, Central. [See F. D. Godman & O. Salvin.]
Argentine Republic. [See H. Burmeister.]
Asia Minor. [See C. G. Danford & E. R. Alston.]
Ecuador. [See O. Thomas.]
France. [See E. Olivier & E. L. Trouessart.]
Italy. [See H. H. Giglioli.]
Livonia. [See O. Loewis.]
Madagascar. [See W. Peters.]
United States of America. [See E. Coues & J. A. Allen.]

PRIMATES.

W. Koster compares some myological features in the hand of Man and Apes; Versl. Ak. Amst. (2) xiv. pp. 179–185.

Simiidæ.

Gorilla savagii. Virchow describes at length, and figures, the skull of a very young example, not yet having its milk dentition complete; MB. Ak. Berl. 1880, pp. 516–543, pls. 1 & 2. See also R. Hartmann, *suprà*, p. 6.

Simia satyrus. H. C. Chapman has notes on its anatomy; P. Am. Phil. Soc. 1880, pp. 160–175, pls. xi.–xvii. C. Langer describes the muscles of the extremities as a basis for a comparative myological study; SB. Ak. Wien, lxxix. [1879], Abth. 3, pp. 177–222, pls. i & ii..

Hylobates syndactylus, lar, and *leuciscus.* On their cranial differences; C. G. Giebel, Z. ges. Naturw. (3) v. pp. 193–196.

Cercopithecidæ.

Semnopithecus. E. L. Trouessart gives a synoptic revision of the species of this genus, 31 in number, with notes, and descriptions of the less-known species; R. Z. (3) vii. pp. 49–59 [*cf.* also Zool. Rec. xvi. *Mamm.* p. 9].

Colobus guereza: note on its cranial characters; C. G. Giebel, Z. ges. Naturw. (3) v. pp. 495 & 496. *C. palliatus*, Peters [*cf.* Zool. Rec. xvi. *Mamm.* p. 10], = *C. angolensis*; P. L. Sclater, P. Z. S. 1880, p. 68.

Macacus inuus: an account of the Gibraltar Monkeys; Zool. Gart. 1880, pp. 337–340. *M. tcheliensis*: note on two live specimens in London; P. L. Sclater, *l. c.* pp. 537 & 538.

Cynocephalus babuin. On its thyroid gland; G. Zoja, Boll. Scientific. ii. pp. 16 & 17. [Not seen by the Recorder; *cf.* Zool. Anz. iii. p. 483.]

Cebidæ.

Brachyurus rubicundus. On its external characters and anatomy; W. A. Forbes, P. Z. S. 1880, pp. 627–647, pls. lxi.–lxiii. Remarks are given on the other species of the genus, and *B. melanocephalus* is figured from life, *l. c.* pl. lxiii. Attention is called on pp. 638–640 to certain little-known cranial differences between the Cata- and Platy-rrhine monkeys.

Chrysothrix sciurea, Notes on; O. Thomas, P. Z. S. 1880, p. 395.

LEMURES.

Lemuridæ.

Lemur nigerrimus, sp. n., P. L. Sclater, P. Z. S. 1880, p. 451, Madagascar.

Necrolemur edwardsi, sp. n. (foss.), H. Filhol, C. R. xc. p. 1580, and Bull. Soc. Philom. (7) iii. p. 124, "Phosphorites du Quercy," France.

Perodicticus edwardsi, sp. n., A. Bouvier, Guide Nat. 1879, p. 10, Congo. [Omitted from Zool. Rec. xvi.]

CHIROPTERA.

Dobson, G. E. Report on accessions to our knowledge of the *Chiroptera* during the past two years (1878–1880). Rep. Br. Ass. 1880, pp. 169–197.

The Reporter here summarizes all the additional information on this group acquired since the publication of his "Catalogue" [*cf.* Zool. Rec. xv. *Mamm.* p. 10]. The introductory portion of this Catalogue is translated by A. Robin, Ann. Sc. Nat. (6) ix. art. No. 6, pp. 1–50.

——. On some New or Rare Species of *Chiroptera* in the Collection of the Göttingen Museum. P. Z. S. 1880, pp. 461–465.

8 species are mentioned, one being new (*Nycteridæ*).

The same author has notes on eight species of bats from Algeria (with a supplementary note by F. Lataste); Bull. Soc. Z. Fr. 1880, pp. 232–239.

E. L. Trouessart (Villevêque, Maine-et-Loire: 1879) reprints from Feuille Nat. (1879) a synoptical review of the European Bats, with two plates showing the principal characters. 25 species are recognized. The same author has notes on four species, rare in, or new to, the French Fauna; Le Nat. i. pp. 125–126. [Omitted from Zool. Rec. xvi.]

On the determination of certain species of *Chiroptera* described by Crespon; Z. Gerbe, Le Nat. i. p. 58. Reply by E. L. Trouessart, *l. c.* pp. 67 & 68.

W. Peters has notes on the bats collected by Dr. F. Hilgendorf in Japan; MB. Ak. Berl. 1880, pp. 23–25. 8 species are mentioned, one being new (*Vespertilionidæ*).

On a collection of *Chiroptera* from Old Calabar; O. Thomas, Ann. N. H. (5) vi. pp. 164–167. 6 species are mentioned, two being new (*Vespertilionidæ.*)

Note on the mammary glands of bats; H. Allen, P. Ac. Philad. 1880, p. 133.

Note on the number of the phalanges in bats; *id. l. c.* p. 359.

On the varieties of structure in the ethmoid bone in this group; *id.* Bull. Mus. C. Z. vi. No. 5, pp. 121 & 122.

The distal extremity of the ulna exists in the *Chiroptera*; E. Regalia, Zool. Anz. iii. pp. 519–522. (*Cf.* also Atti Soc. Tosc. 1880, Proc. Verb. p. 111.)

See also Beneden and Julin, *suprà*, p. 3.

Pteropodidæ.

Boneia bidens [Zool. Rec. xvi. *Mamm.* p. 12, and there mentioned as "incertæ sedis"] belongs here; F. A. Jentink, Zool. JB. Neap. 1879, p. 1171.

Cynonycteris amplexicaudata. On its anatomy; Robin, C. R. xc. pp. 1369 & 1370.

Cynopterus (*Ptenochirus*) *lucasi*, sp. n., G. E. Dobson, Ann. N. H. (5) vi. p. 163, Sarawak.

Epomophorus comptus. Notes on; J. A. Smith, P. Phys. Soc. Edinb. 1880, pp. 362–371.

Nycteridæ.

Megaderma gigas, sp. n., G. E. Dobson, P. Z. S. 1880, p. 461, pl. xlvi. [*cf.* Zool. Rec. xvi. *Mamm.* p. 12], Queensland.

Vespertilionidæ.

Harpyiocephalus hilgendorfi, sp. n., W. Peters, MB. Ak. Berl. 1880, p. 24, pl., Yeddo.

Vesperugo annulatus, sp. n., W. Peters, SB. Nat. Fr. 1880, p. 122, Duke of York Islands. *V. nilssoni*: on its distribution; A. J. Jäckel, Zool. Gart. 1880, pp. 237–243. *V. plancii*, sp. n., Z. Gerbe, Bull. Soc. Z. Fr. 1880, p. 71, Pekin. *V.* (*Vesperus*) *brunneus*, sp. n., O. Thomas, Ann. N. H. (5) vi. p. 165, Old Calabar. *V.* (*Vesperus*) *sinensis*, sp. n., W. Peters, MB. Ak. Berl. 1880, p. 258, Pekin.

Vespertilio abramus, note on; E. Regalia, Atti Soc. Tosc. 1880, Proc. Verb. pp. 39–41. *V. capaccinii*: on its occurrence in Provence; Z. Gerbe, Le Nat. i. p. 67; further note on the same, E. L. Trouessart, *l. c.* p. 75 [omitted from Zool. Rec. xvi.].

Kerivoula javana, sp. n., O. Thomas, Ann. N. H. (5) v. p. 472 (with cut of head), Java. *K. smithi*, sp. n., *id.* Ann. N. H. (5) vi. p. 166, Old Calabar.

Natalus micropus, sp. n., G. E. Dobson, P. Z. S. 1880, p. 443, Jamaica.

Phyllostomatidæ.

Vampyrops infuscus, sp. n., W. Peters, MB. Ak. Berl. 1880, p. 259, Cave of Ninabamba, Peru.

INSECTIVORA.

Leche, W. Zur Morphologie der Beckenregion bei *Insectivora*. Morph. JB. vi. pp. 597–602.

Describing the morphology of the pelvis in this group, as well as the abdominal muscles.

Trouessart, E. L. Revision des Musaraignes (*Soricidæ*) d'Europe, et notes sur les Insectivores en général, avec l'indication des espèces qui se trouvent en France. Angers: 1880, pp. 1–24 (extr. du Bull. Soc. Angers, 1880).

Erinaceidæ.

Cayluxotherium elegans, g. & sp. nn. (foss.), H. Filhol, C. R. xc. p. 1579, and Bull. Soc. Philom. (7) iii. p. 120, "Phosphorites du Quercy," France. Allied to *Gymnura* and *Erinaceus*.

Centetidæ.

Centetes. Notes on the synonymy of this and the allied genera ; E. L. Trouessart, Le Nat. ii. pp. 178–180.

Macroscelididæ.

Rhynchocyon petersi, sp. n., J. V. Barboza du Bocage, J. Sc. Lisb. xxvii. p. 159, Zanzibar.

Soricidæ.

Blarina micrura figured, E. R. Alston, Biol. Centr. Am., Mamm. pl. v. fig. 2.

Crocidura (*Pachyura*) *coquereli*, sp. n., E. L. Trouessart, Notes Leyd. Mus. ii. p. 86, and Ann. Sci. Nat. (6) x. Art. No. 3, p. 2, pl. xix. fig. 1, Mayotte, N.W. Coast of Madagascar. *C. edwardsiana*, sp. n., *id.* Le Nat. ii. p. 330, Sulu Islands. *C. murina* : on a specimen with anomalous dentition ; *id.* Ann. Sci. Nat. (6) x. Art. No. 4, pp. 8–12.

Sorex veræ-pacis figured, E. R. Alston, *l. c.* Mamm. pl. v. fig. 1.

Talpidæ.

Talpa mizura, sp. n., A. Günther, P. Z. S. 1880, p. 441, Japan.

Urotrichus talpoides figured, with details and notes; *ibid.* p. 440, pl. xlii. B.

Neurotrichus, g. n., *ibid.* p. 441. Allied to *Urotrichus*, but differing in its dentition. Type, *Urotrichus gibbsi*, Baird, which is figured, *l. c.* pl. xlii. A.

CARNIVORA.

P. Albrecht discusses the phylogeny of the *Carnivora* ; Schrift. Ges. Königsb. 1879, SB. [Not seen by the Recorder: *cf.* Zool. Anz. iii. p. 482.]

P. N. Bose has notes on the history and comparative anatomy of the extinct *Carnivora*; Geol. Mag. (2) vii. pp. 202–207, 271–279.

He also describes some fossil *Carnivora* from the Siválik Hills ; J. G. S. 1880, pp. 119–136. Several are new (*Felidæ*, *Hyænidæ*, *Viverridæ*, *Canidæ*, *Mustelidæ*).

Cope, E. D. On the genera of *Felidæ* and *Canidæ*. Ann. N. H. (5) v. pp. 36–45, 92–107.

Reprinted from P. Ac. Philad. [*cf.* Zool. Rec. xvi. *Mamm.* p. 13].

[See also L. Acconci, *suprà*, p. 2.]

Felidæ.

Cope, E. D. On the Extinct Cats of America. Am. Nat. xiv. pp. 833–858.

A general account of the extinct *Felidæ* and *Nimravidæ* of America, illustrated by numerous woodcuts.

Two more parts (vi. & vii.) of D. G. ELLIOT'S magnificently illustrated "Monograph of the *Felidæ*" [cf. Zool. Rec. xvi. *Mamm.* p. 4] have been issued during the year.

Felis canadensis, *F. diardi*, *F. temmincki*, *F. caffra* (pt. vi.), *F. tigrina*, *F. eyra*, *F. badia*, and *F. caudata* (pt. vii.) are figured, Elliot, l. c. *F. grandicristata*, sp. n. (foss.), (perhaps not distinct from *F. cristata*); P. N. Bose, *l. c.* p. 128, Siváliks. *F. lynx* (?): on some bones, probably belonging to this species, from Teesdale, Yorkshire; W. Davies, Geol. Mag. (2) vii. pp. 346–349, pls. xi. & xii. *F. uncia* is probably not a native of Asia Minor; C. G. Danford & E. R. Alston, P. Z. S. 1880, p. 51.

Proælurus medius, sp. n. (foss.), H. Filhol, Bull. Soc. Philom. (7) iii. p. 122, "Phosphorites du Quercy," France.

Hoplophoneus platycopis, sp. n. (foss.), E. D. Cope, Am. Nat. xiii. p. 798 B, Lower Miocene of Oregon [omitted from Zool. Rec. xvi.] See also P. Am. Phil. Soc. xviii. p. 373.

Machærodus sivalensis, P. N. Bose, *l. c.* p. 122, pl. vi. fig. 5, Siváliks, and *M. palæindicus*, ibid., p. 125 (foss.), pl. vi. figs. 1–4, spp. nn.

Archælurus debilis, g. & sp. nn. (foss.), E. D. Cope, Am. Nat. xiii. p. 897 A, Lower Miocene of Oregon [omitted from Zool. Rec. xvi.]. See also P. Am. Phil. Soc. xviii. p. 372.

VIVERRIDÆ.

Viverra bakeri, sp. n. (foss.), P. N. Bose, *l. c.* p. 131, Siváliks. *V. civetta*: its myology described; A. H. Young, J. Anat. Phys. xiv. pp. 166–177.

Palæoprionodon lamandini, g. & sp. nn. (foss.), H. Filhol, C. R. xc. p. 1579, "Phosphorites du Quercy," France. Allied to *Prionodon*.

HYÆNIDÆ.

Hyæna sivalensis, p. 128, and *H. felina*, p. 130, pl. vi. fig. 6, spp. nn. (foss.), P. N. Bose, *l. c.*, Siváliks.

CANIDÆ.

HUXLEY, T. H. On the Cranial and Dental Characters of the *Canidæ*. P. Z. S. 1880, pp. 238–287.

An elaborate paper, with copious measurements and figures, on the cranial and dental characters in the living genera of *Canidæ*, and the conclusions deducible therefrom.

——. On the Epipubis in the Dog and Fox. P. R. Soc. xxx. pp. 162 & 163.

J. H. SCOTT describes the structure of the style in the tongue of the Dog; J. Anat. Phys. xiv. p. 288.

On fossil *Canidæ* from the Cavern of Cucigliana; L. Acconci, Atti Soc. Tosc. 1880, Proc. Verb. pp. 41 & 42.

Canis curvipalatus, sp. n. (foss.), P. N. Bose, *l. c.* p. 134, Siváliks. Another undetermined species is described and figured; *l. c.* p. 135, pl. vi. figs. 7–9. *C. lemur*, sp. n. (foss.), E. D. Cope, P. Am. Phil. Soc. xviii., p. 371, Miocene of Oregon.

Icticyon venaticus figured, and its anatomy described; W. H. Flower, P. Z. S. 1880, pp 70–76, pl. x.

Amphicyon entoptychi, sp. n. (foss.), E. D. Cope, P. Am. Phil. Soc. xviii. p. 372, Miocene of Oregon. *A. curtum*, sp. n. (foss.), H. Filhol, C. R. xci. p. 344, "Phosphorites du Quercy," France.

Hyænocyon, g. n. (foss.), E. D. Cope, P. Am. Phil. Soc. xviii. p. 372. Type, *Enhydrocyon basilatus* [cf. Zool. Rec. xvi. *Mamm.* p. 15.]

Procyonidæ.

Bassaricyon [cf. Zool. Rec. xiv. *Mamm.* p. 12] *alleni*, sp. n., O. Thomas, P. Z. S. 1880, p. 397, pl. xxxviii., Ecuador.

Bassaris sumichrasti figured; E. R. Alston, Biol. Centr. Am., Mamm. pl. vi. (the plate is lettered *B. raptor*, errore).

Mustelidæ.

Gulo luscus. On its occurrence in the "Forest-bed" of Eastern England; E. T. Newton, Geol. Mag. (2) vii. pp. 424–427, pl. xv.

Mustela patagonica. Observations on this species; H. Burmeister, Arch. f. Nat. 1880, pp. 111–114. *M. itatsi*, described and figured; D. Braun, Jen. Z. Nat. xiv. pp. 577–584, pl. xxvii.

Lutra vulgaris (?). Note on a specimen from Leh; R. Lydekker, J. A. S. B. xlix. pt. 2, p. 6. *L. palæindica*, sp. n. (foss.), P. N. Bose, *l. c.* p. 133, Siváliks.

Pterura sandbachi occurs in Ecuador; O. Thomas, P. Z. S. 1880, p. 396.

Enhydris marina. On a head of this species from California; E. Alix, Bull. Soc. Z. Fr. 1879, pp. 119–123.

Meles taxus. On its reproduction; S. Fries, Zool. Anz. iii. pp. 486–492. The fertilized ovum undergoes a "resting-stage," during which no further development takes place.

Lutrictis lycopotamicus, sp. n. (foss.), E. D. Cope, Bull. U. S. Geol. Surv. v. p. 67, Miocene of Oregon [omitted from Zool. Rec. xvi.].

Stenoplesictis cayluxi, g. & sp. nn. (foss.), H. Filhol, C. R. xci. p. 345, "Phosphorites du Quercy," France.

Ursidæ.

Ursus americanus. On a very young cub of this species; J. B. Gilpin, P. N. Scot. Inst. v. pp. 151–155. *U. arctos* and *japonicus.* Observations on; A. Günther, P. Z. S. 1880, pp. 441 & 442.

Arctotherium sinum. E. D. Cope's description reproduced; Ann. N. H. (5) v. pp. 260 & 231 [*cf.* Zool. Rec. xvi. *Mamm.* p. 16].

GENERA INCERTÆ SEDIS.

Quercytherium tenebrosum, g. & sp. nn. (foss.), H. Filhol, C. R. xc. p. 1579, "Phosphorites du Quercy," France. Allied to *Cynohyænodon*.

Cynodictus nanus, sp. n. (foss.), *id. op. cit.* xci. p. 345, "Phosphorites du Quercy," France.

Plesictis formosus, sp. n. (foss.), *id. ibid.*, "Phosphorites du Quercy," France.

Ælurogale acutata, sp. n. (foss.), *ib. l. c.* p. 346, "Phosphorites du Quercy," France.

OTARIIDÆ.

J. A. ALLEN, Hist. N. A. Pinnipeds, recognizes 9 species (2 of which are doubtful, however) belonging to 6 genera (*Otaria*, *Eumetopias*, *Zalophus*, *Phocarctos*, *Callorrhinus*, and *Arctocephalus*), as composing this group; p. 205. Their history, synonymy, and habits are fully discussed, and a synopsis of the genera and species is given, pp. 208-213. Eleven other species are mentioned as "mythical" or "undeterminable."

Arctocephalus falklandicus, auctt., should stand as *A. australis*, Zimmerman; *id. l. c.* p. 210.

Calorrhinus ursinus occurs in Japan; A. Günther, P. Z. S. 1880, p. 443.

Otaria pusilla, Peters, &c., should stand as *Arctocephalus antarcticus*, Thunberg; Allen, *l. c.* p. 212.

Zalophus gillespii, McBain, should stand as *Z. californianus*, Lesson; *id. l. c.* pp. 276, 291 & 292.

TRICHECHIDÆ.

Odobænus is used as the proper generic appellation for the Walruses; Allen, *l. c.* p. 14. There are two species, *O. rosmarus*, from the Atlantic, and *O. obesus* from the Pacific. Woodcuts of the external appearance, skull, &c., of both forms are given.

Trichechus rosmarus. A fœtal specimen described; H. Allen, P. Ac. Philad. 1880, pp. 38 & 39.

T. (*Trichec*[*h*]*odon*) *huxleyi.* Abstract of a paper on its tusks; E. R. Lankester, Pr. L. S. xv. pp. 144–146.

PHOCIDÆ.

J. A. ALLEN reviews the family, with an exhaustive account of their history and synonymy, *l. c.* pp. 412–484. 11 genera (*Phoca*, *Erignathus*, *Histriophoca*, *Halichœrus*, *Cystophora*, *Macrorrhinus*, *Ogmorrhinus*, *Leptonychotes* and *Ommatophoca*) with 17 species are recognized as existing, and their synonymy and distribution pointed out in a systematic list, pp. 464–467. The species inhabiting the North American coasts are then treated of in detail, with copious accounts of their habits, and of the seal fishery.

Phoca greenlandica. On its anatomy; J. Sommers, P. N. Scot. Inst. v. pp. 155–161.

CETACEA.

Beneden, P. J. van. Description des ossemens fossiles des environs d'Anvers. 2eme partie. Cétacés. Ann. Mus. Belg. iv. (Brussels: 1880), with Atlas of 39 pls.

Contains the genera *Balœnula*, *Balœna*, and *Balœnotus*.

——. Les Mysticètes a courts fanons des sables des environs d'Anvers. Bull. Ac. Belg. (2) xl. pp. 11–25.

Several new genera and species are described (*Balœnidæ*).

The same author has notes on several species of *Cetacea* stranded on the southern and western coasts of France during the years 1878 & 1879, Bull. Ac. Belg. (2) xlix. pp. 96–107; and on a consignment of fossil *Cetacea* from Croatia, *op. cit.* xlvii. pp. 183 & 184.

He also gives an account of the Arctic Whale Fishery; *op. cit.* xlvi. pp. 966–985.

[See also P. J. van Beneden & P. Gervais, *suprà*, p. 3.]

P. Fischer has remarks on the *Cetacea*, 17 in number, of the south-west coasts of France; Act. Soc. L. Bord. 1879, Proc. Verb. pp. lxxvii.–lxxix.

W. Turner reports on the bones of *Cetacea* collected during the voyage of the 'Challenger'; Reports on the Scientific Results of the Voyage of H.M.S. 'Challenger,' Zoology, i. pt. iv. pp. 1–45, pls. i.–iii., 1880. Numerous Cetacean bones, dredged from the bed of the ocean, are described and figured (*l. c.* pp. 33–43, pl. ii.). [See also *Physeteridæ* and *Balœnidæ*.]

Delphinidæ.

Eudelphinus and *Prodelphinus* are new names proposed by Gervais (Beneden & Gervais, *l. c.* p. 601) for the genera *Delphis* and *Clymenia* of Gray.

Tursiops aduncus (pl. xxxiv. figs. 1 & 2) and *T. tursio* (pls. xxiv. & xxv.): their osteology figured, Beneden & Gervais, l. c. *T. brochii*: teeth figured, pl. xxxiv. fig. 10; skull figured, pl. lix. fig. 5, *ibid.*

Phocœna communis: on some points in its anatomy; G. B. Howes, J. Anat. Phys. xiv. pp. 467–473, pl. xxix. The existence of a rudimentary auditory pinna in fœtal specimens of this species and of *Delphinapterus leucas*, is described with figures, as is the anatomy of the laryngeal cartilages. Its osteology figured; Beneden & Gervais, *l. c.* pls. xliii., lv., & lvi. Note on its parturition; S. Jourdain, C. R. xc. pp. 138 & 139.

Lagenorrhynchus leucopleurus, eschrichti (pl. xxxv.), *breviceps, cruciger, leucopleurus, albirostris*, and *asia* (pl. xxxvi.): their osteology figured; Beneden & Gervais, *l. c.*

Lagenorrhynchus albirostris. Note on; T. Southwell, Zool. (3) iv. p. 220.

Steno ? (sp. inc.). A fœtal skull figured; Beneden & Gervais, *l. c.* pl. lxiii. figs. 3 & 3 *a*.

Cephalorrhynchus heavisidii. Its skull figured; *ibid.* pl. xxxvi. figs. 1–1 *b*.

Delphinorrhynchus plumbeus, sinensis, rostratus, and *frontatus.* Their osteology figured ; *ibid.* pl. xxxvii.

Prodelphinus marginatus, tethyos, leucorrhamphus, frœnatus, frontalis, and *roseiventris.* Their osteology figured ; *iid. l. c.* pl. xxxviii.

Delphinus. Teeth and auditory bones figured ; *iid. l. c.* pl. lx figs. 1–8 *a*. *D. delphis, fulvo-fasciatus, tasmaniensis, longirostris, brevimanus,* and *roseiventris*: their osteology figured; *iid. l. c.* pls. xxxix. & xl. *D. lophogenius* and *dationum*: lower jaws figured ; *iid. l. c.* pl. lvii. figs. 10 & 11. *D. delphis* (fig. 1) and *D. tursio* figured, with remarks on their distribution and characters ; W. H. Flower, Tr. Z. S. xi. pp. 1–5, pl. i.

Eurrhinodelphis cocheteuxi and *longirostris.* Their skulls figured ; Beneden & Gervais, *l. c.* pl. lviii.

Priscodelphis productus. Its skull figured; *iid. l. c.* pl. lviii. figs. 3-3 *b*.

Platydelphis canaliculatus. Its skull figured ; *iid. l. c.* pl. lviii. figs. 4–4 *c*.

On the species of *Orca* observed in the European seas; P. J. van Beneden, Mem. Ac. Belg. xliii. Art. 5, pp. 1–32, pls. i.–iv.

Orca gladiator and *capensis.* Their osteology figured; Beneden & Gervais, *l. c.* pls. xlvi., xlvii., xlviii., xlix., & liii. fig. 1.

Orcella breviceps. Its skull figured; *iid. l. c.* pl. xlix figs. 5–5 *b*, & lxiv. figs. 1–2 *c*.

Pseudorca meridionalis and *crassidens.* Their osteology figured ; *iid. l. c.* pls. l. & liii. figs. 2 & 3.

Pseudorca. The lower jaw of an undetermined species figured ; *iid. l. c.* pl. lxiv. fig. 3.

Globicephalus melas. Its osteology figured ; *iid. l. c.* pls. li., lii., liii., & lxiii. figs. 1 & 1 *a*.

Grampus griseus and *rissoanus.* Their osteology figured ; *iid. l. c.* pls. liv. & lxiv.

Neomeris phocœnoides. Its skull figured ; *iid. l. c.* pl. lvi. figs. 1–4.

Champsodelphis macrogenius, acutus, renovi (pl. lvii.), *tetrago*[*nor*]*rhinus, dationum* (pl. lix.), and an undetermined species (pl. lx. figs. 18, 19–19*b*). Their osteology figured ; *iid. l. c.*

Schizodelphis sulcatus. Its osteology figured ; *iid. l. c.* pl. lvii.

Sotalia guyanensis. It osteology figured ; *iid. l. c.* pl. xli.

Beluga albicans. Its osteology figured ; *iid. l. c.* pls. xlii., xliv., & lxiii.

Monodon monoceros. Its osteology and dental structures figured ; *iid. l. c.* pls. xlii., xliv., & xlv. On its thoracic rete mirabile ; H. S. Wilson, J. Anat. Phys. xiv. pp. 377–397, pls. xxii. & xxiii.

Inia geoffrensis. Its osteology figured; Beneden & Gervais, *l. c.* pls. xxix., xxxii., & xxxiii. *I. boliviensis*: skull figured ; *iid. l. c.* pl. xxxiii. fig. 12.

Pontoporia blainvillii. Its osteology figured; *iid. l. c.* pl. xxix. figs. 5–14.

Platanista gangetica. Its osteology figured ; *iid. l. c.* pls. xxx. & xxxi. *P. indi*: skull figured; *iid. l. c.* pl. xxxi. fig. 9.

Cethorrhynchus christolii. Its lower jaw figured; *iid. l. c.* pl. lvii. fig. 12.

Pachyacanthus suessii. Its osteology figured; *iid. l. c.* pl. lx. figs. 9–16.

Physeteridæ.

Ziphius planirostris (pls. xxvii. & xxvii. bis), *Z. longirostris* (pls. xxvii. & xxvii. bis), *Z. becanii*, *tenuirostris*, *medilineatus*, *ungulatus*, *planus*, *angustus*, and *gibbus* (pl. xxvii.): their osteology figured; Beneden & Gervais, *l. c.* *Z. cavirostris*: remarks on this species; W. Turner, Zool. Chall. Exp. i. pt. iv. pp. 27–29. Its osteology figured; Beneden & Gervais, *l. c.* pl. xxii. figs. 6 & 7. *Z. chatamensis*: skull figured; *iid. l. c.* pl. xxi. bis, figs. 5 & 6. *Z. novæ-zealandiæ*: further remarks on this species [*cf.* Zool. Rec. xiii. *Mamm.* p. 15]; J. von Haast, Tr. N. Z. Inst. xii. pp. 241–246, pl. vii., and P. Z. S. 1880, pp. 232–237, pl. xxiii.

Ziphius. An undetermined tooth figured; Beneden & Gervais, *l. c.* pl. lix. figs. 4 & 4 *a*. Skulls and teeth of several figured; *iid. l. c.* pl. xxi.

Euphyseter macleayi. Skeleton figured; *iid. l. c.* pl. xxii. fig. 8.

Mesoplodon bidens. On its occurrence in Denmark; J. Reinhardt, Overs. Dan. Selsk, 1880, pp. 63–72, pl. ii. *M. layardi*: its skull, skeleton, and teeth described and figured; W. Turner, Zool. Chall. Exp. i. pt. iv. pp. 2–26, pls. i. & iii. [*cf.* Zool. Rec. xvi. *Mamm.* p. 17]. *M. sowerbiensis*: its osteology figured; Beneden & Gervais, *l. c.* pls. xxii. & xxvi.

Berardius arnouxi. Its osteology figured; *iid. l. c.* pls. xxi. *bis*, xxiii, & xxiii. *bis*.

Placoziphius duboisi. Its osteology figured; *iid. l. c.* pl. xxvii. figs. 11 & 12.

Belemnoziphius compressus, pl. xxvii. fig. 13, and *recurvus* (pl. xxvii. *bis*, figs. 2 & 2 *). Their rostra figured; *iid. l. c.*

Ziphiopsis phymatodes (pl. xxvii. *bis*, fig. 1) and *servatus* (ibid. fig. 8). Their rostra figured; *iid. l. c.*

Ziphirostrum lævigatum and *turnisiense.* Their rostra figured; *iid. l. c.* pl. xxvii. *bis*.

Aporotus discurtus. Its rostrum figured; *iid. l. c.* pl. xxvii. *bis*, fig. 7.

Physeter australis (pl. xviii.), *macrocephalus* (pls. xviii., xix., & xx.), and *antiquus* (pl. xx.). Their osteology figured; *iid. l. c.*

Meganeuron krefftii. Its atlas figured; *iid. l. c.* pl. xviii. fig. 10.

Hyperoodon butzkopf. Its osteology figured; *iid. l. c.* pls. xviii., xix. xliii., & lxiii. *H. latifrons*: its head figured; *iid. l. c.* pl. xix. *H. rostratum*: note on a specimen of this species; P. J. van Beneden, Bull. Ac. Belg. (2) l. pp. 9–11.

Vlodon grayi. Its osteology figured; Beneden & Gervais, *l. c.* pl. lxii.

Dioplodon seychellensis (pl. xxii. fig. 9, & pl. xxv.), *D. europæus* (pl. xxv.), and *D. densirostris* (pl. xxv.). Their osteology figured; *iid. l. c.*

Dolichodon layardi. Its osteology figured; *iid. l. c.* pl. xxvii.

Kogia breviceps. Its osteology figured; *iid. l. c.* pls. xx. & lxi.

Prophyseter cervicalis. Its osteology figured; *iid. l. c.* pl. xx. fig. 15.

Physodon leccense. A tooth figured; *iid. l. c.* pl. xx. figs. 16–18.

Palæodelphis fusiformis, *grandis*, and *minutus.* Teeth, &c., figured; *iid. l. c.* pl. xx. figs. 19–23.

Scaldicetus caretti. A tooth figured; *iid. l. c.* pl. xx. fig. 24.

Hoplocetus curvidens, crassidens, and *borgerhoutensis.* Teeth figured; *iid. l. c.* pl. xx. figs. 25–28.

Eucetus ambliodon. Teeth figured; *iid. l. c.* pl. xx. figs. 29 & 30.

Dinoziphius rœmdonki. Teeth figured; *iid. l. c.* pl. xx. figs. 31 & 32.

Squalodontidæ.

Squalodon grateloupi, gervaisi, antverpiensis, atlanticus, and *pygmæus.* Their osteology figured; *iid. l. c.* pl. xxviii.

Rhizoprion bariensis. Its osteology figured; *iid. l. c.* pl. xxviii. figs. 8–11.

Stereodelphis brevidens. Its osteology figured; *iid. l. c.* pl. xxviii. figs. 14–17.

Phocodon. Teeth figured; *iid. l. c.* pl. xxviii. figs. 18 & 19.

Arionus servatus. Skull and teeth figured; *iid. l. c.* pl. xxviii. figs. 22–24.

Balænidæ.

Balæna australis (pls. i., ii., & ix. figs. 9 & 10), *B. antipodum* (pl. iii), *B. mysticetus* (pls. iv., v., & vi.), *B. biscayensis* (pl. vii.), *B. primigenius* and *svedenborgi* (pl. viii.): their osteology figured; *iid.* l. c. *B. australis*: remarks on; W. Turner, Zool. Chall. Exp. i. pt. iv. pp. 32 & 33. *B. biscayensis*: on a specimen stranded at Charleston; P. J. Beneden, Bull. Ac. Belg. (2) xlix. pp. 313–315. *B. primigenius,* sp. n. (foss.), Beneden & Gervais, *l. c.* p. 262, pl. viii. figs. 1–8, Antwerp Crag.

On the Norwegian *Balænopteræ*; G. O. Sars, Förh. Selsk. Chr. 1880. [Not seen by the Recorder; *cf.* Zool. Anz. iv.]

Balænoptera laticeps (pl. xi.), *B. rostrata, musculus, sibbaldi* (pls. xii. & xiii.), and *B. schlegeli* (pls. xiv. & xv.): their osteology figured; Beneden & Gervais, l. c. *B. musculus*: on a skeleton of this species; E. G. Zaddach, TB. 53 Vers. Naturf. pp. 214–219. *B. rostrata*: on the ossification of its mandible, and on the fœtal dentition; C. Julin, Arch. Biol. i. pp. 75–136, pls. ii. & iii. *B. sibbaldina* (p. 14), *musculoides, borealina* (p. 15), and *rostratella* (p. 16); P. J. Beneden, Bull. Ac. Belg. (2) xlix., *l. c.*, Antwerp, spp. nn. (foss.).

Megaptera lalandii (pl. ix.) and *M. longimana* (pls. x. & xi.): their osteology figured; Beneden & Gervais, l. c. *M. lalandii*: remarks on; W. Turner, Zool. Chall. Exp. i. pt. 4, pp. 30 & 31. *M. affinis,* sp. n. (foss.), P. J. van Beneden, Bull. Ac. Belg. (2) xlix. p. 13, Antwerp.

Cetotherium rathkii. Its osteology figured; Beneden & Gervais, *l. c.* pl. xvii. figs. 6 & 7.

Cetotherium vandelli, sp. n. (foss.), *iid. l. c.* p. 273, pl. xvii. fig. 8, Portugal.

Plesiocetus hupschi (p. 282, pl. xvi. figs. 17–22, and pl. xvii. figs. 1–3), *burtini* (p. 284, pl. xvi. figs. 10–16), *garopi* (p. 285, pl. xvi. figs. 1–9), *gervaisi* (p. 287, pl. xxi. figs. 23 & 24), and *cortesi* (p. 288, pl. xvii. figs. 4 & 5), spp. nn. (foss.), *iid. l. c.*, Europe.

Burtinopsis (g. n.) *similis* (p. 16) and *minutus* (p. 17), P. J. van Beneden *l. c.*, Antwerp, sp. nn. (foss.)

Plesiocetus brialmonti, sp. n. (foss.), *id. l. c.* p. 18, Antwerp.

Amphicetus (g. n.) *later*, *verus*, *editus* (p. 20), and *rotundus* (p. 21), spp. nn. (foss.), *id. l. c.*, Antwerp.

Heterocetus affinis, sp. n. (foss.), *id. l. c.* p. 21, Antwerp.

Mesocetus (g. n.) *longirostris* (p. 22), *laxatus*, *latifrons*, and *pinguis*, (p. 23), spp. nn. (foss.), *id. l. c.*, Antwerp.

Idiocetus longifrons, g. & sp. n. (foss.), *id. l. c.* p. 24, Antwerp.

Isocetus depauwi, g. & sp. n. (foss.), *id. ibid.*, Antwerp.

GLIRES.

On the phylogeny of the *Glires*; P. Albrecht, Schr. Ges. Königsb. 1880, SB. pp. 31–33.

Anomaluridæ.

Anomalurus orientalis, sp. n., W. Peters, MB. Ak. Berl. 1880, p. 164, pl., Zanzibar.

Sciuridæ.

Sciurus. A list of the various minor groups and species of this genus; E. L. Trouessart, Le Nat. ii. pp. 290–293. *Eo-*, *Hetero-*, *Nanno-*, *Neo-*, *Para-*, *Echino-*, *Tamia-*, *Helio-*, and *Funi- sciurus* are names proposed for new subgenera. Some misprints are corrected, *l. c.* p. 315. Huet reviews the African species of this group, of which he recognizes two sections, *Xerus* and *Sciurus*; N. Arch. Mus. (2) iii. pp. 131–158. Several are described as new, or figured.

Sciurus poensis, figured, Huet, *l. c.* pl. vii. fig. 1. *S. ochraceus*, sp. n., *id. l. c.* p. 154, pl. vii. fig. 2, Bagamoyo, E. Africa. *S. vulgaris*: on its coloration; K. J. Liebe, Zool. Gart. 1880, pp. 97–103. On its history in England; J. A. Harvie-Brown, P. Phys. Soc. Edinb. 1880, pp. 343–348. *S. variegatus* (pl. xi.), *S. hypopyrrhus* (pl. xii.), and *S. æstuans* (pl. xiii., lettered *S. griseogenys*, cf. *infrà*) figured; E. R. Alston, Biol. Centr. Am. Mamm., tab. cit. *S. æstuans*: notes on; O. Thomas, P. Z. S. 1880, p. 400. *S. griseogenys*, which must stand as *S. æstuans*, var. *hoffmanni*, is not distinct from it. *S.* (*Xerus*) *flavus* figured; Huet, *l. c.* pl. vi. fig. 2. *S.* (*Xerus*) *fuscus*, sp. n., *id. l. c.* p. 139, pl. vi. fig. 1, Abyssinia. *S. vortmani*, sp. n. (foss.), E. D. Cope, P. Am. Phil. Soc. xviii. p. 370, Miocene of Oregon.

Spermophilus altaicus. On remains from Thiede; Nehring, Z. ges. Naturw. (3) vi. p. 524.

Arctomys: note on the Himalayan species; W. T. Blanford, P. Z. S. 1880, p. 453 [*cf.* Zool. Rec. xvi. *Mamm.* p. 22]. *A. caudatus*: note on; R. Lydekker, J. A. S. B. xlix. pt. 2, p. 8. *A. bobac*: on fossil remains from Prague; G. Laube, Verh. geol. Reichsanst. 1879, pp. 183–185.

Castoridæ.

Castor fiber. On its habits in Norway; A. H. Cocks, Zool. (3) iv. pp. 233–236 & 497–501.

Myoxidæ.

Myoxus avellanarius. On the histology of the mucous membrane of its stomach; C. Bergonzini, Ann. Soc. Mod. 1879, pp. 127–129, and *l. c.* 1880, p. 177. *M. elegans* (Temminck, *nec* Ogilby) renamed *M. lasiotis*, O. Thomas, P. Z. S. 1880, pp. 40 & 41; it = *M. javanicus* (Schinz), and is not a *Muscardinus*.

Lophiomyidæ.

Lophiomys imhausi recorded from the Keren country, in North Abyssinia, where it is called "Tzechira"; R. Gestro, Ann. Mus. xv. pp. 122 & 123.

Muridæ.

Pachyuromys duprasi (g. & sp. nn.), F. Lataste, Le Nat. 1880, p. 313, Algerian Sahara. Allied to *Gerbillus*, from which it differs chiefly by its fleshy, clavate tail and greatly developed auditory bullæ.

Cricetus accedula. Its reputed occurrence in Asia Minor erroneous; E. R. Alston & C. G. Danford, P. Z. S. 1880, p. 60.

Mus rattus. On its occurrence in Thuringia; Z. ges. Naturw. (3) v. pp. 419–424. *M. huegeli*, sp. n., O. Thomas, P. Z. S. 1880, p. 13, Ovalau, Fiji Islands.

Neotoma ferruginea figured; E. R. Alston, Biol. Centr. Am., Mamm. pl. xvi.

Heteromys desmarestianus (pl. xvii. fig. 1) and *H. longicaudatus* (ibid. fig. 2), figured; *id. l. c.*

Perognathus bicolor, Gray, is a *Heteromys*; E. R. Alston, Ann. N. H. (5) vi. pp. 118 & 119. The correct habitat is Venezuela.

Hesperomys teguina (pl. xiv. fig. 1), *H. sumichrasti* [= *H. salvini*, Tomes] (*ibid.* fig. 2), *H. couesi* (pl. xv. fig. 1), and *H. panamensis* (ibid. fig. 2), figured; E. R. Alston, Biol. Centr. Am., Mamm. *tab. cit. H. nematodon*, sp. n. (foss.), E. D. Cope, P. Am. Phil. Soc. xviii. p. 370, Miocene of Oregon.

Reithrodon. Remarks on the species of this genus; O. Thomas, P. Z. S. 1880, pp. 691–696. One is described as new, *R. alstoni* (p. 691), from Venezuela.

Arvicola incertus and *ibericus*: a comparison of their characters; Z. Gerbe, R. Z. (3) vii. p. 42–47. A new species is indicated, though not described, *l. c.* p. 44, as *A. lusitanicus*. *A. pyrenaicus*: note on; L. Gerbe, Le Nat. i. p. 51 [omitted from Zool. Rec. xvi.]. *A. gerbii*, sp. n., A. de L'Isle & Z. Gerbe; Bull. S. Z. Fr. 1880, p. 49, pl. iv. France: on its occurrence in France; Le Nat. i. p. 51 [omitted from Zool. Rec. xvi.]. *A. blanfordi*, sp. n., J. Scully, Ann. N. H. (5) vi. p. 399, Gilgit, Kashmir.

A. guentheri, sp. n., C. G. Danford & E. R. Alston, P. Z. S. 1880, p. 62, pl. v., Asia Minor. A. *stracheyi*, sp. n., O. Thomas, Ann. N. H. (5) vi. p. 322, Kumaon. *A. ratticeps*: on its occurrence in Holland, F. A. Jentinck, Ned. T. D. v. p. 105 [not seen by the Recorder; *cf.* Zool. Anz. iv. p. 174]. *A. wynnii*, sp. n., W. T. Blanford, J. A. S. B. xlix. pt. 2, p. 244, Punjab, Himalayas.

Dipodidæ.

Alactaga indica: note on; P. L. Sclater, P. Z. S. 1880, pp. 538 & 539. *A. jaculus*: on remains from Thiede; A. Nehring, Z. ges. Naturw. (3) vi. p. 524.

Octodontidæ.

Ctenomys fueginus, sp. n., R. A. Philippi, Arch. f. Nat. 1880, p. 276, pl. xiii., Tierra del Fuego.

Dasyproctidæ.

Dasyprocta isthmica (pl. xviii. figs. 2 & 3) and *D. mexicana* (id., fig. 1) figured; E. R. Alston, Biol. Centr. Am., Mamm.

Leporidæ.

Lepus. On the cranial characters of the species of this genus; C. G. Giebel, Z. ges. Naturw. (3) v. pp. 318–340, pls. viii.–x. *S. variabilis* and *vulgaris*: on their cranial differences; K. T. Liebe, Zool. Gart. 1880, pp. 231–237. *L. diluvianus*: on its specific characters; C. G. Giebel, Z. ges. Naturw. (3) v. pp. 508–510. *L. gabbi* is a good species; E. R. Alston, Biol. Centr. Am., Mamm. pl. xix. *L. netscheri*, sp. n., H. Schlegel, Notes Leyd. Mus. ii. p. 62, Sumatra (the first species of *Lepus* found in any of the Malay Islands). *L. salæ*, sp. n., F. A. Jentinck, Notes Leyd. Mus. ii. p. 57, Benguela. *L. syriacus*: its reputed occurrence in Asia Minor erroneous; C. G. Danford & E. R. Alston, P. Z. S. 1880, p. 64.

Genus incertæ sedis.

Paciculus insolitus, g. & sp. nn. (foss.), E. D. Cope, P. Am. Phil. Soc. xviii. p. 371, Miocene of Oregon (with 3 superior molars, as in the *Muridæ*, with the structure of those of *Dasyprocta* and *Steneofiber*).

PROBOSCIDEA.

Elephantidæ.

Remarks on the "Elephantine Mammals"; R. Owen, P. Geol. Ass. vi. pp. 321–328, pl. ii. (abstract).

Elephas indicus. H. C. Chapman describes the birth of a young Elephant at Philadelphia; the period of gestation is about 650 days. He was enabled to examine the placenta, the general structure of which is described and figured; it is deciduate and zonary, with a supplementary

patch of villi at each end of the chorion; J. Ac. Philad. (2) viii. pp. 413–423, pls. xlviii. & xlix. On its breeding in captivity in North America; E. A. Brown (*in litt.* to P. L. Sclater), P. Z. S. 1880, pp. 222 & 223: the period of gestation was 629 days. On its breeding in captivity and period of gestation;—Heysham, P. Z. S. 1880, pp. 23 & 24. On some minor points in the myology; A. H. Young, J. Anat. Phys. xiv. pp. 289–291. *E. primigenius*: note on the remains of this species from Washington Territory, J. T. Donald, Canad. Nat. (n.s.) ix. pp. 53–56 [omitted from Zool. Rec. xvi.]; on its occurrence in Siberia, H. H. Howorth, Geol. Mag. (2) pp. 408–414, 491–501, & 550–561. *E. africanus*: the female genital organs described and figured; H. C. Chapman, *l. c.* p. 420, pl. i. [*cf.* also Zool. Rec. xvi. *Mamm.* p. 25]

Mastodon angustidens. On remains of; R. Hörnes, Verh. geol. Reichsanst. 1880, pp. 159 & 160.

SIRENIA.

Manatidæ.

Manatus australis. J. Murie has futher observations on its anatomy, and other points, as observed in a specimen lately living in London [*cf.* Zool. Rec. xv. *Mamm.* p. 15]. The brain and the vexed question of the cervical nerves are in particular described; Tr. Z. S. xi. pp. 19–48, pls. v.–ix. Figured from life by Wolf; E. R. Alston, Biol. Centr. Am., Mamm. pl. vii.

Halicore dugong. Notes on a young specimen; R. Hartmann, SB. nat. Fr. 1880, pp. 156–159.

Halitheriidæ.

Rytiodus capgrandi. An entire skeleton of this form was discovered in the Falernian deposits of the Gironde; its skull is described and figured: — Delfortrie, Act. Soc. L. Bord. xxxiv. pp. 137–144, pls. v.–viii.

UNGULATA.

P. Albrecht discusses the phylogeny of the *Ungulata*; Schr. Ges. Königsb. 1880, SB. pp. 22–24.

ARTIODACTYLATA.

Anthracotheriidæ.

Anthracotherium. On remains of this genus; T. Fuchs, Verh. geol. Reichsanst. 1879, pp. 185 & 186.

Mesotherium mirabile, g. & sp. n. (foss.), H. Filhol, C. R. xc. p. 1580, "Phosphorites du Quercy," France. Allied to *Anoplotherium*. [The generic name is pre-occupied by Serres (C. R. xliv. 1857, p. 961) for a genus of fossil Rodents.—Rec.]

Mixtotherium cuspidatum, g. & sp. nn. (foss.), Filhol, C. R. xc. p. 1580, "Phosphorites du Quercy," France.

Plesydacrytherium elegans, g. & sp. nn. (foss.), *id. ibid.*, "Phosphorites du Quercy," France. Allied to *Dacrytherium*.

Hippopotamidæ.

Hippopotamus amphibius. The brain of an adult male described and figured, with notes on the other organs; A. H. Garrod, Tr. Z. S. xi. pp. 11–17, pls. iii. & iv. As regards its cerebral characters, Dr. Krueg's researches on which in the *Ungulata* [cf. Zool. Rec. xvi. *Mamm.* p. 56] are epitomized, the *Hippopotamus* "stands very much by itself." [The last of this lamented author's contributions to zoological science]. On its lachrymal gland; E. Alix. Bull. S. Z. Fr. 1879, p. 117.

Dicotylidæ.

Dicotyles. On the species found in the bone-caverns of Brazil; J. Reinhardt, Vid. Medd. 1879–80, pp. 271–301, pl. vii. (skull of *D. stenocephalus*, Lund). *D. labiatus* figured; E. R. Alston, Biol. Centr. Am., Mamm. pl. x.

Suidæ.

Chœnohyus decedens, g. & sp. nn. (foss), E. D. Cope, P. Am. Phil. Soc. xviii. p. 373, Miocene of Oregon.

Thinohyus trichœnus, sp. n. (foss.), *id. ibid.* p. 373, Miocene of Oregon.

Palæochœrus subœquans, sp. n. (foss.), *id. l. c.* p. 374, Miocene of Oregon.

Oreodontidæ.

Merycopater [cf. Zool. Rec. xvi. *Mamm.* p. 20] *guiotianus*. Further characters given; Cope, *l. c.* p. 375.

Coloreodon (g. n.) *ferox* (p. 375) and *macrocephalus* (p. 376), spp. nn. (foss.), *id. l. c.* Miocene of Oregon.

Genus incertæ sedis.

Boochœrus humerosus, g. & sp. nn. (foss.), E. D. Cope, Bull. U. S. Geol. Surv. v. p 59, Miocene of Oregon [omitted from Zool. Rec. xvi.]. Allied to the *Oreodontidæ* and *Hypertragulidæ*.

Camelidæ.

Poebrotherium sternbergi, sp. n. (foss.), E. D. Cope, Bull. U. S. Geol. Surv. v. p. 59, Miocene of Oregon [omitted from Zool. Rec. xvii.].

Protolabis transmontanus, sp. n. (foss.), *id. l. c.* p. 67, Miocene of Oregon [omitted from Zool. Rec. xvi.].

Camelus (*dromedarius* ?). On its introduction into Australia; W. Stricker, Zool. Gart. 1880, pp. 57–59.

Moschidæ.

Moschus moschiferus. On its occurrence in Tibet; R. Lydekker, J. A. S. B. pt. 2, xlix. pp. 4–6.

Bovidæ.

Bos primigenius: an atlas of this species found near Kiel, and mistaken by its describer for that of *Rhinoceros antiquitatis*, redescribed and figured; K. Möbius, Schr. Ver. Schlesw. Holst. pl. *B. indicus*: on a peculiar race from Senegambia; A. T. de Rochebrune, N. Arch. Mus. (2) iii. pp. 159–165 [separate].

Ovibos moschatus. On a new discovery of its remains; C. Gottsche, Verh. Ver. Hamb. iv. pp. 235–238, pl. [Not seen by the Recorder; *cf.* Zool. Anz. iii. p. 129.]

†*Oreas canna*. On its fœtal membranes; W. Turner, J. Anat. Phys. xiv. pp. 241–243. (It is one of the *Polycotyledontophora*).

Tragelaphus gratus, sp. n., P. L. Sclater, P. Z. S. 1880, p. 452, pl. xliv., Gaboon.

Neotragus kirki, A. Günther, P. Z. S. 1880, p. 17, South Somali Land, *N. damarensis*, l. c. p. 26, Damara Land, spp. nn.

†*Saiga tartarica*. On its existence in France during the quaternary epoch; A. Gaudry, Arch. Z. expér. viii. pp. 405–416.

Ovis aries: on the variability in the number of its mammæ; V. Tayon, C. R. xc. pp. 930–933, 1085 & 1086. †*O. gmelini*: notes on specimens from the Cilician Taurus; C. G. Danford & E. R. Alston, P. Z. S. 1880, pp. 55–59. †*O. montana* must stand as *O. cervina*; E. R. Alston, Biol. Centr. Am., Mamm. p. 111. *O. nahura*: on its systematic position; R. Lydekker, J. A. S. B. xlix. pt. 2, pp. 131–133. †*O.* ("*Caprovis*") *savini*, sp. n. (foss.), E. T. Newton, Geol. Mag. (2) vii. p. 449, "Forest-bed," E. England.

Antilocapridæ.

†*Antilocapra americana*. Observations on the shedding of its horns [*cf.* Zool. Rec. xv. *Mamm.* p. 19], as re-observed in London: W. A. Forbes, P. Z. S. 1880, pp. 540–543 (with woodcuts showing the growth of the new horns).

Camelopardalidæ.

Camelopardalis giraffa. Note on its visceral anatomy; S. Richiardi, Zool. Anz. iii. p. 92, and Atti Soc. Tosc., 1880, P. V. p. 26.

Cervidæ.

Alces machlis. Note on its interdigital glands; R. Morrow, P. N. Scot. Inst. v. p. 161.

Rangifer tarandus. On fossil antlers of this species from the Löss of Vienna; F. Karr, Verh. geol. Reichsanst. 1879, pp. 149–152.

Cervus equinus: note on: A. Günther, P. Z. S. 1880, p. 452. *C. megaceros*: notes on; A. von Pelzeln, Verh. z.-b. Wien, xxix. SB. pp. 29 & 30; on its occurrence in Bohemia; G. C. Laube, Verh. geol. Reichsanst. 1880 p. 113. *C. dawkinsi*, sp. n. (foss.), E. T. Newton, Geol. Mag. (2) vii. p. 450. *C. lu[e]hdorfi*, sp. n., H. Bolau, Abh. Ver. Hamb. 1880, p. 33, pl. v., N. Manchuria; also Zool. Gart. 1880, pp. 268–270,

PERISSODACTYLATA.

Tapiridæ.

Tapirus. The species inhabiting Central America treated of, and their skulls figured; E. R. Alston, Biol. Centr. Am., Mamm. pp. 97–106, pl. viii. *T. dowi* figured, *l. c.* pl. ix.; further note on, *id.* P. Z. S. 1880, p. 187.

Rhinocerontidæ.

On fossil Rhinoceroses in the district of Dusino; M. Barretti, Atti Ac. Tor. xv. pp. 678–682 & 731–734, pl. xvi.

Cadurcotherium minus, sp. n. (foss.), H. Filhol, Bull. Soc. Philom. (7) iii. p. 125, "Phosphorites du Quercy," France.

Rhinoceros mercki: on an entire carcase found near Werchojansk, E. Siberia; L. von Schrenck, Mém. Pétersb. xxvii. No. 7, pp. 1–55, pls. i.–iii. (figures of the head); see also Zool. Gart. 1880, pp. 353–359. *R. tichorrhinus*: J. F. Brandt gives some supplementary information on this species, Mél. Biol. x. pp. 225–232; on its dentition, J. Kiesow, Schr. Ges. Danz. (n.f.) iv. [Not seen by the Recorder, *cf.* Zool. Anz. iii. p. 484.] *R. sondaicus*: note on a supposed example of this species; P. L. Sclater, P. Z. S. 1880, p. 420.

Ceratorrhinus sumatrensis. Notes on a skull from Borneo; W. H. Flower, P. Z. S. 1880, pp. 69 & 70.

Brontotheriidæ.

Astrapotherium patagonicum, g. & sp. nn. (foss.), H. Burmeister, Rep. Arg. iii. p. 520, S. Patagonia.

Equidæ.

On the characteristics of the equine type; G. Tampelini, Ann. Soc. Mod. xiv. pp. 8–46. [Not seen by the Recorder; *cf.* Zool. Anz. iii. p. 484.]

On fossil *Equidæ* from the environs of Constantine; P. Thomas, Rev. Montp. i. pp. 335–351. [Not seen by the Recorder; *cf.* Zool. Anz. iii. p. 129.

Equus. On remains of two fossil species from the Savekenberg, near Quedlinburg: C. G. Giebel, Z. ges. Naturw. (3) v. pp. 518–521.

Equus asinus [vide J. H. Steel, *suprà*, p. 9].

Hippidium spectans, sp. n. (foss.), E. D. Cope, Am. Nat. xiv. p. 223.

Anchitherium australe, sp. n. (foss.), H. Burmeister, Rep. Arg. iii. p. 520, S. Patagonia.

EDENTATA.

P. Albrecht discusses the phylogeny of the *Edentata*; Schr. Ges. Königsb. 1880, SB. pp. 22–24.

Bradypodidæ.

Remarks on the cause of the green colour of the hair of Sloths (due to the presence of a *Chlorococcus*); E. R. Alston, Biol. Centr. Am., Mamm. p. 183.

Cholopus hoffmanni occurs in Ecuador; O. Thomas, P. Z. S. 1880, p. 402.

Dasypodidæ.

Chlamydophorus truncatus. E. W. White describes its habits; P. Z. S. 1880, pp. 8–11.

Tatusia kappleri occurs in Ecuador; O. Thomas, P. Z. S. 1880, p. 402.

T. novem-cincta figured, E. R. Alston, Biol. Centr. Am., Mamm. pl. xx. Further observations on its peculiar placentation, confirmatory of those of A. Milne-Edwards [*cf.* Zool. Rec. xvi. *Mamm.* p. 26], A. Dugès, Ann. Sc. Nat. (6) ix. art. 3, pp. 1 & 2.

Macrotheriidæ.

Ancylotherium gaudrii, sp. n. (foss.), H. Filhol, Bull. Soc. Philom. (7) iii. p. 125, "Phosphorites du Quercy," France.

Limognitherium ingens, sp. n. (foss.), H. Filhol, C. R. xc. p. 1580, "Phosphorites du Quercy," France. Near *Macrotherium*.

"PANTOTHERIA."

According to O. C. Marsh, Am. J. Sci. (3) xx. pp. 238 & 239, the Mesozoic *Mammalia* yet discovered cannot be properly placed in any existing order, but must form a new one, called "Pantotheria." The generalized members of this order were doubtless the forms from which the modern specialized Insectivores and Marsupials, at least, were derived.

Diplocynodon victor, g. & sp. nn. (foss.), *id. l. c.* p. 235, "Atlantosaurus beds," Rocky Mountains.

Dryole[*i*]*stes obtusus*, sp. n. (foss.), *id. l. c.* p. 237, "Atlantosaurus beds," Rocky Mts.

Stylacodon validus, sp. n. (foss.), Marsh, *l. c.* p. 236, "Atlantosaurus beds," Rocky Mts.

Tinodon ferox, sp. n. (foss.), *id. ibid.*, "Atlantosaurus beds," Rocky Mts.

Triconodon bisulcus, sp. n. (foss.), *id. l. c.* p. 237, "Atlantosaurus beds," Rocky Mts.

"ALLOTHERIA."

According to O. C. Marsh, *l. c.*, p. 239, the genera *Plagiaulax* and *Ctenacodon* should be considered as forming a special group to be called "Allotheria." "These are all highly specialized aberrant forms, which apparently have left no descendants."

Ctenacodon serratus [cf. Zool. Rec. xvi. *Mamm.* p. 27]. Additional note on; *id. l. c.* p. 238.

MARSUPIALIA.

Brass, A. Beiträge zur Kenntniss des weiblichen Urogenitalsystems der Marsupialen. Leipzig: 1880, pp. 1–40, 6 pls.

[Not seen by the Recorder; *cf.* Zool. Anz. iii. p. 368.]

E. Alix has a note on the organs of parturition in this group; Bull. Soc. Z. Fr. 1879, p. 118.

Young, A. H. On the Intrinsic Muscles of the Marsupial Hand. J. Anat. Phys. xiv. pp. 149–165.

Didelphyidæ.

Didelphys cinerea (pl. xxi.) and *derbiana* (pl. xxii.) figured; E. R. Alston, Biol. Centr. Am., Mamm.

Dasyuridæ.

Alston, E. R. On *Antechinomys* and its allies. P. Z. S. 1880, pp. 454–461.

Antechinomys, with *Phascologale* (em.), *Antechinus*, and *Podabrus*, form a subfamily, *Phascologalinæ*, of the *Dasyuridæ*. *A. lanigera* is redescribed, with some details on its osteology and visceral anatomy, and figured, *l. c.* pl. xlv.

Dasyurus fuscus, sp. n., A. Milne-Edwards, C. R. xc. p. 1519, Arfak Mountains, New Guinea; see also Ann. N. H. (5) vi. p. 172 [? = *D. albo-punctatus*, Schlegel; *cf.* Zool. Rec. xvi. *Mamm.* p. 27].

Phalangistidæ.

Phascolarctos cinereus alive in London; P. L. Sclater, P. Z. S. 1880, p. 355 (with a woodcut from life).

MACROPODIDÆ.

Palorchestes crassus, sp. n. (foss.), R. Owen, Tr. Z. S. xi. p. 7, pl. ii., Alluvial deposits, Queensland.

GENUS INCERTÆ SEDIS.

Quercytherium tenebrosum, sp. n. (foss.), H. Filhol, Bull. Soc. Philom. (7) iii. p. 123, "Phosphorites du Quercy," France. Compared with *Dasyurus*.

MONOTREMATA.

TACHYGLOSSIDÆ.

The salivary glands described and figured ; H. Viallanes, Ann. Sc. Nat. (6) x. art. No. 2, pp. 1–6, pl. xviii., also Ann. N. H. (5) v. pp. 83 & 84 [cf. Zool. Rec. xvi. *Mamm.* p. 28].

Tachyglossus hystrix. Note on its ova; R. Owen, P. R. Soc. xxx. p. 407.

ORNITHORRHYNCHIDÆ.

Ornithorrhynchus platypus. On the structure of its cochlea; U. Pritchard, P. R. Soc. xxxi. pp. 149–153.

AVES.

BY

HOWARD SAUNDERS, F.L.S., F.Z.S., &c.

As regards important ornithological work, a slight falling-off is, perhaps, perceptible for the year 1880, although there is no diminution, but the reverse, in the amount of trivial magazine literature.

For the principal papers relating to geographical divisions, the following names may be consulted:—

PALÆARCTIC REGION: Alléon, Blasius, Brandt, Brown, Cordeaux, Danford, Dresser, Elwes, Newton, Seebohm, Taczanowski.

ETHIOPIAN: Ayres, Bocage, Cabanis, Fischer, Hartlaub, Reichenow.

ORIENTAL: Brooks, Hume, Legge, Ramsay, Salvadori.

AUSTRALIA AND OCEANIA: Ramsay, Finsch, Layard.

NEARCTIC: Allen, Cory, Coues, Henshaw, Ridgway.

NEOTROPICAL: Allen, Gibson, Godman, Salvin, Sclater, Taczanowski.

For Extinct species, see: Marsh, Owen, Vogt.

For Anatomical and Physiological papers, see: Angelucci, Behrens, Bieletzky, Braun, Budge, Bunge, Clark, Forbes, Gasser, Gadow, Giebel, Hoffmann, Kupffer, Merkel, Nathusius, Schäfer.

The systematic arrangement proposed by P. L. Sclater, in an important paper on "The Present State of the Systema Avium," is given in its place; and, as it appears to the Recorder to be infinitely preferable to any yet propounded, he has adopted its principal features in the present Record.

THE GENERAL SUBJECT, WITH TITLES OF SEPARATE WORKS AND OF THE MORE IMPORTANT PAPERS PUBLISHED IN PROCEEDINGS OF SOCIETIES, &c.

ADAMS, W. H. D., & GIACOMELLI, H. The Bird World described with Pen and Pencil. London: 1880, 8vo, pp. 460.

A popular illustrated work.

Allen, J. A. On Recent Additions to the Ornithological Fauna of North America. Bull. Nutt. Orn. Club, v. pp. 85–92.

References and authorities are cited for 28 species and 10 varieties added and distinguished since 1874.

——. Capture of Escaped Cage-birds having the Appearance of Wild Birds. *Tom. cit.* pp. 119–121.

A very requisite warning against the assumption that in such cases as the above, the specimens have not been artificially introduced.

——. Destruction of Birds by Lighthouses. *Tom. cit.* pp. 131–138.

Reports from 24 lighthouses, on the plan adopted by some British Ornithologists [*cf.* Zool. Rec. xvi. *Aves*, p. 6] show that the loss of life is considerable.

——. Origin of the Instinct of Migration in Birds. *Tom. cit.* pp. 151–154.

——. On the Birds of the Island of Santa Lucia, West Indies. *Tom. cit.* pp. 163–169.

Remarks on three collections sent by Dr. Semper, adding 16 species to those previously made known as inhabiting that island by P. L. Sclater & G. N. Lawrence. The total number is now raised to 56 species. For most important, see *Margarops* [*Turdidæ*], *Orthorrhynchus* [*Trochilidæ*].

——. See also *Grus fratercula* [*Gruidæ*].

Alléon, A. Catalogue des Oiseaux observés aux environs de Constantinople. Bull. Soc. Z. Fr. v. pp. 80–116.

A very interesting contribution, containing much information as to dates of migration and breeding, especially with regard to the forest of Belgrade, which appears to be a great haunt of birds of prey.

Altum, Bernard. Forstzoologie. ii. Vögel. Berlin : 1880, 81 woodcuts.

Angelucci, Arnaldo. Sullo sviluppo e struttura del tratte uveale anteriore dei vertebrati. Atti Acc. Rom. (3) vii. pp. 287–317.

In this purely anatomical paper, the structure of the coats of the eye in Birds is alluded to, with that of other Vertebrates.

Ayres, Thomas. Additional Notes on the Ornithology of the Transvaal. Communicated by J. H. Gurney. Ibis, 1880, pp. 99–112 & 257–273.

The species collected now amount to 357 [*cf.* Zool. Rec. xvi. *Aves*, p. 2]. *Cotile riparia* [*Hirundinidæ*] is recorded for the first time from any African locality south of the Equator.

Baldamus, E. Der Würtzburger Amsel-Prozess und die Amsel. Frankfurt.-a.-M. : 1880.

[Not seen by the Recorder.]

Barnes, H. E. Notes on the Nidification of certain species in the neighbourhood of Chaman, S. Afghanistan. Str. Feath. ix. pp. 212–220.

Behrens, W. Untersuchungen über der Processus uncinatus der Vögel und der Krokodile. Gotha: 1880, 8vo.

Berlepsch, H. v. Preliminary Description of New Birds from South America, and remarks on some described species. Ibis, 1880, pp. 112–114.

The novelties are *Tanagra sclateri*, *Tachyphonus intercedens* [*Tanagridæ*], *Hylocharis cyanea*, subsp. *viridiventris* [*Trochilidæ*], *Centurus terricolor*, *Celeus immaculatus* [*Picidæ*].

Bieletzky, N. F. ["Materials for the Physiology of the Eyes of Birds" is the English rendering of a paper in Russian.] Charkow : 1879, rl. 8vo, pp. 76, 3 pls.

Bicknell, E. P. See *Loxia* [*Fringillidæ*].

Bingham, C. T. Additional Notes on the Birds of Tenasserim, and specially on those of the Thoungyeen Valley. Str. Feath. ix. pp. 138–198 (with sketch-map of district).

——. See also *Bucerotidæ*.

Blanford, W. T. See *Trochalopterum meridionale*, sp. n. [*Timeliidæ*].

Blasius, R., Böhm, R., Rohweder, J., & Schalow, H. iii. Jahresbericht (1878) des Ausschusses für Beobachtungsstationen der Vögel Deutschlands. J. f. O. 1880, pp. 12–97. [*Cf.* Zool. Rec. xv. *Aves*, p. 3.]

The results of the observations of many naturalists in various parts of Germany on a total number of 259 species.

——, Muller, A., Rohweder, J., & Schalow, H. iv. Jahresbericht (1879) des Ausschusses für Beobachtungsstationen der Vögel Deutschlands. *Tom. cit.* pp. 355-407.

Another yearly analysis, treating of 264 species.

Bocage, J. V. Barboza du. Aves de Zambezia e do Transvaal, colligidas pelo Major Serpa Pinto. J. Sc. Lisb. vii. pp. 133–139.

A list of 40 species, none of which are new, and few rare, but interesting for locality, 38 being from the Upper Zambesi, near the Victoria Falls.

——. Critical remarks on A. Reichenow's paper (*infrà*, p. 19), on O. Schütt's collection from Angola : *tom. cit.* pp. 184–191 ; also remarks on E. Oustalet's paper (*cf.* Zool. Rec. xvi. *Aves*, p. 22) on Birds from the Ogowé : *tom. cit.* pp. 192–196.

——. Aves das possessões Portuguezas d'Africa occidental, xix. lista. *Tom. cit.* pp. 229 ; xx. lista, *op. cit.* viii. pp. 62–70.

List of collections sent by Senhor Anchieta from Caconda, the first paper treating of 93 species, 7 of them not having hitherto been recorded from Angola, *Hyphantornis temporalis* [*Ploceidæ*] being described as new ; whilst the second list contains 92 species.

——. Mélanges ornithologiques. Espèces nouvelles, rares, ou peu connues d'Angola et de la Côte de Loango. *Op. cit.* viii. pp. 49–61.

On two collections : one made by Lucan & Petit on the coast of Loango ; the other by Anchieta at Caconda ; 17 species are noticed, *Dendrobatus*

congicus [*Picidæ*], *Criniger multicolor*, *Andropadus minor* [*Pycnonotidæ*], *Drymœca grandis*, *D. modesta* [*Timeliidæ*], *Hyphantornis fusco-castanea* [*Ploceidæ*] being new.

[Bocage, J. V. Barboza du.] Aves de Bolama e da Ilha do Principe. *Tom. cit.* pp. 71 & 72.

Four hitherto unrecorded species from Bolama, and 5 from Prince's Island.

——. See also *Coracias dispar*, sp. n. [*Coraciidæ*].

Böckmann, F. Vogel-albino des Hamburger naturhistorischen Museums. Orn. Centralbl. 1880, pp. 19 & 27.

Bogdanow, M. Die Vögel des Kaukasus. [Abstract and translation by H. Schalow.] J. f. O. 1880, pp. 254–276. [*Cf.* Zool. Rec. xvi. *Aves*, p. 4.]

——. See also *Pteroclidæ*.

Bolau, H. Verzeichniss der von Fr. Dörries auf Askold an der ostsibirischen Küste gesammelten Vögel. J. f. O. 1880, pp. 114–132.

A catalogue of 86 species from Askold and the eastern coast of Siberia. [*Cf.* Taczanowski, *infrà*, p. 27.]

Boucard, A. See *Pseudocolaptes costaricensis*, sp. n. [*Dendrocolaptidæ*].

Brandt, J. F. v. Avium Provinciæ Petropolitanæ Enumeratio. J. f. O. 1880, pp. 225–254.

A succinct catalogue, with observations in Latin on 220 species found in the province of St. Petersburg.

Braun, M. Aus der Entwickelungsgeschichte des Papageiens. I. Rückenmark (pp. 121–123); II. Entwickelung des Mesoderms (pp. 251 & 252). Verh. Ges. Würzb. xiv.

——. See also *Melopsittacus undulatus* [*Psittaci*].

Brayton, A. W. Catalogue of the Birds of Indiana. Trans. Indiana Horticult. Soc. for 1879, pp. 89–166 (Indianapolis: 1880).

[Not seen by the Recorder; see Bull. Nutt. Orn. Club, v. p. 174.]

Brewer, T. M. (the late). Catalogue of Humming Birds in the Museum of the Boston Society of Natural History. P. Bost. Soc. xx. p. 353. [Conclusion: *cf.* Zool. Rec. xvi. *Aves*, p. 5, where reference is erroneously given to Am. Nat. instead of P. Bost. Soc.]

——. See also *Picus* [*Picidæ*].

Brewster, W. See *Vireo philadelphicus* [*Vireonidæ*].

Brogi, S. Catalogus ornithologicus. Siena: 1879, No. 1.

[Not seen by the Recorder.]

Brooks, W. E. Ornithological Observations in Sikhim, the Punjab, and Sind. Str. Feath. viii. pp. 464–489.

Cyornis poliogenys [*Muscicapidæ*], *Phylloscopus sindianus* [*Sylviidæ*], *Calandrella tibetana* [*Alaudidæ*] are described as new; with a copious list and field notes on other species.

[Brooks, W. E.] See also *Phylloscopus burmanicus*, sp. n., *Dumeticola* [*Sylviidæ*], *Schœnicola* [*Timeliidæ*], *Alseonax* [*Muscicapidæ*].

Brown, J. A. Harvie. The Capercaillie in Scotland. Scot. Nat. v. pp. 289–294.

Additional notes elicited by correspondence and notices of the author's book bearing the above title. [*Cf.* Zool. Rec. xvi. *Aves*, p. 5.]

——. The Shiant Islands [between Skye and Lewis] and their Bird Life. Tr. Norw. Soc. iii. pp. 47–60.

An interesting notice of 14 species found in this remote group.

——. Ornithological Journal of the Winter of 1878–79, with collected Notes regarding its effect upon Animal Life, including Remarks on the Migration of Birds in the Autumn of 1878 and the Spring of 1879. P. N. H. Soc. Glasg. Sept. 1879 [pub. 1880].

—— & Cordeaux, J. Report on the Migration of Birds in the Autumn of 1879. Zool. 1880, pp. 161–204.

An important contribution on the above subject, embodying the result of answers to printed forms of inquiry, from 62 lighthouses and light-ships in England and Scotland.

Buchanan, J. H. See *Mergus merganser* [*Anatidæ*].

Budge, Albrecht. Ueber ein Canalsystem im Mesoderm von Hühnerembryonen. Arch. Anat. Phys. 1880, pp. 320–327, pl. xiv.

Bunge, Alex. Untersuchungen zur Entwickelungsgeschichte des Beckengürtels der Amphibien, Reptilien und Vögel. Dorpat: 1880, 8vo, pp. 54, and 1 pl.

Buchholz, Reinhold (the late). Reisen in West-Afrika. Leipzig: 1880, 8vo.

Contains several notices of the Birds observed, and some novel facts on their geographical distribution.

Burbidge, F. W. The Gardens of the Sun, or a Naturalist's Journeys in Borneo. London: 1880, 8vo.

Some interesting details are given respecting the habits of the birds collected.

Cabanis, J. See *Euplectes gierowii*, *Sycobrotus amaurocephalus* [*Ploceidæ*], *Thamnobia munda* [*Sylviidæ*], *Chalcomitra deminuta* [*Nectariniidæ*], *Pentheres insignis* [*Paridæ*], *Trichophorus flavigula*, *T. flaveolus*, *Andropadus gracilis* [*Pycnonotidæ*], *Halcyon pallidiventris* [*Alcedinidæ*], *Bycanistes subquadratus* [*Bucerotidæ*], *Pogonorrhynchus frontatus* [*Capitonidæ*], *Francolinus schuetti* [*Phasianidæ*], *Polymitra* (*Fringillaria*) *major* [*Fringillidæ*], spp. nn.

Campbell, W. D. See *Glaucopis* [*Corvidæ*].

Clark, B. A new Arrangement of the Classes of Zoology founded on the position of the Oviducts and Ovaries. London: 1879 [1880], 4to.

The portion relating to birds is brief, and its scientific value is questionable.

CLARKE, W. E. The Birds of Yorkshire. Tr. York. Nat. Union, i. Series B, pp. 17–48.

[Continuation: *cf.* Zool. Rec. xvi. *Aves*, p. 6.]

——. Ornithological Notes from Yorkshire. Zool. 1880, pp. 353–358.

COLENSO, W. On the Moa. Tr. N. Z. Inst. xii. pp. 63–108, pls. iv. & v.

A full notice of all the New Zealand legends respecting this extinct group of birds, embodying what the author published in 1842, and what he has since learned; all tending to prove that the Moas [*Dinornithidæ*] were extinct before the present New Zealanders came to the islands.

CORDEAUX, JOHN. Ornithological Notes from North Lincolnshire. Zool. 1880, pp. 6–15.

——. See also BROWN, J. A. H.

CORY, C. B. Birds of the Bahama Islands. Boston: 1880, 4to, pp. 350, with 8 coloured plates.

An interesting work supplementing the observations of Bryant & Moore, and comprising notes on 149 species, one of which, *Ardea cyanirostris* [*Ardeidæ*] is described as new. Greater accuracy in some of the scientific names and plates is to be desired.

——. Beautiful and Curious Birds. Pt. i. Oct. 1880. Boston: folio, 2 plates.

The commencement of a gigantic picture-book with appropriate letterpress; species figured in this part are *Didus ineptus* and *Ptiloris paradiseus*.

COUES, ELLIOTT. Notes and Queries concerning the Nomenclature of North American Birds. Bull. Nutt. Orn. Club, v. pp. 95–102.

Criticisms, corrections, and conjectures respecting the names of some 50 genera and species, with rectifications, from the author's point of view.

——. Third Instalment of American Ornithological Bibliography. Bull. U. S. Geol. Surv. v. pp. 521–1066. [*Cf.* Zool. Rec. xvi. *Aves*, p. 7.].—Fourth Instalment—being a List of Faunal Publications relating to British Birds; P. U. S. Nat. Mus. ii. pp. 359–477.

These valuable contributions are only regarded by the author as proof-sheets subject to revision, for which corrections and additions are invited.

——. Sketch of North American Ornithology in 1879. Am. Nat. xiv. pp. 20–25.

——. See also *Empidonax* [*Tyrannidæ*], *Dendrœca kirtlandi* [*Mniotiltidæ*], *Limosa hæmastica* [*Scolopacidæ*], *Phaeton flavirostris* [*Phaetontidæ*], [*Alcidæ*], *Speotyto cunicularia* [*Striges*].

D'ALBERTIS, L. M. New Guinea: what I did and what I saw. London: 1880, 2 vols. 8vo, with maps and illustrations.

A narrative of the author's adventures as a collector, with some interest-

ing details respecting the habits of the birds obtained, especially the *Paradiseidæ*, some of which are figured from drawings by Gould & Hart.

Dalgleish, J. J. List of Occurrences of North American Birds in Europe. Bull. Nutt. Orn. Club, v. pp. 65–74, 141–150, 210–221.

In this compilation, 68 species are enumerated, subject to question, in some cases, as to authenticity and accuracy of identification. A few corrections and additions will be found *op. cit.* vi. p. 63.

Danford, C. G. A further Contribution to the Ornithology of Asia Minor. Ibis, 1880, pp. 81–99, pl. ii. (map).

An itinerary, with interesting notes on the birds observed, of the author's last visit to Asia Minor: the map showing the districts visited on this and previous occasions. Amongst the more interesting species, are *Ibis comata*, *Geronticus calvus* [*Plataleidæ*], *Grus leucogeranus*, and *Perdix cinerea*, the last having apparently a restricted range in Asia Minor.

Davies, William. On some Fossil Bird-Remains from the Siwalik Hills, in the British Museum. Geol. Mag. (2) vii. pp. 18–26. [*Struthionidæ*.]

Deane, Ruthven. Additional Cases of Albinism and Melanism in North American Birds. Bull. Nutt. Orn. Club, v. pp. 25–30 [*cf.* Zool. Rec. xvi. *Aves*, p. 8.]

——. See also *Sterna* [*Laridæ*], *Mareca* [*Anatidæ*].

Deslongchamps, E. Catalogue descriptif des Oiseaux du Musée de Caen appartenant à la famille des *Paradiseidæ*. Annuaire Mus. Hist. Nat. Caen, i. pp. 3–48.

A monographical paper on the 8 species which the author includes in the *Epimachidæ*, and the 25 comprised in the *Paradiseidæ*, with analytical tables and key to the species.

——. Catalogue descriptif des Oiseaux du Musée de Caen appartenant à la famille des Trochilidés. *Tom. cit.* pp. 59–534, pls. ii.–vi.

Another monographical paper, treating of 256 species, with full synonymy, analytical tables, and lithographic illustrations of the generic distinctions.

——. See also *Melanotrochilus*, subg. n. [*Trochilidæ*], *Strigops habroptilus* [*Striges*], *Didunculus strigirostris* [*Dididæ*].

Deyrolle, E. See *Hylonympha* [*Trochilidæ*].

Dixon, C. Rural Bird Life: being Essays on Ornithology. London: 1880, 8vo, pp. 388.

Doig, S. B. Birds'-nesting on the Eastern Narra [Sindh]: Additions and Alterations [to former paper; see Zool. Rec. xvi. *Aves*, p. 8]. Str. Feath. ix. pp. 277–282.

Dresser, H. E. A History of the Birds of Europe, including all the

Species inhabiting the Western Palæarctic Region. Parts lxxvii.–lxxxii.

These parts virtually conclude this important work, as they comprise the reviews of genera and tables of contents. The introduction will form a separate volume. For species figured, see *Pelecanidæ*, *Ardeidæ*, *Colymbidæ*, *Podicepidæ*, *Anatidæ*, *Procellariidæ*, *Phasianidæ*, *Falconidæ*, *Platalæidæ*, *Scolopacidæ*, *Cypselidæ*, *Sturnidæ*, *Alcidæ*, *Picidæ*, *Rallidæ*, *Sylviidæ*, *Fringillidæ*.

Drummond Hay, H. M. Notes on the Birds of the Basin of the Tay and its Tributaries. Scot. Nat. v. pp. 241–255, 295–309, 337–346. [Continuation: *cf.* Zool. Rec. xvi. *Aves*, p. 8.]

Dubois, A. Faune illustrée des Vertébrés de la Belgique. II. Oiseaux. [Not seen by the Recorder.]

Durnford, W. A. Ornithological Notes from North Lancashire. Zool. 1880, pp. 241–246.

Elliott, D. G. A Monograph of the *Bucerotidæ*, or Family of the Hornbills. Pts. vii. & viii. [*Cf.* Zool. Rec. xvi. *Aves*, p. 9.] [*Bucerotidæ*.]

——. See also *Cyanthus* [*Trochilidæ*].

Elwes, H. J. Field-notes on the Birds of Denmark. Ibis, 1880, pp. 385–399.

On the nesting of several species, among which *Ciconia nigra* is perhaps the least known.

Finsch, O. Ornithological Letters from the Pacific. No. i. Ibis, 1880, pp. 75–81, No. ii. pp. 218–220, No. iii. pp. 329–333, No. iv. pp. 429–434.

Interesting remarks on the birds observed on the way to and at the Sandwich Islands; thence to and throughout the Marshall group, where 20 species were noted; thence through the Kingsmill group, from which 19 are recorded.

——. Beobachtungen über die Vögel der Insel Ponapé (pp. 283–296), Kuschai (pp. 296–310), Carolinen. J. f. O. 1880.

From the former island in the Caroline group 32 species are recorded; from the latter 22 species, including *Ptilopus hernsheimi*, sp. n. [*Columbæ*].

——. A List of the Birds in the Island of Ruk in the Central Carolines. P. Z. S. 1880, pp. 574–577.

A list of 29 species collected by J. Kubary in this hitherto almost unvisited island.

Fiori, A. Avifauna del Modenese e del Reggiano. Ann. Soc. Mod. (2), xiv. pp. 88–96, 97–130, 1880.

——. Nuovi Uccelli del Modenese. *Tom. cit.* p. 175.

Fischer, G. A. Briefliche Berichte aus Ost-Afrika. J. f. O. 1880, pp. 187–193.

——. See also *Corythaix reichenowi*, sp. n. [*Musophagidæ*].

Fischer, G. A., & Reichenow, A. Ueber eine dritte Collection von Vogelbälgen aus Ost-Afrika gesammelt von Dr. G. A. Fischer. J. f. O. 1880, pp. 139–144. [*Cf.* Zool. Rec. xvi. *Aves*, p. 10.]

This collection contains 26 species, *Dryoscopus major mossambicus* [*Laniidæ*], *Cinnyris fischeri* [*Nectariniidæ*] being described as new.

——. See also *Myrmecocichla leucolæma*, sp. n. [*Sylviidæ*].

Forbes, W. A. Remarks on Dr. Gadow's Papers on the Digestive System of Birds. Ibis, 1880, pp. 234–237. [*Cf.* Zool. Rec. xvi. *Aves*, p. 11.]

——. Contributions to the Anatomy of Passerine Birds. Part I. On the Structure of the Stomach in certain Genera of Tanagers; P. Z. S. 1880, pp. 143–147. Part II. On the Syrinx and other Points in the Anatomy of the *Eurylæmidæ*; Tom. cit. pp. 380–386. Part III. On some Points in the Structure of *Philepitta* and its Position amongst the *Passeres*; Tom. cit. pp. 387–391.

——. See also *Leptosoma discolor* (anatomy) [*Leptosomidæ*], *Vidua splendens*, *Pytelia wieneri* [*Ploceidæ*], *Eupodotis denhami* [*Otididæ*].

Freke, P. E. A Comparative Catalogue of Birds found in Europe and North America. P. R. Dubl. Soc. ii. (n.s.) pp. 373–416 (April, 1880). [*Cf.* Zool. Rec. xvi. *Aves*, p. 10, where it was prematurely recorded from a separate copy.]

Frenzel, A. See *Coryllis* [*Psittaci*].

Gammie, J. A. Occasional Notes from Sikkim. No. II. [*cf.* Zool. Rec. xiv. *Aves*, p. 9]. Str. Feath. viii. No. 6, pp. 450–456.

Gasser, —. Der Primitivstreifen bei Vogelembryonen. Cassel: 1879. [Not seen by the Recorder,]

——. Die Entstehung der Cloakenöffnung bei Hühner-embryonen. Arch. Anat. Phys. 1880, pp. 296–317, pls. xii. & xiii.

Gadow, Hans. Beiträge zur vergleichenden Anatomie der Muskeln und Nerven des Beckens und der hinteren Extremität der *Ratitæ*. Jena: 1880, rl. 8vo, 5 plates.

Gatcombe, John. Ornithological Notes from Devon and Cornwall. Zool. 1880, pp. 46–49, 247–251.

Gibson, Ernest. Ornithological Notes from the Neighbourhood of Cape San Antonio, Buenos Ayres. Ibis, 1880, pp. 1–38, 153–169.

The continuation and conclusion of a series of interesting papers [*cf.* Zool. Rec. xvi. *Aves*, p. 11]. The descriptions of the breeding-haunts, nests, and eggs of many of the birds observed are especially good; the total number of species enumerated being 61.

Giebel, C. G. Ueber Zähne bei Vogeln. Z. ges. Naturw. (3) v. p. 208.

On Fraisse's investigations respecting the indications of teeth in birds.

——. See also *Megacephalon maleo* (osteology) [*Megapodiidæ*].

GIGLIOLI, E. H. Elenco dei Mammiferi, degli Uccelli e dei Rettili ittiofagi appartenenti alla Fauna italica. Firenze: 1880, pp. 10–14.

Enumerates 63 species of fish-eating birds as found in Italy. Amongst these *Phœnicopterus roseus* is included.

—— & MAZELLA, A. Iconografia dell' Avifauna Italica, ovvero Tavole illustrante le specie di Uccelli che trovansi in Italia. Prato (Toscana): 1880, folio, fasc. iii.–ix. [*Cf.* Zool. Rec. xvi. *Aves* p. 11.]

In these numbers, the quality of the plates hardly warrants special reference.

GILPIN, J. BERNARD. On the semi-annual Migration of Sea Fowl in Nova Scotia. P. N. Scot. Inst. v. pp. 135–151.

An interesting paper, especially as regards the remarks on the causes which have led to the extinction or diminution of such species as the Great Auk and the Labrador Duck.

GIRTANNER, A. See *Cuculus canorus* [*Cuculidæ*], *Lagopus mutus* [*Tetraonidæ*].

GOULD, JOHN (THE LATE). The Birds of New Guinea and the adjacent Papuan Islands, including any new species that may be discovered in Australia. Part xi. Feb. 1880. [*Cf.* Zool. Rec. xvi. *Aves*, p. 12.]

For species figured, see *Dicruridæ*, *Pittidæ*, *Columbæ*, *Paradiseidæ*, *Alcedinidæ*, *Rallidæ*, *Sittidæ*, *Muscicapidæ*, *Campephagidæ*.

——. The Birds of Asia. Part xxxii. July 1st, 1880. [*Cf.* Zool. Rec. xvi. *Aves*, p. 12.]

For species figured, see *Falconidæ*, *Dicruridæ*, *Pittidæ*, *Upupidæ*, *Alcedinidæ*, *Fringillidæ*.

——. A Supplement to the *Trochilidæ*, or Humming Birds. Part i. folio, Aug. 1, 1880.

This was intended to be the first of four parts. For species figured, see *Trochilidæ*.

——. See also *Cynanthus bolivianus*, sp. n., *Pinarolæma buckleyi*, g. & sp. nn. [*Trochilidæ*.]

GRÄSSNER, F. Die Vögel von Mittel-Europa und ihre Eier. Lief. 1–6. Dresden: 1880.

A popular work, with flat, coloured illustrations of eggs, and appropriate letterpress.

GRAY, R. See *Nycticorax* [*Ardeidæ*], *Dafila* [*Anatidæ*].

GURNEY, J. H. Notes on a 'Catalogue of the *Accipitres* in the British Museum,' by R. B. Sharpe (1874). Ibis, 1880, pp. 195–217, 312–329, 462–471. [*Cf.* Zool. Rec. xvi. *Aves*, p. 13.]

The genera whose component species are discussed are *Pernis*, *Regerrhinus*, *Leptodon*, and *Baza* [*Falconidæ*].

——. See also AYRES, T., and *Falco*, *Accipiter*, *Baza*, *Dryotriorchis* [*Falconidæ*], *Nyctea*, *Scops* [*Striges*].

HANF, P. BLASIUS. Ornithologischen Beobachtungen aus Ober-Stiermark. Orn. Centralbl. 1880, pp. 113 & 149.

HART, H. C. Notes on the Ornithology of the British North Polar Expedition, 1875–76. Zool. 1880, pp. 121–129, 204–214.

The author was naturalist to H.M.S. 'Discovery,' and his observations supplement those of Capt. Feilden of H.M.S. 'Alert.'

HARTING, J. E. Hawks and Hawking. Zool. 1880, pp. 273–290.

——. Dr. Lamb's "Ornithologia Bercheria." *Tom. cit.* pp. 313–325.

Dr. Lamb's unpublished Catalogue of the Birds of Berkshire, written in 1814, is now printed with editorial notes.

——. Some Notes on Hawking as formerly practised in Norfolk. Tr. Norw. Sc. iii. pp. 79–94.

——. See also RODD, E. H., and *Actiturus* [*Scolopacidæ*].

—— & ROBERT, L. P. Glimpses of Bird-Life pourtrayed with Pen and Pencil. London: 1880, fo., 20 coloured plates, &c.

A handsome illustrated book, with popular descriptions of familiar birds.

HARTLAUB, G. Ueber einige neue von Dr. Emin Bey, Gouverneur der aequatorial Provinzen Ægyptens, um Lado, Central-Afrika, entdeckte Vögel. J. f. O. 1880, pp. 210–214.

A new genus, *Sorella*, near *Nigrita*, type, *S. eminibey* [sic], sp. n. [*Ploceidæ*], *Dryoscopus cinerascens*, sp. n. [*Laniidæ*], *Acrocephalus albotorquatus*, sp. n. [*Sylviidæ*], *Anthreptes orientalis*, sp. n. [*Nectariniidæ*], are described.

——. On some New Birds Discovered and Collected by Emin Bey in Central Africa, between 5° and 2° N. lat., and 31° and 32° E. long. P. Z. S. 1880, pp. 624–627.

Tricholais flavo-torquata, Cisticola hypoxantha, spp. nn., *Eminia lepida, Drymocichla incana*, gg. & spp. nn. [*Timeliidæ*], *Muscicapa infulata*, sp. n. [*Muscicapidæ*], are described.

——. See also *Ardea rutenbergi*, sp. n. [*Ardeidæ*], *Hyphantica cardinalis*, sp. n. [*Ploceidæ*].

HENSHAW, H. W. Ornithological Report upon Collections made in Portions of California, Nevada, and Oregon. In Wheeler's Ann. Rep. Geogr. Explor. W. of 100th Merid., &c., Appendix L. pp. 282–335, Feb. 1880.

An important treatise on the distribution of species as largely influenced by the climatic conditions on either side of the Sierra Nevada of California and the Cascade Mountains of Oregon, which, with the Rocky Mountains to the east, enclose what may be styled the Middle Faunal Province. The specific validity of many forms is discussed, and the field-notes are, as usual, excellent.

——. See also *Somateria* [*Anatidæ*].

HODEK, E. Ornis und Jagd zwischen Unna und Drina [along the River Save, Bosnia]. MT. orn. Ver. Wien, 1880, p. 2.

Hoffmann, C. K. Zur Morphologie des Schultergürtels und des Brustbeines bei Reptilien, Vögeln [&c.]. Niederl. Arch. Zool. v. pp. 150–233.

Homeyer, E. F. v. Meine ornithologische Sammlung. J. f. O. 1880, pp. 152–157, 277–282.

The first paper contains remarks upon and identifications of some *Fringillidæ*; *Oraegithus indicus* and *Pinicola flammula* being described as new; the second paper treats of the author's specimens of *Emberizidæ*.

——. Ueber das scheinbare und wirkliche Vorrücken mancher Vogelarten. Zool. Gart. 1880, pp. 129–135.

——. Reise nach Helgoland, den Nordseeinseln, Sylt, Lyst, &c. Frankfort-a.-M.: 1880, rl. 8vo.

——. See also *Lanius* [*Laniidæ*].

Hume, A. O. Notes. Str. Feath. viii. pp. 494–500 [May, 1880]; *op. cit.* ix. pp. 226–235, 283–298.

Voluminous criticisms, corrections, and identifications: for some of which see under *Anatidæ*, *Falconidæ*, *Sylviidæ*, *Timeliidæ*, *Fringillidæ*, *Sturnidæ*.

——. Remarks on some Species recently described by W. E. Brooks [*suprà*, p. 4]. Str. F. ix. pp. 96–99.

In the main, the writer approves of the above as valid species.

——. The Birds of the Western Half of the Malay Peninsula. Third Notice. *Tom. cit.* pp. 107–132.

28 species are added to the previous lists [*cf.* Zool. Rec. xvi. *Aves*, p. 14], and *Cyornis frenatus* [*Muscicapidæ*] and *Stachyris poliogaster* [*Timeliidæ*], described as new.

——. A Second List of the Birds of North-eastern Cachar. *Tom. cit.* pp. 241–259.

100 species collected by Mr. J. Inglis are added to the former list [*cf.* Zool. Rec. xiv. *Aves*, p. 12].

—— & Marshall, C. H. T. The Game Birds of India, Burmah, and Ceylon. [Calcutta ?] 1880, vols. ii. & iii. [*Cf.* Zool. Rec. xvi. *Aves*, p. 15.]

These volumes contain the rest of *Perdicidæ*, the *Rallidæ*, *Gruidæ*, *Anatidæ* and *Scolopacidæ*; and also an Appendix, concluding the work, with illustrations as before. Some Addenda and Corrigenda to vol. i. are given in Str. Feath. viii. pp. 489–494, ix. pp. 198–209, reprinted from "The Asian."

Hutton, F. W. See *Anas* [*Anatidæ*].

Ingersoll, Ernest. Nests and Eggs of American Birds. Salem, Mass.: 1880, large 8vo, pt. iv.. [*Cf.* Zool. Rec. xvi. *Aves*, p. 15.]

Jeffries, J. A. See *Bucephala* [*Anatidæ*].

Johnson, O. B. List of the Birds of the Willamette Valley, Oregon. Am. Nat. xiv. pp. 485–491, 635–641 [140 species].

Jones, G. E., & Shulze, Eliza, J. Illustrations of the Nests and Eggs of the Birds of Ohio. Circleville, Ohio : 1880, 4to, pts. ii.-iv. [*Cf.* Zool. Rec. xvi. *Aves*, p. 15].

These three parts contain plates of the nests and eggs of *Cyanospiza cyanea*, *Agelæus phœnicurus*, *Tyrannus carolinensis*, *Quiscalus æneus*, *Turdus migratorius*, *Collurio ludovicianus*, *Sayornis fuscus*, *Thryothorus ludovicianus*, *Sialia sialis*.

Kirk, T. W. Remarks on some curious specimens [albinos and deformities] of New Zealand Birds. Tr. N. Z. Inst. xii. pp. 248 & 249.

——. See also *Hiaticula* [*Charadriidæ*].

Kollibay, P. Ornithologischen Mittheilungen aus Ober-Schlesien. Orn. Centralbl. 1880, pp. 132 & 154.

Kupffer, C., & Benecke, B. Photogramme zur Ontogenie der Vögel. Nova Acta Ac. L.-C. Nat. cur. Leipzig: 1880, 4to, pp. 46, 15 plates.

[Not seen by the Recorder.]

Kutter [Dr.]. Bemerkungen über einige oologische Streitfragen. J. f. O. 1880, pp. 157–187.

Observations on the oological controversy between the author and W. v. Nathusius [*cf.* Zool. Rec. xvi. *Aves*, p. 21]. For reply of the latter see *tom. cit.* pp. 341–346.

Landbeck, — von. See *Geositta antarctica*, sp. n. [*Dendrocolaptidæ*].

Langdon, F. W. See *Helmintophaga cincinnatensis*, sp. n. [*Mniotiltidæ*].

Lawrence, G. N. See *Chrysotis cœligena*, *Chrysotis nichollsi*, *Brotogerys ferrugineifrons* [*Psittaci*], *Melopelia plumbescens* [*Columbæ*], *Margarops dominicensis* [*Turdidæ*], spp. nn.

——, N. T. See *Macrorrhamphus* [*Scolopacidæ*].

Layard, E. L. Notes on the Ornithology of Ceylon. Ibis, 1880, pp. 279–286.

Reminiscences elicited by the perusal of pts. i. & ii. of W. V. Legge's "Birds of Ceylon."

——. Notes on the Avifauna of New Caledonia and the Loyalty Islands. *Tom. cit.* pp. 336–339.

——. Short Notes from New Caledonia. *Tom. cit.* p. 381.

——. See also *Halcyon tristrami*, sp. n. [*Alcedinidæ*].

—— & E. L. C. Notes on the Avifauna of the Loyalty Islands. Ibis, 1880, pp. 220–234.

The species noticed are 48 in number.

——. Notes of a collecting trip in the New Hebrides, the Solomon Islands, New Britain, and the Duke of York Islands. *Tom. cit.* pp. 290–309.

——. See also *Pachycephala assimilis* [*Laniidæ*].

LEGGE, W. V. A History of the Birds of Ceylon. Part iii. *Gallinæ* to *Pelecanidæ*, pp. 731–1237. Title page, Introduction, Index, &c., Sept. 1880, 4to. [*Cf.* Zool. Rec. xvi. *Aves*, p. 17.]

The conclusion of a well planned and admirably executed work. For plates (including some extra) of species figured, see *Phasianidæ*, *Turdidæ*, *Pycnonotidæ*, *Timeliidæ*, *Dicæidæ*, *Hirundinidæ*, *Ploceidæ*, *Sturnidæ*, *Columbæ*. The location of *Turnix* amongst the *Tinamidæ* (p. 761), a family hitherto supposed to be confined to Neotropical America, is an idea at present in advance of general acceptance. The removal of *Strepsilas* from the *Charadriidæ* to the *Scolopacidæ* will be less opposed to current views, but modern systematists will be surprised at finding *Tantalus* with the Spoonbills and Ibises, and also at some remarks on the position of *Phœnicopterus*. A useful coloured physical map and some illustrations of eggs are also given.

——. See also *Ægialitis jerdoni* [*Charadriidæ*].

LEMOINE, V. Notice sur les Oiseaux fossiles des terrains tertiaires inférieurs des environs de Reims. Bull. Soc. Geol. Fr. vii. pp. 398–402.

LILFORD, LORD. See *Larus audouini* [*Laridæ*], *Phasianus reevesi* [*Phasianidæ*], *Phœnicopterus antiquorum* [*Phœnicopteridæ*].

LISTA, RAMON. Exploracion de la Costa Oriental de la Patagonia bajo los auspicios del Gobierno Nacional. Buenos Aires: 1880, sm. 8vo, pp. 67.

Contains a list of the birds observed during the expedition from the Rio Negro to Santa Cruz, by the way of San Antonio and the Chubut.

LISTER, C. E. Field-Notes on the Birds of St. Vincent, West Indies. Ibis, 1880, pp. 38–44.

Observations on 32 species, two of which, both visitants, are additions to G. N. Lawrence's list [*cf.* Zool. Rec. xv. *Aves*, p. 16].

LYDEKKER, R. A Sketch of the History of the Fossil Vetebrata of India. J. A. S. B. xlix. pt. ii. pp. 8–40. For the allusions to Birds see pp. 10, 11, 22, 23, 37.

MADARASZ, JULIUS. See *Phyllopseuste curvirostris*, sp. n. [*Sylviidæ*].

MALM, A. W. See *Lagopotetrix dicksoni* [*Tetraonidæ*], *Dromæus novæhollandiæ* [*Casuarii*].

MARCHAND, A. Notes sur les Poussins des Oiseaux d'Europe. R. Z. (3) vii. pp. 60–63, pls. iii.–vi.

Descriptions of young of *Ibis falcinellus*, *Stercorarius catarrhactes*, *Pelidna cinclus*, *Scolopax major*; but only the plate of the first-named is given in part i. for 1879 [all seen by Recorder up to June, 1881.]

MARMOTTAN, —, & VIAN, J. Liste d'Oiseaux capturés en France, mais rares dans ce pays. Bull. Soc. Z. Fr. iv. pp. 245–250.

MARSCHALL, A. F. Arten der Ornis Austriaco-Hungarica, welche in

West-Sibirien vorkommen; nach Finsch, Brehm, und Graf Karl Waldburg. MT. orn. Ver. Wien, 1880, pp. 18, 28, & 37.

A useful compilation for reference as to localities and dates of the occurrence in Western Siberia of species common to that district and to Central Europe.

[MARSCHALL, A. F.] Arten der Ornis Austriaco-Hungarica in Nord Amerika. *Tom. cit.* pp. 49, 51.

——. Vorkommen von Arten der Ornis Austriaco-Hungarica in Europa. *Tom. cit.* p. 76.

——. Arten der Ornis Austriaco-Hungarica welche ausser Europa vorkommen. *Tom. cit.* p. 89.

MARSH, O. C. See *Odontornithes.*

MAYNARD, C. J. The Birds of Eastern North America, with original Descriptions of all the species which occur East of the Mississippi River between the Arctic Circle and the Gulf of Mexico, with full Notes upon their Habits. [*Cf.* Zool. Rec. xvi. *Aves*, p. 19.] Pts. ix.–xiii. Newtonville, Mass.: 1880, 4to.

MCCHESNEY, C. E. Report on the Mammals and Birds of the General Region of the Big Horn River and the Mountains of Montana Territory. New York: 1879.

MEARNS, EDGAR A. A List of the Birds of the Hudson Highlands, with Annotations. Bull. Essex Inst. xi. pp. 189–204 (April, 1880).

Interesting field-notes, containing some new matter, with dates of arrival and departure of migrants, and other information.

MENZBIER, M. A. See *Tetrastes griseiventris*, sp. n. [*Tetraonidæ*].

MERKEL, FR. Ueber die Endigungen der sensibilen Nerven in der Haut der Wirbelthiere. Rostock: 1880, 4to, 15 plates. [For Birds, see pp. 116–130.]

MERRILL, J. C. See *Leucosticte* [*Fringillidæ*].

MEYER, A. B. Führer durch das königliche zoologische Museum zu Dresden. [For Birds, see pp. 15–40.]

——. [Review of Salvadori's Ornithology of Papuasia and the Moluccas.] J. f. O. 1880, pp. 310–313.

MILNE-EDWARDS, A. Recherches sur la Faune des Régions australes. Ann. Sc. Nat. (6) ix. Nos. 5–6, art. 9. Faune Aviénne, pp. 21–81, pls. xvii.–xx. & map.

The commencement of an important essay on the distribution of Birds in the Southern Ocean. The *Spheniscidæ* are discussed in this portion, and a map shows the geographical distribution of the various genera and species, figures of some of the latter being issued with vol. x.

——. Observations sur les Oiseaux de la région antarctique. C. R. xcv. pp. 211 & 212.

MINOT, H. D. Notes on Colorado Birds. Bull. Nutt. Orn. Club, v. pp. 223–232.

Field-notes on 44 species observed in May and June, at elevations ranging from 5,500 up to 11,000 feet at Pike's Peak and the Seven Lakes.

——. English Birds compared with American. Am. Nat. xiv. pp. 561–565.

[Popular notes on a visit to England; only noticed because the title is somewhat misleading.]

MÖBIUS, K. Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen. Berlin: 1880, 8vo.

A short reference to the birds at pp. 37 & 38.

MÜLLER, A. Meine während der Brutzeit gemachten ornithologischen Beobachtungen am Saltzigen See bei Eisleben. Zool. Gart. 1880, pp. 20–24, 48–53, 82–86.

MULVANY, —. See *Eudyptes* [*Spheniscidæ*].

NATHUSIUS, W. v. Ueber Eier-Dunnschliffe. J. f. O. 1880, pp. 341–346.

NEHRLING, H. v. Beiträge zür Ornis des nördlichen Illinois. J. f. O. 1880, pp. 408–418.

Commencing with the *Turdidæ*, the author notices 30 species of *Passeres* (to be continued).

NELSON, E. W. An afternoon in the vicinity of St. Michael's, Alaska. Bull. Nutt. Orn. Club, v. pp. 33–36.

NEUMANN, M., & GRÜNEWALD, A. Beobachtungs-Notizen über das Jahr 1879. Orn. Centralbl. 1880, pp. 161 & 177.

NEWALD, J. Die Falkenjagd, insbesondere in Niederöstreich. MT. orn. Ver. Wien, 1880, pp. 65 & 71.

Although a description of Falconry in Lower Austria is not, strictly speaking, scientific, it is too interesting to be left unrecorded.

NEWTON, A. A History of British Birds, by the late William Yarrell. 4th edition. Part xiii. London: 1880, 8vo. [*Cf.* Zool. Rec. xv. *Aves*, p. 20.]

This part concludes the *Corvidæ* and, with the *Hirundinidæ*, closes the *Passeres*. The remainder consists of *Cypselidæ*, *Caprimulgidæ*, and a portion of the *Cuculidæ*.

——. A Preface to the New Edition of DESFONTAINES's 'Mémoire sur quelques nouvelles espèces d'Oiseaux des Côtes de Barbarie,' 1789; a fac-simile reproduction by photo-lithography of letter-press and plates, published by the Willughby Society, 1880. [*Cf.* Zool. Rec. xvi. *Aves*, p. 21, and SALVIN, O., *infrà*, p. 21.]

——. On the Migration of Birds, and Messrs. Brown and Cordeaux's Method of obtaining Systematic Observations of the same at Light-houses and Lightships. Rep. Brit. Ass. 1880, p. 605 (abstract).

——. On Hawking near Yarmouth. Tr. Norw. Soc. iii. pt. i. pp. 34–36.

[Newton, A.] See also *Acanthyllis caudacuta* [*Cypselidæ*], and articles 'Grebe,' 'Greenfinch,' 'Grosbeak,' 'Grouse,' 'Guacharo,' 'Guan,' 'Guillemot,' 'Guinea-fowl,' 'Gull,' 'Harpy,' 'Harrier,' 'Hawfinch,' 'Hawk,' 'Heron,' in Encyclopædia Britannica, 9th ed. vol. xi. 1880.

Ninni, A. P. Materiali per una Fauna Veneta. I.–VI. *Aves*. Venezia: 1880, 8vo.

[Not seen by the Recorder.]

Oates, E. W., in "Ornithology," in the British Burma Gazetteer, vol. i. chap. xvii. pp. 569-604 (Rangoon : 1880, large 8vo), remarks upon the Birds of Burma and their distribution, with a list of 771 species.

Ober, F. A. Camps in the Caribbees : the Adventures of a Naturalist in the Lesser Antilles. Boston, New York, and Edinburgh : 1880, 8vo.

A most interesting and graphic narrative by this Smithsonian collector, of his experiences in travel and natural history. The purely ornithological facts have already been given by G. A. Lawrence [*cf.* Zool. Rec. xv. *Aves*, pp. 15 & 16, xvi. *Aves*, p. 16], but the present work contains many important details.

——. Ornithological Explorations of the Lesser Antilles. Bull. Essex Inst. xi. pp. 39–42.

Olivier, E. Essai sur la faune de l'Allier. Catalogue raisonné des Animaux sauvages observés jusqu' à ce jour dans ce Département, 1re partie, Vertébrés. Moulins : 1880, 8vo.

180 species of birds are recorded, pp. 24–61.

——. Supplement à l'essai sur la faune de l'Allier. Le Nat. 1880, p. 298.

Oustalet, E. Sur une collection des Oiseaux de la Patagonie et du Chili. Rev. Bordelaise [1879], No. 26.

——. See also *Cyanalcyon quadricalor*, sp. n. [*Alcedinidæ*], *Ptilopus marchii*, sp. n. [*Columbæ*], *Talegallus bruijni*, sp. n., *Æpypodius*, subg. n. [*Megapodiidæ*], *Drepanornis bruijni*, sp. n. [*Paradiseidæ*], *Cyclopsittacus salvadorii*, sp. n. [*Psittaci*], *Chloromyias laglaizii*, *Pomareopsis semi-atra*, gg. & spp. nn. [*Muscicapidæ*], *Ninox reyi*, sp. n. [*Striges*], *Buceros montani*, sp. n. [*Bucerotidæ*].

Owen, R. On the Skull of *Argillornis longipennis*. J. G. Soc. xxxvi. pp. 23–26, pl. ii.

In a former paper [*cf.* Zool. Rec. xv. *Aves*, p. 21], the humerus was described from the Eocene clay of Sheppey, which has now yielded a fragmentary cranium. The position of the genus was then supposed to be nearest to *Diomedea*, and it was placed by the Recorder amongst the *Procellariidæ* ; but these recently discovered remains indicate the existence of teeth in the bill, although in other points it differs materially from *Odontopteryx* [*Odontornithes*].

Patterson, R. L. The Birds [pp. 9–188], Fishes, and Cetacea commonly frequenting Belfast Lough. London and Belfast: 1880, 8vo.

Pelzeln, A. v. Bericht über die Leistungen in der Naturgeschichte der Vögel während des Jahres 1878. Arch. f. Nat. 1879 [pt. 5, published 1880], pp. 381-468. —— während des Jahres 1879; *op. cit.* 1880, pt. 4, pp. 1–96.

Records of annual ornithological literature, executed with the author's usual care.

——. Ueber eine fünfte Sendung von Vögeln aus Ecuador. Verh. z.-b. Wien, xxix. pp. 525 & 526.

This further collection [*cf.* Zool. Rec. xv. *Aves*, p. 22], made by L. Sodiro, contains no new species.

——. Ueber eine von Herrn Dr. Breitenstein gemachte Sammlung von Säugethieren und Vögeln aus Borneo. *Tom. cit.* [Birds] pp. 528–532.

A collection containing several rare and interesting species. *Platysmurus schlegeli* [*Corvidæ*], from Sumatra, is here described as new.

——. Ueber die Ergebnisse der Reise des Herrn Alois Kraus nach Aegypten, Sumatra, und Java. Zool. Garten, 1880, [Birds] pp. 42 & 43. [14 species.]

——. Raubvögeln aus Syrien. MT. orn. Ver. Wien, 1880, p. 10.

Picaglia, —. Avifauna del Modenese. Ann. Soc. Mod. (2) xiv. Disp. 1–2.

Pleske, T. See Russow, V.

Powell, Wilfred. See *Casuarius bennetti* [*Casuarii*].

Ramsay, E. P. Contributions to the Ornithology of New Guinea. Pt. vi. P. Linn. Soc. N. S. W. iv. pp. 464–470 [*cf.* Zool. Rec. xvi. *Aves*, p. 23].

Amongst the new and rare birds obtained by Mr. Goldie, *Astur brachyurus* [*Falconidæ*], *Ninox terricolor* [*Striges*], *Piezorrhynchus melanocephalus* [*Muscicapidæ*], *Sericornis* ? *fulvipectoris* [*Sylviidæ*], *Myzomela forbesi* [*Meliphagidæ*], spp. nn., *Otidophaps nobilis* var. n. *cervicalis* [*Columbæ*], are described.

——. See also *Lalage* [*Campophagidæ*].

Ramsay, R. G. Wardlaw. Contributions to the Ornithology of Sumatra: Report on a Collection from the Neighbourhood of Padang. P. Z. S. 1880, pp. 13–16, pl. i.

This collection made by Mr. Carl Bock consisted of 166 species, 7 of which do not appear to have hitherto been recorded from Sumatra, and 3 more, *Dicrurus sumatranus* [*Dicruridæ*], *Turdinus marmoratus* [*Timeliidæ*], *Myiophoneus castaneus* [*Turdidæ*], are described as new, the last being figured.

——. Ornithological Notes from Afghanistan, No. II. On the Birds of the Hariab District. Ibis, 1880, pp. 45–71.

The conclusion of the author's paper on the birds of the Peiwar Kotal district [*cf.* Zool. Rec. xvi. *Aves*, p. 24], the total number of species recorded being 88.

RATHBUN, F. R. Bright Feathers; or, Some North American Birds of Beauty. Pt. i., 4to, pp. 24, with one coloured plate. Auburn, N.Y.: 1880.

A picture-book of slight scientific or artistic merit.

REICHENAU, W. VON. Die Nester und Eier der Vögel in ihren natürlichen Beziehungen betrachtet. Leipzig: 1880, 8vo, pp. 110.

REICHENOW, A. Ueber eine Vogelsammlung aus Malange in Angola, eingesandt von dem Reisenden Otto Schütt. MT. african. Ges. i.

Not obtainable by the Recorder. From a review by J. V. B. du Bocage (*suprà*, p. 3), the collection appears to contain 56 species, *Upupa africana major* being described as a new sub-species [*Upupidæ*].

——. Vogelbilder aus fernen Zonen [*cf.* Zool. Rec. xv. *Aves*, p. 23], pts. iii.–vi. pls. vii.–xviii. Cassel: folio.

Coloured plates of Parrots, with descriptive text.

——. Die wissenschaftlichen Benennungen der Vögel. Orn. Centralbl. 1880, pp. 25, 68, 156, 164.

——. Vögel der Vorwelt. Orn. Centralbl. 1880, pp. 129 & 145.

——. See also FISCHER, G. A., and *Chrysotis apophoenica*, sp. n. [*Psittaci*] *Treron schalowi*, sp. n. [*Columbæ*], *Barbatula fischeri*, sp. n. [*Capitonidæ*].

——, & SCHALOW, H. Compendium der neu beschriebenen Gattungen und Arten. J. f. O. 1880, pp. 97–102, 194–209, 314–324.

——. *Aves*: in Zool. JB. Neap. 1879. Leipzig: 1880, pp. 1108–1161.

REIN, J. J. Japan, nach Reisen und Studien im Auftrage der königlich Preussichen Regierung dargestellt. Erster Band. Natur und Volk des Mikadoreiches. Leipzig: 1881 [1880].

For a general notice of the Birds of Japan, see pp. 207–212.

REINHARDT, J. See *Lanius* [*Laniidæ*].

REMOUCHAMPS, E. See *Rhea americana* [*Struthiones*].

RIDGWAY, ROBERT. On Six Species of Birds new to the Fauna of Illinois, with Notes on other Rare Illinois Birds. Bull. Nutt. Orn. Club, v. pp. 30–32.

6 species are enumerated, with remarks on 6 others.

——. On Current Objectionable Names of North American Birds. *Tom. cit.* pp. 36–38.

——. Notes on the American Vultures (*Sarcorrhamphidæ*), with Special Reference to their Generic Nomenclature. *Tom. cit.* pp. 77–84.

The author argues for the adoption of the family name *Sarcorrhamphidæ* instead of that of *Cathartidæ*, and discusses the component genera, adding remarks on several little known species, the validity of some of which has been disputed [*Cathartidæ*].

[Ridgway, Robert.] Revisions of Nomenclature of certain North American Birds. P. U. S. Nat. Mus. 1880, pp. 1–16.

Taking E. Coues's Check-list of 1873 as a basis, the author reviews the changes already made, and institutes many others: a total number of upwards of 80 alterations, which cannot possibly be noticed in detail. Several geographical races are distinguished by unwieldly trinomials, the principal being in the *Turdidæ*, *Fringillidæ*, *Corvidæ*; *Phalænoptilus* [*Caprimulgidæ*] and *Nomonyx* [*Anatidæ*] are made new genera. For changes noted by the Recorder, see also under *Corvidæ*, *Striges*, *Mniotiltidæ*.

——. See also *Peucæa* [*Fringillidæ*], *Buteo harlani*, *Hierofalco gyrfalco obsoletus* [*Falconidæ*], *Sterna caspia* [*Laridæ*], *Ardea occidentalis* [*Ardeidæ*], *Alcidæ*, *Rallus longirostris* [*Rallidæ*], *Macrorrhamphus*, *Arquatella couesi*, sp. n. [*Scolopacidæ*], *Grus fraterculus* [*Gruidæ*], *Helmintophaga* [*Mniotiltidæ*].

Roberts, T. S. See *Grus* [*Gruidæ*].

Roberts, T. S., & Benner, F. A Contribution to the Ornithology of Minnesota. Bull. Nutt. Orn. Club, v. pp. 11–20.

A collecting trip from June 5th–20th, mostly on prairie ground with little timber, produced 86 species.

Rodd, E. H. The Birds of Cornwall and the Scilly Islands. Edited, with an Introduction, Appendix, and Brief Memoir, by J. E. Harting. London: 1880, 8vo, pp. 320.

An interesting and well edited contribution on the ornithology of a county which has added several rare species to the British list.

Ruhmer, G. Beitrag zur Ornithologie des Werrathales in Thüringen. J. f. O. 1880, pp. 144–148.

Russ, Carl. Die fremländischen Stubenvögel [*cf.* Zool. Rec. xvi. *Aves*, p. 26]. Pts. 7–10, published in 1880, conclude the work.

Russow, V. Die Ornis Ehst-, Liv-, und Curlands, mit besonderer Berücksichtigung der Zug- und Brut-verhältnisse. Nach dem Tode des Verfassers herausgegeben von Th. Pleske. Arch. Nat. Livl. (2) ix. pp. 1–214, and 5 tables.

An interesting catalogue of 280 species recorded from these little-known Russian Provinces, although the matter might easily have been compressed into a fourth of the actual space.

Salvadori, T. Prodromus Ornithologiæ Papuasiæ et Moluccarum. viii. *Campophagidæ*, *Artamidæ*, *Dicruridæ*, *Laniidæ*. Ann. Mus. Genov. xv. pp. 32–48.

Thirty-six species of the first (with *Edoliisoma neglectum*, sp. n.), 3 of the second, 10 of the third, and 49 of the fourth families (with *Pachycephala miosnomensis*, sp. n.), are enumerated.

——. Remarks on two recently-published Papers on the Ornithology of the Solomon Islands. Ibis, 1880, pp. 126–131.

The papers noticed are by E. R. Ramsay [*cf.* Zool. Rec. xvi. *Aves*,

p. 24] and by H. B. Tristram [*cf.* tom. cit. p. 34], and some stringent observations are made upon the nomenclature of E. P. Ramsay, to which the Recorder has already alluded. For H. B. Tristram's reply, see Ibis, 1880, p. 246.

[Salvadori, T.] Ornitologia della Papuasia e delle Mollucche. Mem. Acc. Tor. 1880, [sep. copy, pp. xii. & 569].

The first portion of this important work contains the preface, full descriptions of 255 species of *Accipitres*, *Psittaci*, and *Picariæ*, and an index.

——. See also *Collocallia* [*Cypselidæ*].

Salvin, O. A List of Birds collected by the late Henry Durnford during his last Expedition to Tucuman and Salta. Ibis, 1880, pp. 351–364; [his diary] pp. 411–429, with map.

In the former 54 species are enumerated, *Cyclorrhis altirostris* [*Vireonidæ*] being described as new, and three [*Fringillidæ* (2), *Tyrannidæ*] are figured. The latter paper is probably intended to be considered as 'In Memoriam.'

——. A Preface to the New Edition of Sir Andrew Smith's 'Miscellaneous Ornithological Papers' [on the Birds of South Africa], a reprint in facsimile, published by the Willughby Society: 1880.

——. Notes [natural history] on Capt. Markham's "Visit to the Galapagos Islands." P. R. Geogr. Soc. (n.s.) ii. pp. 755–758.

——, & Godman, F. D. On the Birds of the Sierra Nevada of Santa Marta, Colombia. Ibis, 1880, pp. 114–125, 169–178, pls. iii.–v.

Three later consignments [*cf.* Zool. Rec. xvi. *Aves*, p. 27] from Mr. F. A. A. Simons are here noticed, the novelties being *Basileuterus conspicillatus* [*Mniotiltidæ*], *Pœcilothraupis melanogenys* (fig.), *Buarrhemon melanocephalus* [*Tanagridæ*], *Ochthœca poliogastra* [*Tyrannidæ*], *Rhamphomicron dorsale* (fig.), *Oxypogon cyanolœmus* (fig.) [*Trochilidæ*].

—— & ——. Biologia Centrali-Americana; or, Contributions to the Fauna and Flora of Mexico and Central America. London: 1880, 4to. Zoology, *Aves*, pt. iii. pp. 57–80, pl. v.: pt. iv. pp. 81–104, pls. vi. & vii.; pt. vi. pp. 105–128, pl. viii. [*Cf.* Zool. Rec. xvi. *Aves*, p. 28.]

These further instalments comprise the remainder of the *Paridæ*, the *Sittidæ*, *Certhiidæ*, *Troglodytidæ* (pls., and *Thryothorus* spp. nn.), *Motacillidæ*, and a portion of the *Mniotiltidæ* (pls.).

—— & ——. See also *Otidophaps regalis*, sp. n. [*Columbæ*].

Sandeman, E. F. See *Indicator* [*Indicatoridæ*].

Saunders, Howard. On the Sea-Birds obtained during the Voyage of Lord Lindsay's Yacht 'Venus' from Plymouth to Mauritius in 1874 P. Z. S. 1880, pp. 161-165.

The species, mostly *Procellariidæ*, are 18 in number, and the exact position of the place of capture of each specimen having been accurately recorded, data are thus furnished for estimating the range of many pelagic birds.

[SAUNDERS, HOWARD.] On the Skuas and some other Birds observed in the Shetland Islands. Zool. 1880, pp. 1–6.

SCHÄFER, E. A. On the Structure of the Immature Ovarian Ovum in the Common Fowl. . . . P. R. Soc. xxx. pp. 237–250, pl. ii.

SCHALOW, H. See REICHENOW, A., BLASIUS, R., BOGDANOW, M.

SCHLEGEL, H. Mus. P.-B. viii. Monographie 41: *Tinami, Megapodii*.

30 species of the former [comprising the whole order *Cypturi*] and 18 of the latter are recognized and treated.

——. See also *Megapodius sanghirensis*, sp. n. [*Megapodiidæ*], *Malia grata* sp. n. [*Timeliidæ*].

SCHMIDT, MAX. On the Duration of Life of the Animals in the Zoological Gardens at Frankfort-on-the-Main. P. Z. S. 1880 [*Aves*] pp. 308–318.

SCLATER, P. L. Supplementary Notes on the Curassows now or lately living in the [Zoological] Society's Gardens. Tr. Z. S. x. pp. 543–546, pls. lxxxix.–xcv. [*cf.* Zool. Rec. xii. p. 53]. For species figured, see *Cracidæ*.

——. A Monograph of the Jacamars and Puff-Birds, or Families *Galbulidæ* and *Bucconidæ*. Pts. ii.–iv. London: 1880, 4to [*cf.* Zool. Rec. xvi. *Aves*, p. 29].

10 species of *Galbulidæ* and 19 of *Bucconidæ* are figured.

——. On a Fifth Collection of Birds made by the Rev. G. Brown, C.M.Z.S., on Duke-of-York Island and in its Vicinity. P. Z. S. 1880, pp. 65–67, pls. vi.–viii. [*cf.* Zool. Rec. xvi. *Aves*, p. 29].

The above collector has his headquarters on Duke-of-York Island, but the entire collection, consisting of 13 species, is from Kabakadai, on the coast of the island of New Britain. *Megalurus interscapularis* [*Timeliidæ*], *Pœcilodryas æthiops* [*Muscicapidæ*], *Munia melæna* [*Ploceidæ*], *Rallus insignis* [*Rallidæ*], are described as new and figured.

——. List of the Certainly Known Species of *Anatidæ*, with Notes on such as have been Introduced into the Zoological Gardens of Europe, and Remarks on their Distribution. *Tom. cit.* pp. 496–536.

In this important monographical revision, the *Anatidæ* are arranged in 9 subfamilies:—*Anseranatinæ*, *Cereopsinæ*, *Anserinæ*, *Cygninæ*, *Anatinæ*, *Fuligulinæ*, *Erismaturinæ*, *Merganettinæ*, *Merginæ*; the recognized species being about 176, of which number 94 have been kept in confinement, and 50 have bred in captivity. Their geographical distribution is described, and the rare species and those desirable for introduction are indicated.

——. Notes upon some West Indian Birds. Ibis, 1880, pp. 71–75, pl. i.

Remarks on 7 species, 1 of which, *Margarops sanctæ-luciæ* [*Turdidæ*], is described as new, and a new genus, *Catharopeza*, is instituted for *Leucopeza bishopi* [*Mniotiltidæ*], the species and the generic distinctions being also illustrated.

[Sclater, P. L.] Remarks on the Present State of the Systema Avium. *Tom. cit.* pp. 340–350, 399–411.

The author enumerates the arrangement as set forth in the 'Nomenclator,' and points to the improvements of which it is susceptible. His arrangement appears to be the best which has hitherto been set forth, and as the Recorder has adopted its main features in the present volume, it is advisable to give the following synopsis:—

Subclass CARINATÆ.

I.—PASSERES.

1. Oscines.

A. *Laminiplantares.*

1. *Dentirostres.*
2. *Latirostres.*
3. *Curvirostres.*
4. *Tenuirostres.*
5. *Conirostres.*
6. *Cultirostres.*

B. *Scutiplantares.*

(*Alaudidæ.*)

2. Oligomyodæ.

(New World)
Oxyrhamphidæ, Tyrannidæ, Pipridæ, Cotingidæ, Phytotomidæ.

(Old World)
Pittidæ, Philippitidæ.

Eurylæmidæ.

3. Tracheophonæ (New World).

Dendrocolaptidæ, Formicariidæ, Pteroptochidæ.

4. Pseudoscines.

Atrichiidæ, Menuridæ (both Australian).

II.—PICARIÆ.

1. Pici.

1. *Picidæ.*
2. *Iyngidæ.*

2. Cypseli sive Macrochires.

1. *Trochilidæ.*
2. *Cypselidæ.*
3. *Caprimulgidæ.*

3. Anisodactylæ.

1. *Coliidæ.*
2. *Alcedinidæ.*
3. *Bucerotidæ*
4. *Upupidæ.*
5. *Irrisoridæ.*
6. *Meropidæ.*
7. *Momotidæ.*
8. *Todidæ.*
9. *Coraciidæ.*
10. *Leptosomidæ.*
11. *Podargidæ.*
12. *Steatornithidæ.*

4. Heterodactylæ.

Trogonidæ.

5. ZYGODACTYLÆ.

Galbulidæ, Bucconidæ, Rhamphastidæ, Capitonidæ, Indicatoridæ.

6. COCCYGES.

Cuculidæ, Musophagidæ.

III.—PSITTACI.

1. *Cacatuidæ.* 2. *Stringopidæ.* 3. *Palæornithidæ.* 4. *Psittacidæ.*

IV.—STRIGES.

Strigidæ, Asionidæ.

V.—ACCIPITRES.

Falconidæ, Cathartidæ, Serpentariidæ.

VI.—STEGANOPODES.

Fregatidæ, Phaethontidæ, Pelecanidæ, Phalacrocoracidæ, Plotidæ.

VII.—HERODIONES.

Ardeidæ, *Ciconiidæ,* (including *Tantalus*) *Platalæidæ* { *Platalea.* *Ibis.*

VIII.—ODONTOGLOSSÆ.

Phœnicopteridæ.

IX.—PALAMEDEÆ.

Palamedeidæ.

X.—ANSERES.

Anatidæ.

XI.—COLUMBÆ.

Carpophagidæ, Columbidæ, Gouridæ, Didunculidæ.—DIDIDÆ.

XII.—PTEROCLETES. *Pteroclidæ.*

XIII.—GALLINÆ. *Tetraonidæ, Phasianidæ, Cracidæ, Megapodiidæ.*

XIV.—OPISTHOCOMI. *Opisthocomidæ.*

XV.—HEMIPODII. *Hemipodiidæ.*

XVI.—FULICARIÆ. *Rallidæ, Heliornithidæ.*

XVII.—ALECTORIDES. { *Aramidæ, Eurypygidæ, Gruidæ, Psophiidæ, Cariamidæ, Otididæ.*

XVIII.—LIMICOLÆ. { *Œdicnemidæ, Parridæ, Charadriidæ, Chionididæ, Thinocoridæ, Scolopacidæ.*

XIX.—GAVIÆ. *Laridæ.*

XX.—TUBINARES. *Procellariidæ.*

XXI.—PYGOPODES. *Colymbidæ, Alcidæ.*

XXII.—IMPENNES. *Spheniscidæ.*

XXIII.—CRYPTURI. *Tinamidæ.*

Subclass RATITÆ.

XXIV.—APTERYGES. *Apterygidæ.*

XXV.—CASUARII. *Casuariidæ.*

XXVI.—STRUTHIONES. *Struthionidæ.*

[Sclater, P. L.] On the Classification of Birds. Rep. Brit. Ass. 1880, pp. 606–609.

——. See also *Chrysotis bodini, C. erythrura, C. cœligena, C. dufresniana, C. apophœnica, Cacatua ophthalmica* [*Psittaci*], *Tyrannus* [*Tyrannidæ*], *Conothraupis*, g. n. [*Tanagridæ*], *Rallus sulcirostris* [*Rallidæ*], *Numida* [*Phasianidæ*], *Pauxis galeata* [*Cracidæ*].

——, & Salvin, O. On New Birds Collected by Mr. C. Buckley in Eastern Ecuador. P. Z. S. 1880, pp. 155–161, pls. xvi. & xvii.

The collection, consisting of upwards of 10,000 skins referable to nearly 800 species, was formed on the upper branches of the River Pastaza and the spurs between it and the Bobonaza. In addition to many rarities, it contains the following 19 species here described as new: *Hylophilus fuscicapillus* [*Vireonidæ*], *Nemosia chrysopis* [*Tanagridæ*], *Platyrrhynchus senex, Serphophaga albo-grisea, Syristes albo-cinereus, Myiochanes nigrescens* [*Tyrannidæ*], *Heteroocercus aurantiivertex* [*Pipridæ*], *Ptilochloris buckleyi*, (fig.) [*Cotingidæ*], *Automolus dorsalis* [*Dendrocolaptidæ*], *Dysithamnus subplumbeus, Herpsilochmus frater, Myrmotherula spodionota, Terenura humeralis, Hypocnemis stellata, H. lepidonota, Pithys melanosticta, Grallaria dignissima* (fig.) [*Formicariidæ*], *Celeus spectabilis* [*Picidæ*], *Porzana œnops* [*Rallidæ*].

Sedgwick, A. Development of the Kidney in its relation to the Wolffian body in the Chick. Q. J. Micr. Sc. 1880, pp. 146–166, with 2 plates.

——. On the development of the structure known as the 'glomerulus of the head kidney' in the Chick. P. Cambr. Phil. Soc. iii. pp. 3–6.

Seebohm, H. Contributions to the Ornithology of Siberia. Ibis, 1880, pp. 179–195.

This conclusion [*cf.* Zool. Rec. xvi. *Aves*, p. 30] of an important series, contains remarks on 5 small collections from the Yenissei, and on Dr.

Théel's report. The observations on *Sturnus vulgaris* and allies, *Lanius homeyeri* and congeners, and *Cinclus*, are especially full and interesting.

[Seebohm, H.] Siberia in Europe: a Visit to the Valley of the Petchora in North-east Russia, with Descriptions of the Natural History, Migration of Birds, &c.; with Maps and Illustrations. London: 1880, 8vo, pp. 303.

A graphic narrative of the author's first visit to Siberia with J. A. Harvie Brown, supplementing the account of those ornithological discoveries which have already been made known through the "Ibis." [*Cf.* Zool. Rec. xiii. *Aves*, p. 29.]

——. See also *Turdus dissimilis*, *Geocichla innotata* [*Turdidæ*]; *Sylviidæ*, *Cuculidæ*, *Platalæidæ*.

Semper, Karl. Die natürlichen Existenzbedingungen der Thiere. Leipzig: 1880, woodcuts, maps. English translation, "The Natural Conditions of Existence as they affect Animal Life." London: 1881 [1880], sm. 8vo, pp. 472.

Contains numerous observations on the distribution, variations, and powers of adaptation in birds.

Serre y Savatier. Aves procedentes de los viajes de esploracion de la Magicienne. Cronica cientifica, Sept. 1879.

[Not seen by the Recorder.]

Severtzow, N. Études sur le passage des Oiseaux dans l'Asie Centrale, particulièrement par le Ferghânah et le Pamir. Bull. Mosc. 1880, pp. 234–287, map [to be continued].

The first portion of a valuable treatise on the lines of bird-migration, giving the result of the writer's wide experience during the Russian scientific expeditions from 1877–1879, and also embodying the observations of our Indian and other naturalists in Central Asia. The map is from Stieler, corrected by the author.

Sharpe, R. B. "Aves," in Cassell's Natural History, illustrated. London: 1880, 4to, ii. pp. 101–240. [Conclusion: *cf.* Zool. Rec. xvi. *Aves*, p. 33].

—— See also *Tanysiptera danaæ*, sp. n, *Clytoceyx rex*, g. & sp. nn. [*Alcedinidæ*], *Accipiter* [*Falconidæ*].

Shelley, G. E. A Monograph of the *Nectariniidæ*, or Family of the Sun-Birds. Pts. xi.–xii. [*Cf.* Zool. Rec. xvi. *Aves*, p. 33.]

This handsome work is now concluded, the last part containing the introduction, &c., and a valuable synopsis of the literature, and the geographical distribution.

——. See also *Cisticola rhodoptera*, *Phyllostrephus sharpii* [*Timeliidæ*], *Barbatula olivacea* [*Capitonidæ*], *Amydrus walleri* [*Sturnidæ*], spp. nn.

Sibree, Jas., Junr. The Great African Island: Chapters on Madagascar. London: 1880, 8vo.

Popular notices of the birds, and also of the folk-lore and superstitions connected with them, are to be found in chaps. iii. and xiv.

Sierra, Enrique Ibar (the late), in an Appendix to F. Vidal Gormaz's Report of the Explorations of the Southern Coast of Chili and the Straits of Magellan, enumerates the birds observed, and makes some interesting remarks on their habits. Ann. Hidrograf. Marina Chili v. [1879].

Steer, J. B. A List of the Mammals and Birds [111 species] of Ann Arbor and vicinity. [Michigan] 1880, 8vo.

Stejneger, L. Bidrag til Vestlandets ornithologiske Fauna. N. Mag. Naturv. xxv. pp. 141–148.

Remarks on 16 species of rare occurrence in Norway.

——. See also *Lanius* [*Laniidæ*].

Stevenson, H. Ornithological Notes from Norfolk for 1878. [Supplementary ; *cf.* Zool. Rec. xvi. *Aves*, p. 33.]. Zool. 1880, pp. 325–343, and Tr. Norw. Sc. iii. pp. 120–125.——For 1879 : Tr. Norw. Sc. iii. pp. 125–139.

——. See also *Stercorariinæ* [*Laridæ*].

Stieda, Ludwig. Ueber den Bau und die Entwicklung der Bursa fabricii. Z. wiss. Zool. xxxiv. pp. 296–309 (with 5 woodcuts in text). [*Cf.* Ibis, 1881, p. 169.]

Stolzmann, J. See *Steatornithidæ*.

Stone, O. C., in "A Few Months in New Guinea" (London : 1880, 8vo), makes numerous allusions to the Birds observed, and on pp. 254–256 gives a list of 116 species collected near Port Moresby, which have already been noticed by R. B. Sharpe. [*Cf.* Zool. Rec. xiv. *Aves*, p. 23.]

Taczanowski, L. Ptaki [Birds] in "Encyklopedia Rolnictwa." Warsaw : 1879, No. v. pp. 206–236.

——. Fauna ornitologiczana Amerijki zwrotnikowej [Birds of Tropical America] : in Przyroda i Przemsyl [a Natural History Magazine], Warsaw, 1878–9, No. 8, pp. 5–15.

——. Supplément à la liste des Oiseaux recueillis dans l'île Askold. Bull. Soc. Z. Fr. iv. pp. 133–140. [*Cf.* Zool. Rec. xv. *Aves*, p. 30.]

The number of species is increased to 103. *Chrysomitris dybowskii* [cf. Zool. Rec. xiii. *Aves*, p. 49] is cancelled [*Fringillidæ*] ; and nests and eggs of *Xanthopygia leucophrys* and *Herbivox cantans* are described.

——. Liste des Oiseaux recueillis au Nord du Pérou par M. Stolzmann pendant les derniers mois de 1878 et dans la première moitié de 1879. P. Z. S. 1880, pp. 189–215, pls. xx. & xxi.

The localities where this collection has been made are Chepin, on the coast, at an elevation of about 400 feet ; Cutervo, in the mountains, and the Forest of Angurra, 9,000 to 10,000 feet ; and Callacate, a coast-like district, with an admixture of mountain plants, and an elevation of between 4,800 and 5,200 feet. Many rarities are here recorded, the following species being described as new :—*Turdus maranonicus* (fig.) [*Turdidæ*], *Basileuterus trifasciatus* [*Mniotiltidæ*], *Hirundo leucopygia*

[*Hirundinidæ*], *Arrhemon nigriceps* [*Tanagridæ*], *Grallaria albiloris* [*Formicariidæ*], *Colaptes stolzmanni* [*Picidæ*]. Also *Chlorospingus berlepschi*, obtained in Central Peru in 1874, is now distinguished and described as new, and *Conothraupis speculigera* [*Tanagridæ*] is figured; for other interesting species, see *Diphlogæna warszewiczi* [*Trochilidæ*], and *Steatornithidæ*.

TALKSKY, JOSEF. Beitrag zur Ornithologie Mährens [continuation; *cf.* Zool. Rec. xvi. *Aves*, p. 34]. MT. orn. Ver. Wien, 1880, pp 5, 14, 26, 34, 46, 53–58 [conclusion].

TEGETMEIER, W. B. See *Balearica chrysopelargus* [*Gruidæ*].

TIRAUT, GILBERT. Les Oiseaux de la Basse-Cochinchine. Bull. Comité Agricole et Industriel de la Cochinchine (3) i. pp. 73–174, Paris: 1879.

A catalogue of 353 species comprised in a collection of more than 1,000 skins made by the author during the years 1875-77, and now in the Museum of Lyon. The Annamite and Cambodian names are given where obtainable, and are repeated in an appendix.

TORRE, A. A. Cenni preventivi sulla Ematopoesi negli Uccelli. Atti Acc. Tor. xv. pp. 390–392.

TRIMEN, ROLAND. See *Coracias spatulatus*, sp. n. [*Coraciidæ*], *Laniarius atro-croceus*, sp. n. [*Laniidæ*].

TRISTRAM, H. B. See *Gymnoscops insularis*, g. & sp. nn. [*Striges*].

TSCHUSI ZU SCHMIDHOFFEN, V. VON. Ornithologische Mittheilungen aus Oesterreich-Ungarn. J. f. O. 1880, pp. 133-138. [*Cf.* Zool. Rec. xvi. *Aves*, p. 35.]

——. Aufzeichungen über die Zug der Vögel bei Hallein, 1879. MT. orn. Ver. Wien, 1880, p. 8.

——. Einladung zur Betheiligung an der Beobachtung des Vögel-zuges. *Tom. cit.* p. 40.

Two papers on Migration.

VIAN, JULES. See *Oreocincla* [*Turdidæ*].

VIDAL, G. W. First List of the Birds of the South Koukan. Str. Feath. ix. pp. 1–96, with map.

A total of 284 species are recorded from this district of Western India, situated between 16° and 18° N. lat. The paper is freely annotated by A. O. Hume.

VOGT, CARL. *Archæopteryx macrura*, an Intermediate Form between Birds and Reptiles. Ibis, 1880, pp. 434–456, pl. xiii. (photograph).

The translation of a paper already recorded [*cf.* Zool. Rec. xvi. *Aves*, p. 35].

——. [Letter on *Archæopteryx*]. Bull. Hebdom., 1880, No. 11, p. 173.

WAGA, A. Zywe kolibry w Europie. Przyroda i Przemsyl, Warsaw: 1879–80, No. 7, p. 353.

On keeping Humming-birds alive in Europe.

[WAGA, A.] Obyczaje kolibrów [On the Haunts of the Hummers]. *Op. cit.* No. 8, pp. 173–176.

WALLACE, A. R., in 'Island Life,' or the Phenomena and Causes of Insular Faunas and Floras (London: 1880, large 8vo), makes numerous remarks on Birds, with reference to their variation and distribution.

WARREN, ROBERT. Ornithological Notes from the County Mayo. Zool. 1880, pp. 129–133.

WATERHOUSE, F. H. On the Dates of Publication of the Parts of Sir Andrew Smith's 'Illustrations of the Zoology of South Africa.' P. Z. S. 1880, pp. 489–491.

WATTEBLED, G. Influence du Froid sur quelques Oiseaux des environs de Moulins pendant l'hiver de 1879–80. Actes Soc. L. Bord. (4) iv. pp. 175–180.

WOOD, S. V., JUN. Triassic Footprints. Nature, xxi. p. 347.

Footprints in the Triassic beds of New South Wales are referred to birds allied to the existing *Ratitæ*.

WÜRM, W. Die deutschen Waldhühner. Zool. Gart. 1880, pp. 87–91, 109–119, 152–155, 175–182, 201–207, 270–277.

A popular monograph of the *Tetraonidæ* found in Germany, with remarks on allied species.

ZEREGA, L. A. See *Corvus ossifragus* [*Corvidæ*].

PASSERES.

TURDIDÆ.

Geocichla innotata, note on; H. Seebohm, Str. Feath. ix. pp. 99–101. Editorial note, totally dissenting from the conclusions of the above; A. O. Hume, *tom. cit.* pp. 101–103.

Margarops sanctæ-luciæ, sp. n., distinguished from *M. herminieri*; P. L. Sclater, Ibis, 1880, p. 73, Island of St. Lucia, West Indies. Identified with *M. herminieri*, var. *semperi*, subsp. n.; G. N. Lawrence, Bull. U. S. Nat. Mus. 1880, p. 16. The latter subsequently distinguished as *M. dominicensis*, sp. n., *id.* Pr. U. S. Nat. Mus. p. 16, Dominica. Remarks on above; J. A. Allen, Bull. Nutt. Orn. Club, v. p. 165.

Monticola cyanus: explanation of its erroneously recorded occurrence in Ireland; A. G. More, Zool. 1880, p. 67.

Myiophoneus castaneus, sp. n., R. G. W. Ramsay, P. Z. S. 1880, p. 16, figured pl. i., Mount Sago, Sumatra. *M. blighi* figured; W. B. Legge, B. Ceylon, (with) pt. iii.

Oreocincla. A monographical revision of this genus; J. Vian, Bull. Soc. Z. Fr. 1880, pp. 210–229.

Turdus maranonicus (Stolzm., MS.), sp. n., L. Taczanowski, P. Z. S. 1880, p. 189, figured pl. xx., Callacate, N. Peru. *T. dissimilis*: on this species and its synonymy; H. Seebohm, Str. Feath. viii. pp. 437–439; A. O. Hume, *op. cit.* ix. pp. 103–107.

Sylviidæ.

Sylviidæ: various corrections of synonymy; H. Seebohm, Ibis, 1880, pp. 273–279.

Acrocephalus albo-torquatus, sp. n., G. Hartlaub, J. f. O. 1880, p. 212, Lado, Equatorial Egypt. Cancelled, being *A. bæticatus*, Vieill.; *id. tom. cit.* p. 325.

Dumeticola intermedia, sp. n., E. W. Oates, Str. Feath. ix. p. 220, Pegu River; notes on above, W. E. Brooks (p. 221) and A. O. Hume (p. 224).

Myrmecocichla leucolæma, sp. n., G. A. Fischer and A. Reichenow, Orn. Centralbl. 1880, p. 181, Nguru Hills, East Africa.

Phylloscopus sindianus, sp. n., W. E. Brooks, Str. Feath. viii. p. 476, Sukhur. *P. burmanicus*, sp. n., *id. op. cit.* ix. p. 272, Pegu and Moulmein. *P. plumbeitarsus*, Swinhoe, and *P. viridanus*, Blyth; on the distinctions between these two species; W. E. Brooks, Ibis, 1880, p. 382. *P. bonellii* figured; H. E. Dresser, B. Eur. pts. lxxx.–lxxxii.

Phyllopseuste curvirostris, sp. n., J. Madarasz, J. f. O. 1880, pp. 326–328, Europe, distinguished from *P. trochilus* and *P. rufa*.

Polioptila albiloris, ♂ & ♀ figured; O. Salvin & F. D. Godman, Biol. Centr. Amer. *Aves*, i. pl. v. figs. 1 & 2.

Pratincola: additional notes on the Indian species of this genus; A. O. Hume, Str. Feath. ix. p. 133.

Sericornis ? *fulvipectoris*, sp. n., E. P. Ramsay, P. Linn. Soc. N. S. W. iv. p. 468, Goldie River, New Guinea.

Suya superciliaris, Anders., is the earlier name for *S. albo-gularis*, Hume; A. O. Hume, Str. Feath. ix. p. 227.

Sylvia momus figured; H. E. Dresser, B. Eur. pls. lxxx.–lxxxii.

Thamnobia munda, sp. n., J. Cabanis, Orn. Centralbl. 1880, p. 143, and J. f. O. 1880, p. 419, Angola.

Timeliidæ.

Alcippe nigrifrons figured; W. V. Legge, B. Ceylon, (with) pt. iii.

Cisticola rhodoptera, sp. n., G. E. Shelley, Ibis, 1880, p. 333, Usambara Hills, East Africa. *C. hypoxantha*, sp. n., G. Hartlaub, P. Z. S. 1880, p. 624, Magungo, Central Africa.

Drymœca (*Cisticola*) *grandis* (p. 56, Caconda), and *D. modesta* (p. 57, Coast of Loango), spp. nn., J. V. B. du Bocage, J. Sc. Lisb. viii.

Drymœca valida and *D. insularis*, figured; W. V. Legge, B. Ceylon, (with) pt. iii.

Drymocichla, g. n., type *D. incana*, sp. n.; G. Hartlaub, P. Z. S. 1880, pp. 626 & 627, figured, pl. lx., Magungo.

Elaphrornis palliseri, figured; W. V. Legge, B. Ceylon, (with) pt. iii.

Eminia, g. n., type *E. lepida*, sp. n.; G. Hartlaub, P. Z. S. 1880, p. 625, figured pl. lx., Magungo.

Malia grata, sp. n., H. Schlegel, Notes Leyden Mus. ii. p. 165, Macassar.

Megalurus interscapularis, sp. n., P. L. Sclater, P. Z. S. 1880, p. 65, figured pl. vi., Island of New Britain.

Pellorneum fuscicapillum figured; W. V. Legge, B. Ceylon, (with) pt. iii.

Phyllostrephus sharpii, sp. n., G. E. Shelley, Ibis, 1880, p. 334, Dar-es-Salaam, East Africa.

Pyctorrhis nasalis figured; W. V. Legge, B. Ceylon, (with) pt. iii.

Schœnicola platyura: remarks on; W. E. Brooks, Str. Feath. ix. pp. 209–211, followed by note by A. O. Hume, pp. 211 & 212; further remarks, *id. tom. cit.* pp. 234 & 260–264.

Stachyris poliogaster, sp. n., A. O. Hume, Str. Feath. ix. p. 116, Western Malay Peninsula.

Tricholais flavo-torquata, sp. n., G. Hartlaub, P. Z. S. 1880, p. 624, Magungo, Central Africa.

Trochalopterum meridionale, sp. n., W. T. Blanford, P. A. S. B. 1880, p. 184, also in J. A. S. B. xlix. pt. ii. p. 142, Travancore, with remarks on its allies.

Turdinus marmoratus, sp. n., R. G. W. Ramsay, P. Z. S. 1880, p. 15, Padang district, Sumatra.

Paridæ.

Pentheres insignis, sp. n., J. Cabanis, Orn. Centralbl. 1880, p. 143, and J. f. O. 1880, p. 419, Angola.

Sittidæ.

Sitella albata figured; J. Gould, B. New Guinea, pt. xi.

Sitta cœsia: on its nesting habits in Norfolk; F. Norgate, Zool. 1880, pp. 41–46.

Troglodytidæ.

Cistothorus elegans figured; O. Salvin & F. D. Godman, Biol. Centr. Amer. *Aves*, i. pl. vii. fig. 3.

Microcerculus philomela and *M. luscinia* figured; *iid.* op. cit. *Aves*, i. pl. v. figs. 3 & 4.

Thryophilus thoracicus and *T. semibadius* figured; *iid.* op. cit. *Aves*, i. pl. vi.

Thryothorus hyperythrus (p. 91, Panama), *T. hypospodius* (p. 92, Colombia), *T. bairdi* (p. 95, N. Mexico), spp. nn.; *iid.* op. cit. *Aves*, i. *T. atrigularis* (pl. vi.), *T. felix* (pl. vii. fig. 1), *T. albinucha* (pl. vii. fig. 2), figured; *iid. op. cit.*

Mniotiltidæ.

Basileuterus conspicillatus, sp. n., O. Salvin & F. D. Godman, Ibis, 1880, p. 117, San José, Colombia. *B. trifasciatus* (Stolzm. MS.), sp. n., L. Taczanowski, P. Z. S. 1880, p. 191, Callacate, N. Peru.

Catharopeza, g. n., type, *Leucopeza bishopi*; P. L. Sclater, Ibis, 1880, pp. 73 & 74, generic distinctions figured, woodcut p. 73, species figured, pl. i.

Dendrœca kirtlandi, ♀ described; E. Coues, Bull. Nutt. Orn. Club, v. p. 49, Ann Arbor, Michigan.

Helminthotherus, amended form of *Helmitherus* and *Helmintherus*; O. Salvin & F. D. Godman, Biol. Centr. Amer. I. *Aves*, p. 112.

Helmintophaga cincinnatensis, sp. n., F. W. Langdon, J. Cincinn. Soc. 1880, pp. 119 & 120, and Bull. Nutt. Orn. Club, v. pp. 208–210, figured, pl. iv., Hamilton county, Ohio [not Cincinnati]. Its specific validity questioned; R. Ridgway, *tom. cit.* p. 237.

Parula inornata, *P. superciliosa*, *P. gutturalis* figured; O. Salvin & F. D. Godman, Biol. Centr. Amer. *Aves*, i. pl. viii.

Siurus nævius notabilis, Grinnell, MS. [sic], subsp. n.: R. Ridgway, Pr. U. S. Nat. Mus. i. [March, 1880] p. 12, Black Hills, Wyoming.

Vireonidæ.

Cyclorrhis altirostris, sp. n., O. Salvin, Ibis, 1880, p. 352, Salta.

Hylophilus fuscicapillus, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1880, p. 155, Sarayacu, Ecuador.

Vireo philadelphicus: notes on habits and distribution; W. Brewster, Bull. Nutt. Orn. Club, v. pp. 1–7.

Laniidæ.

See Salvadori, T.

Dryoscopus major mossambicus, subsp. n., G. A. Fischer & A. Reichenow, J. f. O. 1880, p. 141, Mozambique. *Dryoscopus cinerascens*, sp. n., G. Hartlaub, J. f. O. 1880, p. 212, Lado, Equatorial Egypt.

Laniarius atro-croceus, sp. n., R. Trimen, P. Z. S. 1880, p. 623, Upper Limpopo River, S. Africa.

Lanius. On the Norwegian species of this genus; L. Stejneger, Arch. Math. Naturvid. iv. pp. 262–270. Remarks; R. Collett, *tom. cit.* pp. 271–279, with woodcuts. *Lanius major*, Pall.: remarks on, showing it to be a perfectly good species; J. Reinhardt, Vid. Medd. 1879–80, pp. 387–396. *Lanius excubitor*, *L. major*, *L. homeyeri*: remarks on; E. F. von Homeyer, J. f. O. 1880, pp. 148–152.

Pachycephala miosnomensis, sp. n., T. Salvadori, Ann. Mus. Genov. xv. p. 46, Miosnom, Papuasia. *P. assimilis*, Verr. & Des Murs, = *P. xanthetræa*, Forst.; E. L. & E. L. C. Layard, Ibis, 1880, p. 460.

Campophagidæ.

See Salvadori, T.

Artamides temmincki figured; J. Gould, B. New Guinea, pt. xi.

Edoliisoma [*Hedolios-*] *neglectum*, sp. n., T. Salvadori, Ann. Mus. Genov. xv. p. 36, Mafor, Papuasia.

Lalage: note on an undetermined species; E. P. Ramsay, P. Linn. Soc. N. S. W. iv. p. 396.

Muscicapidæ.

Alseonax. On several species of this genus; W. E. Brooks & A. O. Hume, Str. Feath. ix. pp. 225 & 226.

Chloromyias, g. n., near *Muscicapula*, type *C. laglaizii*, sp. n., E. Oustalet, Bull. Ass. Sc. Fr. 1880, No. 11, pp. 172 & 173, Northern Coast of New Guinea.

Cyornis poliogenys, sp. n., W. E. Brooks, Str. Feath. viii. p. 469, Sikhim Terai. *Cyornis frenatus*, sp. n., A. O. Hume, *op. cit.* p. 114, Jurrum, Western Malay Peninsula.

Micræca assimilis figured ; J. Gould, B. New Guinea, pt. xi.

Muscicapa infulata, sp. n., G. Hartlaub, P. Z. S. 1880, p. 626, Central Africa.

Piezorrhynchus melanocephalus, sp. n., E. P. Ramsay, P. Linn. Soc. N. S. W. iv. p. 468, San Cristoval, Solomon Islands.

Pœcilodryas æthiops, sp. n., P. L. Sclater, P. Z. S. 1880, p. 66, figured, pl. vii. fig. 1, Island of New Britain.

Pomareopsis, g. n., close to *Pomarea* : type, *Pomareopsis semi-atra*, sp. n. ; E. Oustalet, Bull. Ass. Sc. Fr. 1880, No. 11, p. 173, Northern Coast of New Guinea.

Pycnonotidæ.

Andropadus gracilis, sp. n., J. Cabanis, Orn. Centralbl. 1880, p. 174, Angola. *Andropadus minor*, sp. n., J. V. B. du Bocage, J. Sc. Lisb. viii. p. 55, Massabe, Coast of Loango.

Criniger (*Xenocichla*) *multicolor*, sp. n., *id. tom. cit.* p. 54, Coast of Loango.

Rubigula melanictera figured ; W. V. Legge, B. Ceylon, (with) pt. iii.

Trichophorus flavigula and *T. flaveolus*, spp. nn., J. Cabanis, Orn. Centralbl. 1880, p. 174, Angola.

Artamidæ.

See Salvadori, T.

Dicruridæ.

See Salvadori, T.

Chætorrhynchus papuensis figured ; J. Gould, B. New Guinea, pt. xi.

Dicrurus sumatranus, sp. n., R. G. W. Ramsay, P. Z. S. 1880, p. 15, Padang District, Sumatra.

Irena cyanea and *I. criniger* figured ; J. Gould, B. Asia, pt. xxxii.

Hirundinidæ.

Cotile riparia obtained in the Transvaal ; T. Ayres, Ibis, 1880, p. 260.

Hirundo leucopygia (Stolzm. MS.), sp. n., L. Taczanowski, P. Z. S. 1880, p. 192, Chepen, coast of N. Peru. *H. hyperythra* figured ; W. V. Legge, B. Ceylon, (with) pt. iii. *H. rustica* : on nidification, and rearing of broods ; Z. Gerbe (pp. 72–74) and A. Besnard (p. 205), Bull. Soc. Z. Fr. v.

Nectariniidæ.

See Shelley, G. E.

Æthopyga eximia, *Æ. nipalensis*, *Æ. horsfieldi*, *Æ. gouldiæ*, *Æ. temmincki*, *Æ. mystacalis*, *Æ. flavo-striata*, *Æ. seheriæ*, *Æ. shelleyi* figured, G. E. Shelley, Mon. Cinnyr. pts. xi. & xii.

Anthreptes orientalis, sp. n., G. Hartlaub, J. f. O. 1880, p. 213, Lado, Equatorial Egypt. *Anthreptes anchiœtæ*, *A. rectirostris*, *A. zambesiana*, *A. hypodila*, *A. tephrolæma*, figured; G. E. Shelley, Mon. Cinnyr. pts. xi. & xii.

Chalcomitra deminuta, sp. n., J. Cabanis, Orn. Centrabl. 1880, p. 143, and J. f. O. 1880, p. 419, Angola.

Cinnyris fischeri, sp. n., A. Reichenow, J. f. O. 1880, p. 142, Mozambique and Cafferland. *Cinnyris heuglini*, sp. n., G. E. Shelley, Mon. Cinnyr. pts. ix. & x., N. E. Africa, = *C. fazoglensis*, Finsch, *id. op. cit.* pts. xi. & xii. *C. corneliæ*, *C. corinnæ*, *C. aurora*, *C. flagrans*, *C. zenobia*, *C. microrrhynchus*, *C. affinis*, *C. venustus*, *C. coquereli*, *C. hartlaubi*, *C. oustaleti*, figured; *id. op. cit.* pts. xi. & xii.

Eudrepanis dubia figured; *id. tom. cit.*

Hedydipna platyura figured; *id. tom. cit.*

Nectarinia bocagii, sp. n., *id. op. cit.* ix. & x., Angola, and figured, *l. c.*, also *N. cupreo-nitens*, pts. xi. & xii.

Dicæidæ.

Pachyglossa vincens figured; W. V. Legge, B. Ceylon, (with) pt. iii.

Zosterops ceylonensis figured; *id. tom. cit.*

Meliphagidæ.

Myzomela forbesi, sp. n., E. P. Ramsay, P. Linn. Soc. N. S. W. iv. p. 469, Woodlark Island [? New Guinea].

Tanagridæ.

Arrhemon nigriceps, sp. n., L. Taczanowski, P. Z. S. 1880, p. 196, Callacate, N. Peru.

Buarr[*h*]*emon specularis* (Salvin, MS.), sp. n., L. Taczanowski, P. Z. S. 1879, p. 228, Tambillo, N. Peru [omitted in Zool. Rec. xvi.]. *B. melanocephalus*, sp. n., O. Salvin & F. D. Godman, Ibis, 1880, p. 121, San Sebastian, Colombia.

Chlorospingus berlepschi, sp. n., distinguished from *C. castaneicollis*, Scl.; L. Taczanowski, P. Z. S. 1880, p. 195, Ropaybamba, Central Peru.

Conothraupis, g. n., type, *Schistochlamys speculigera*, Gould; P. L. Sclater, Ibis, 1880, p. 253. Figured; L. Taczanowski, P. Z. S. 1880, pl. xxi.

Nemosia chrysopis, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1880, p. 155, Sarayacu, Ecuador.

Pœcilothraupis melanogenys, sp n., O. Salvin & F. D. Godman, Ibis, 1880, p. 120, figured, pl. iii. San Sebastian, Colombia.

Tachyphonus intercedens, sp. n., H. v. Berlepsch, Ibis, 1880, p. 113, Orinoco district, or Trinidad.

Tanagra sclateri, sp. n. (= *T. glauco-colpa*, Scl., *nec* Cabanis), H. v. Berlepsch, Ibis, 1880, p. 112, Orinoco district or Trinidad.

Ploceidæ.

Euplectes gierowii, sp. n., J. Cabanis, Orn. Centralbl. 1880, p. 6 ; and J. f. O. 1880, p. 106, Angola, pl. iii. fig. 2.

Hyphantica cardinalis, sp. n., G. Hartlaub, J. f. O. 1880, p. 325, Lado, Equatorial Egypt.

Hyphantornis temporalis, sp. n., J. V. B. du Bocage, J. Sc. Lisb. vii. p. 244, Caconda. *Hyphantornis fusco-castanea*, sp. n., *id. op. cit.* viii. p. 58, River Loemma, Loango.

Munia melæna, sp. n., P. L. Sclater, P. Z. S. 1880, p. 66, figured, pl. vii. fig. 2, Island of New Britain. *M. kelaarti* figured, W. V. Legge, B. Ceylon, (with) pt. iii.

Pytelia wieneri, Finsch, is the earlier name for *P. cinereigula*, Cab., and a specimen living in the London Zoological Gardens described and figured; W. A. Forbes, P. Z. S. 1880, p. 476, pl. xlvii. fig. 2.

Sorella, g. n., near *Nigrita* ; type, *S. eminibey* [sic], sp. n. ; G. Hartlaub, J. f. O. 1880, pp. 210 & 211, Lado, Equatorial Egypt.

Sycobrotus amaurocephalus, sp. n., J. Cabanis, J. f. O. 1880, p. 349, pl. iii. fig. 1, Angola.

Vidua splendens, Reichen. : a specimen of this recently discovered and rare species described and figured (pl. xlvii. fig. 1) from a specimen living in the Zool. Gard. ; W. A. Forbes, P. Z. S. 1880, p. 475.

Fringillidæ.

See Homeyer, E. F. von.

Chrysomitris dybowskii [cf. Zool. Rec. xiii. *Aves*, p. 49] is cancelled, being identical with *C. spinus* ; L. Taczanowski, Bull. Soc. Z. Fr. iv. p. 139.

Coryphospingus pusillus figured ; O. Salvin, Ibis, 1880, p. 354, pl. ix. fig. 1.

Emberiza schœniclus figured; H. E. Dresser, B. Eur. pts. lxxvii.–lxxix.

Erythrospiza githaginea figured ; J. Gould, B. Asia, pt. xxxii.

Euspiza elegans figured ; *id. tom. cit.*

Polymitra (*Fringillaria*) *major*, sp. n., J. Cabanis, J. f. O. 1880, p. 349, pl. ii. fig. 2, Angola.

Leucosticte tephrocotis and *L. tephrocotis* var. *littoralis* : on their winter plumages and the distinguishing characteristics with regard to sex; J. C. Merrill, Bull. Nutt. Orn. Club, v. pp. 75–77.

Loxia curvirostra americana. Nidification: E. P. Bicknell, *tom. cit.* pp. 7–11 ; also T. M. Brewer, *tom. cit.* p. 50.

Oræginthus indicus, sp. n., E. F. v. Homeyer, J. f. O. 1880, p. 152, India [sic].

Passer pyrrhonotus, Blyth, rediscovered after forty years, in the East Narra, Sindh ; A. O. Hume, Str. Feath. ix. p. 232.

Peucæa illinoensis hastily given specific rank [*cf.* Zool. Rec. xvi. *Aves*, p. 54] is to stand as *P. æstivalis illinoensis* ; R. Ridgway, Bull. Nutt. Orn. Club, v. p. 52.

Pinicola flammula, sp. n., E. F. v. Homeyer, J. f. O. 1880, p. 156, North Western America.

Poospiza melanoleuca figured; O. Salvin, Ibis, 1880, p. 354, pl. ix. fig. 2.

Pyrrhula major and *P. erithacus* figured ; J. Gould, B. Asia, pt. xxxii.

Alaudidæ.

Calandrella tibetana, sp. n., W. E. Brooks, Str. Feath. viii. p. 488, "Thibet, beyond Sikhim"; = *A. acutirostris*, A. O. Hume (Editorial foot-note), *l. c.*

Sturnidæ.

Amydrus walleri, sp. n., G. E. Shelley, Ibis, 1880, p. 335, figured, pl. viii., Usambara Mountains, East Africa.

Acridotheres melanosternus figured, W. B. Legge, B. Ceylon, (with) pt. iii.

Eulabes ptilogenys, figured; *id. tom. cit.*

Sturnornis senex, figured ; *id. tom. cit.*

Sturnia blythi: remarks on ; A. O. Hume, Str. Feath. ix. p. 228 ; also E. A. Butler, *tom. cit.* pp. 237 & 267.

Sturnus purpurascens figured ; H. E. Dresser, B. Eur. pts. lxxvii.–lxxix.

Corvidæ.

Corvus ossifragus: on its northern range and habits; L. A. Zerega, Bull. Nutt. Orn. Club, v. pp. 205–208.

Glaucopis cinerea: on its nesting habits; W. D. Campbell, Tr. N. Z. Inst. xii. p. 249.

Perisoreus canadensis fumifrons, new name for the Alaska race of *P. obscurus* ; R. Ridgway, Pr. U. S. Nat. Mus. i. [March, 1880], p. 5.

Platysmurus schlegeli, sp. n., A. v. Pelzeln, Verh. z.-b. Wien, xxix. p. 529, Sumatra.

Paradiseidæ.

See Deslongchamps, E.

Chlamydodera orientalis figured ; J. Gould, B. New Guinea, pt. xi.

Drepanornis bruijni, sp. n., E. Oustalet, Bull. Ass. Sc. Fr. 1880, No. 11, p. 172, and Ann. Sc. Nat. (6) ix. Nos. 2–4, art. 5, North Coast of New Guinea.

Epimachus ellioti figured ; J. Gould, B. New Guinea, pt. xi.

Pittidæ.

Pitta kochi figured ; J. Gould, B. Asia, pt. xxxii.

Pitta cyanonota figured; *id.* B. New Guinea, pt. xi.

Tyrannidæ.

Cnipolegus cinereus, ♂ ♀ figured; O. Salvin, Ibis, 1880, p. 357, pl. x.

Empidonax acadicus and *E. trailli*: on their nesting in Missouri; E. Coues, Bull. Nutt. Orn. Club, v. pp. 20–25.

Myiarchus mexicanus: remarks on; R. Ridgway, Pr. U. S. Nat. Mus. i. [March, 1880], pp. 13–15.

Myiochanes nigrescens, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1880, p. 157, Sarayacu in Ecuador.

Ochthœca poliogastra, sp. n., O. Salvin & F. D. Godman, Ibis, 1880, p. 123, Sierra Nevada de Santa Marta.

Platyrrhynchus senex, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1880, p. 156, Sarayacu in Ecuador.

Serphophaga albo-grisea, sp. n., *iid. l. c.* Sarayacu in Ecuador.

Syristes albo-cinereus, sp. n., *iid. l. c.* Upper Amazon, Sarayacu in Ecuador, and Colombia.

Tyrannus: remarks on some species of this genus; P. L. Sclater, P. Z. S. 1880, pp. 28–30. *T. niveigularis* (pl. iii.) figured, with woodcut of its wing-end, and also of the wing-end and the tail-end of *T. albigularis*; l. c. [See also Ridgway, Zool. Rec. xvi. *Aves*, p. 25, and *Tyrannus*, p. 45.]

Pipridæ.

Heterocercus aurantiivertex, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1880, p. 157, Sarayacu in Ecuador.

Cotingidæ.

Ptilochloris buckleyi, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1880, p. 158, figured pl. xvi., Pindo, Ecuador.

Dendrocolaptidæ.

Automolus dorsalis, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1880, p. 158, Sarayacu in Ecuador.

Geositta antarctica, sp. n., Von Landbeck, Arch. f. Nat. 1880, p. 274, figured pl. xii., Tierra del Fuego.

Phacellodomus sibilatrix, Döring, MS., exhibited; P. L. Sclater, P. Z. S. 1879, p. 461, Cordova, Argentine Republic. [Apparently a new species, undescribed elsewhere.]

Pscudocolaptes costaricensis, sp. n., distinguished from *P. boissoncauti*; A. Boucard, Bull. Soc. Z. Fr. v. p. 230, Navarro, Costa Rica.

Formicariidæ.

Dysithamnus subplumbeus, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1880, p. 158, Sarayacu in Ecuador, Zamora, Yquitos, E. Peru.

Grallaria dignissima, sp. n., *iid. tom. cit.* p. 160, figured pl. xvii., Sara-

yacu, Ecuador. *Grallaria albiloris*, sp. n., L. Taczanowski, *tom. cit.* p. 201, Cutervo and Callacate, N. Peru.

Herpsilochmus frater, sp. n., P. L. Sclater & O. Salvin, p. 159, Sarayacu, Ecuador.

Hypocnemis stellata (Sarayacu in Ecuador), *H. lepidonota* (Sarayacu in Ecuador, and Upper Amazons), spp. nn., *iid. tom. cit.* p. 160.

Myrmotherula spodionota, sp. n., *iid. tom. cit.* p. 159, Sarayacu in Ecuador.

Pithys melanosticta, sp. n., *iid. tom. cit.* p. 160, Sarayacu in Ecuador.

Terenura humeralis, sp. n., *iid. tom. cit.* p. 159, Sarayacu in Ecuador.

PICARIÆ.

Picidæ.

Celeus spectabilis, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1880, p. 161, Sarayacu in Ecuador. *Celeus immaculatus*, sp. n., H. v. Berlepsch, Ibis, 1880, p. 113, Panama ?

Centurus terricolor, sp. n., *id. tom. cit.* p. 113, Orinoco district or Trinidad.

Colaptes stolzmanni, sp. n., L. Taczanowski, P. Z. S. 1880, p. 209, Cutervo, N. Peru.

Dendrobates congicus, sp. n., J. V. B. du Bocage, J. Sc. Lisb. viii. p. 50, River Loemma, Loango.

Picus pipra figured ; H. E. Dresser, B. Eur. pts. lxxvii.–lxxix. *Picus albo-larvatus*, eggs first described ; T. M. Brewer, Bull. Nutt. Orn. Club, v. p. 56.

Trochilidæ.

See Deslongchamps, E.

Aglœactis caumatonota figured; J. Gould, Supp. Trochil. pt. i.

Campylopterus phainopeplus figured ; O. Salvin & F. D. Godman, Ibis, 1880, pl. iv. fig. 1.

Cynanthus bolivianus, sp. n., J. Gould, Ann. N. H. (5) v. p. 489, Bolivia. Is identical with *C. mochoa* ; D. G. Elliott, *op. cit.* vi. pp. 232–234. Figured, J. Gould, Supp. Troch. pt. i.

Diphlogœna warszewiczi obtained at Cutervo, N. Peru, and ♂ & ♀ described at length ; L. Taczanowski, P. Z. S. 1880, p. 204.

Elvira cupreiceps figured ; J. Gould, Supp. Troch. pt. i.

Hylocharis cyanea subsp. n. *viridiventris*, H. v. Berlepsch, Ibis, 1880, p. 113, Venezuela, Orinoco district and Trinidad.

Hylonympha macrocerca figured; J. Gould, Supp. Troch. pt. i. ; also E. Deyrolle, R. Z. (3) vii. p. 63, pl. ii., from Rio Janeiro.

Lampornis calosoma figured: J. Gould, Supp. Troch. pt. i.

Lophornis adorabilis figured ; *id. tom. cit.*

Melanotrochilus, subg. n., type, *Florisuga fusca*; Deslongchamps, Guide Nat. 1880, p. 7.

Microchera parvirostris figured; J. Gould, Supp. Troch. pt. i.

Oreonympha nobilis figured ; *id. tom. cit.*

Orthorhynchus exilis: on this species and its synonymy; J. A. Allen, Bull. Nutt. Orn. Club, v. pp. 167 & 168.

Oxypogon cyanolæmus, sp. n., O. Salvin & F. D. Godman, Ibis, 1880, p. 172, figured, pl. iv. fig. 2, Sierra Nevada de Sta. Marta.

Pinarolæma buckleyi, g. & sp. nn., J. Gould, Ann. N. H. (5) v. p. 489, Misqui, Bolivia, 10,000 feet. Figured, *id.* Supp. Troch. pt. i.

Rhamphomicron dorsale, sp. n., O. Salvin & F. D. Godman, Ibis, 1880, p. 172, figured, pl. v., Sierra Nevada de Santa Marta.

Sparganura glyceria figured; J. Gould, Supp. Troch. pt. i.

Thalurania hypochlora figured; *id. tom. cit.* pt. i.

Zodalia ortoni figured: *id. tom. cit.*

Cypselidæ.

Acanthyllis caudacuta. Exhibition of a specimen obtained at Ringwood [Hampshire]; A. Newton, P. Z. S. 1880, p. 1. Details of its capture, G. B. Corbin, Zool. 1880, pp. 82–85. Figured, H. E. Dresser, B. Eur. pts. lxxvii.–lxxix.

Collocalia, G. R. Gr. Remarks on 15 species comprised in this genus, including *C. infuscata*, sp. n., Moluccas (p. 348); T. Salvadori, Atti Acc. Tor. xv. pp. 343–349.

Caprimulgidæ.

Phalænoptilus, g. n., type *Caprimulgus alleni*, Audub.; R. Ridgway, Pr. U. S. Nat. Mus. i. [March, 1880], p. 5.

Alcedinidæ.

Carcineutes pulchellus, *C. melanops*, *C. amabilis* figured; J. Gould, B. Asia, pt. xxxii.

Clytoceyx rex, g. & sp. nn., R. B. Sharpe, Ann. N. H. (5) vi. p. 231, South-eastern New Guinea.

Cyanalcyon quadricolor, sp. n., E. Oustalet, Le Nat. 1880, p. 324, North Coast of New Guinea.

Halcyon tristrami, sp. n., E. L. Layard, Ibis, 1880, p. 460, figured, pl. xv. Solomon Islands, with remarks on allied species. *Halcyon pallidiventris*, sp. n., J. Cabanis, J. f. O. 1880, p. 349, Angola. *Halcyon nigrocyanea* and *H. stictolæma* figured; J. Gould, B. New Guinea, pt. xi.

Sauromarptis gaudichaudi figured: *id. tom. cit.*

Tanysiptera danaæ, sp. n., R. B. Sharpe, Ann. N. H. (5) vi. p. 231, South-eastern New Guinea.

Bucerotidæ.

On the nidification of 5 species as observed in Tenasserim; C. T. Bingham, Str. Feath. viii. No. 6, pp. 459–463.

Anorrhinus galeritus (pt. vii.), *A. tickelli* (pt. viii.) figured; D. G. Elliot, Mon. Bucerot.

Anthracoceros convexus figured; *id. op. cit.* pt. vii.

Bucorvus cafer figured; *id. op. cit.* pt. viii.

Buceros montani, sp. n., E. Oustalet, Bull. Ass. Sc. Fr. 1880, No. 39, p. 206, Sooloo Islands.

Bycanistes subquadratus, sp. n.; J. Cabanis, J. f. O. 1880, p. 350, figured pl. i., Angola.

Bycanistes albo-tibialis (pt. vii.) *B. buccinator* (pt. viii.), figured; D. G. Elliot, Mon. Bucerot.

Cranorrhinus leucocephalus (pt. vii.) *C. corrugatus* (pt. viii.), figured; *id. op. cit.*

Hydrocorax mindanensis figured; *id. op. cit.* pt. vii.

Rhytidoceros narcondami figured; *id. op. cit.* pt. viii.

Tockus melanoleucus (pt. vii.), *T. camurus* (pt. viii.) figured; *id. op. cit.*

Upupidæ.

Upupa africana major, subsp. n., A. Reichenow, MT. african. Ges. i. Malange, Angola [not seen by Recorder; *cf.* Bocage and Reichenow]; also A. Reichenow, Orn. Centralbl. 1879, p. 72. *U. nigripennis* figured; J. Gould, B. Asia, pt. xxxii.

Coraciidæ.

Coracias spatulatus, sp. n., R. Trimen, P. Z. S. 1880, pp. 30–33, with woodcut of tail, Zambesi. *Coracias dispar*, sp. n., J. V. B. du Bocage. J. Sc. Lisb. vii. p. 227, Caconda; [apparently = *C. spatulatus*].

Leptosomidæ.

Leptosomus discolor: on its anatomy; W. A. Forbes, P. Z. S. 1880, pp. 465–475. [The author's remarks on the pterylosis and soft parts of this peculiar Madagascar form, are illustrated by woodcuts; the foot is shown to be not truly zygodactyle, and its affinities to the *Cuculidæ* proved to be very remote, whilst its relations to the *Coraciidæ* are tolerably close.]

Steatornithidæ.

Steatornis caripensis obtained in the department of Cajamarca, on the western slope of the Cordillera; L. Taczanowski, P. Z. S. 1880, p. 208. Full description of its habits and nidification in Peru; J. Stolzmann, Bull. Soc. Z. Fr. v. pp. 198–204.

Galbulidæ.

Brachygalba lugubris, *B. gœringi*, *B. salmoni*, *B. albigularis*, *B. melanosterna* figured; P. L. Sclater, Mon. Galbulidæ, pt. ii. pls. xi.–xv.

Galbacyrrhynchus leucotis figured; *id. tom. cit.* pl. xvii.

Galbula leucogastra (pl. ix.), *G. chalcothorax* (pl. x.), figured, *id. tom. cit.*

Jacamaralcyon tridactyla figured; *id. tom. cit.* pl. xvi.

Jacamerops grandis figured; *id. tom. cit.* pl. xviii.

Bucconidæ.

Bucco collaris, *B. macrorrhynchus*, *B. dysoni*, *B. hyperrhynchus*, *B. swainsoni*, *B. pectoralis*, *B. ordi*, *B. testus*, *B. picatus*, *B. subtectus* (pt. iv.), *B. macrodactylus*, *B. ruficollis*, *B. bicinctus*, *B. tamatia*, *B. pulmentum*, *B. maculatus*, *B. striatipectus*, *B. chacuru*, *B. striolatus* (pt. v.), figured; P. L. Sclater, Mon. Bucconidæ, pls. xix.–xxxv.

Capitonidæ.

Barbatula olivacea, sp. n., G. E. Shelley, Ibis, 1880, p. 334, figured, pl. vii., Mombas, East Africa. *Barbatula fischeri*, sp. n., A. Reichenow, Orn. Centralbl. 1880, p. 181, Ngura Hills, East Africa.

Pogonorrhynchus frontatus, sp. n.; J. Cabanis, J. f. O. 1880, p. 351, figured, pl. ii. fig. 1, Angola.

Indicatoridæ.

Indicator, sp. ?: on its habits; E. F. Sandeman in 'Eight Months in an Ox-wagon,' (London: 18 , 8vo) p. 235; copied in Ibis, 1880, p. 286.

Cuculidæ.

Cuculus canorus: on blue eggs, generally in nests of *Ruticilla phœnicurus*; H. Seebohm, Zool. 1880, p. 361. The young found in nest of *Accentor alpinus*; A. Girtanner, Zool. Gart. 1880, p. 28. Remarks: — Volckmar, *tom. cit.* pp. 344–346. On its eggs; R. Rougemont, Bull. Soc. Neuch. xi. pp. 509-517, pl. i.

Musophagidæ.

Corythaix reichenowi, sp. n., G. A. Fischer, Orn. Centralbl. 1880, p. 174, Nguru Hills, East Africa.

PSITTACI.

Brotogerys ferrugineifrons, sp. n., G. N. Lawrence, Ibis, 1880, p. 238, Bogotá, Colombia.

Cacatua ophthalmica hitherto supposed to be peculiar to the Solomon Islands, is found in New Britain, but not in New Ireland; P. L. Sclater, P. Z. S. 1880, p. 67.

Chrysotis cœligena, sp. n., G. N. Lawrence, Ibis, 1880, p. 237, Essequibo River, Guiana. Figured from a specimen living in the Zoological Gardens; P. L. Sclater, P. Z. S. 1880, p. 68, pl. ix. fig. 1, along with *C. dufresniana* (fig. 2). *Chrysotis apophœnica*, sp. n., A. Reichenow, Orn. Centralbl. 1880, p. 16, loc. incert.; = ♀ *C. albifrons*, P. L. Sclater, Ibis, 1880, p. 378. *C. nichollsi*, sp. n., G. N. Lawrence, Pr. U. S. Nat. Mus. [1880], p. 254, Dominica, West Indies. *C. bodini* and *C. erythrura*

(figured, pl. ii.) exhibited, and live specimens are in the Zoological Society's Gardens; Sclater, P. Z. S. 1880, p. 23.

Coryllis. On the species of this genus, with plate of *C. galgulus*; A. Frenzel, Monatsschr. deutsch. Ver. Schutze Vogelwelt, 1880, No. 1.

Cyclopsittacus salvadorii, sp. n., E. Oustalet, Bull. Ass. Sc. Fr. 1880, No. 11, p. 172, North coast of New Guinea.

Melopsittacus undulatus. Its embryological development; M. Braun, Arb. Inst. Würzb. [Dec.] 1879, pp. 161–204, pls. viii. & ix.

STRIGES.

Gymnoscops insularis, g. & sp. nn., H. B. Tristram, Ibis, 1880, p. 356, figured, pl. xiv., Mahé, Seychelle Islands.

Ninox terricolor, sp. n., E. P. Ramsay, P. Linn. Soc. N. S. W. iv. p. 466, Goldie River, S.E. New Guinea. *Ninox reyi*, sp. n., distinguished from *N. philippensis*; E. Oustalet, Bull. Ass. Sc. Fr. 1880, No. 39, p. 206, Sooloo Islands.

Nyctea scandiaca: on the young bred in confinement (p. 144), and on the renewed nesting in confinement (p. 471); J. H. Gurney, Ibis, 1880.

Scops lempiji: on another specimen from Sumatra; *id. tom. cit.* p. 217 [*cf.* Zool. Rec. xvi. *Aves*, p. 38].

Speotyto cunicularia: Shufeldts' Memoir on its Osteology, with 3 plates; E. Coues, Bull. Nutt. Orn. Club, v. pp. 129–130, pls. i.–iii.

Strigops habroptilus: note on this bird and on its skeleton; E. Deslongchamps, Ann. Mus. H. N. Caen, i. pp. 49–53.

Strix nebulosa alleni, new trinomial for the Florida race; R. Ridgway, Pr. U. S. Nat. Mus. i. [March, 1880], p. 8.

ACCIPITRES.

Cathartidæ.

See Ridgway, R., on *Sarcorrhampidæ*, suprà, p. 19.

Pseudogryphus californianus differs from all other American vultures in having 14 rectrices (p. 80), rarity and measurements (p. 82); R. Ridgway, Bull. Nutt. Orn. Club, v.

Cathartes burrovianus: its specific validity re-affirmed (p. 83), and *C. pernigra*, Sharpe, appears to be a good species (p. 84); *id. tom. cit.*

Falconidæ.

Accipiter virgatus; remarks on; R. B. Sharpe, Str. Feath. viii. No. 6, pp. 440–442. On *A. virgatus* and *A. gularis*; J. H. Gurney, *tom. cit.* pp. 443 & 444. *A. stevensoni* occurs in Sumatra: *id.* Ibis, 1880, p. 217.

Aquila rapax, *A. chrysaetus* figured; H. E. Dresser, B. Eur. pts. lxxvii.–lxxix.

Astur brachyurus, sp. n., E. P. Ramsay, P. Linn. Soc. N. S. W. iv. p. 465, South-eastern New Guinea.

Baza: on this genus; J. H. Gurney, Ibis, 1880, p. 462. *Baza sumatrensis* and *B. ceylonensis*: remarks on: *id.* Str. F. viii. p. 444.

Buteo harlani: description of an unusual (?) plumage; R. Ridgway, Bull. Nutt. Orn. Club, v. p. 58.

Dryotriorchis spectabilis: remarks on plumage, with figure; J. H. Gurney, P. Z. S. 1880, p. 621, pl. lviii.

Erythropus amurensis figured; J. Gould, B. Asia, pt. xxxii.

Falco atriceps: on the type specimen, and on *F. peregrinator*; J. H. Gurney, Str. Feath. viii. No. 6, pp. 423–437.

Gyps fulvus figured; H. E. Dresser, B. Eur. pts. lxxvii.–lxxix.

Hierofalco gyrfalco obsoletus [sic]: description of its adult plumage; R. Ridgway, Bull. Nutt. Orn. Club, v. pp. 92–94.

Leptodon: on this genus; J. H. Gurney, Ibis, 1880, p. 322.

Lophotriorchis kieneri: description of immature plumage; A. O. Hume, Str. Feath. ix. pp. 273–277.

Microhierax latifrons.obtained at the Nicobars; *id. op. cit.* viii. p. 496.

Pernis: on the three species of this genus; J. H. Gurney, Ibis, 1880, pp. 195–217.

Regerrhinus: on this genus; *id. tom. cit.* p. 312.

STEGANOPODES.

Phaetontidæ.

Phaeton flavirostris in Western New York: E. Coues, Bull. Nutt. Orn. Club, v. p. 63.

Pelecanidæ.

Sula bassana breeding in confinement; E. T. Booth, Zool. 1880, p. 363, Figured; H. E. Dresser, B. Eur. pts. lxxvii.–lxxix.

HERODIONES.

Ardeidæ.

Ardea rutenbergi, sp. n., G. Hartlaub, P. Z. S. 1880, p. 40, Mohambo, Northern Madagascar. *A. cyanirostris*, sp. n.: very closely allied to *A. leucogastra*, var. *leucoprymna*; C. B. Cory, B. Bahamas, p. 168, figured, *l. c.*, Inagua, Bahamas. *A. occidentalis* and *A. wuerdemanni*; half-grown young of these supposedly distinct species, found in the same nest by W. J. Velie, proving their identity; R. Ridgway, Bull. Nutt. Orn. Club, v. p. 122. *A. garzetta* and *A. alba* figured; H. E. Dresser, B. Eur. pts. lxxvii.–lxxix.

Ardetta minuta figured; *id. tom. cit.*

Nycticorax griseus in Clackmannanshire, and *N. gardeni* in Ayrshire; R. Gray, P. Phys. Soc. Edinb. 1880, pp. 355–360.

Plataleidæ.

Ibis comata (*Geronticus calvus*) obtained at Biledjik, Asia Minor, where it breeds; C. G. Danford, Ibis, 1880, p. 88. Exhibited, P. L. Sclater, P. Z. S. 1880, p. 356, with remarks on its geographical distribution. Figured; H. E. Dresser, B. Eur. pts. lxxvii.–lxxix.

Platalæa leucorodia: a visit to the colony near Amsterdam; H. Seebohm, Zool. 1880, pp. 457–461.

ODONTOGLOSSÆ.

Phœnicopteridæ.

Phœnicopterus antiquorum: on its breeding in Southern Spain; Lord Lilford, P. Z. S. 1880, pp. 446–450.

ANSERES.

Anatidæ.

See Sclater, P. L.

Anas gracilis appears to be distinct from *A. gibberifrons*; F. W. Hutton, Tr. N. Z. Inst. xii. pp. 271 & 272.

Anser [*Bernicla*] *ruficollis* obtained on the Lower Seine; P.-E. Lemetteil, Bull. Soc. Z. Fr. v. p. 75.

Bucephala islandica: on a peculiarity in the structure of the feathers which is absent in *B. clangula*; J. A. Jeffries, Bull. Nutt. Orn. Club, v. p. 189.

Cygnus americanus: on five specimens obtained in Scotland; C. A. Parker, Zool. 1880, p. 111. *C. olor*, *C. musicus*, *C. immutabilis*, *C. bewicki*, (heads) figured; H. E. Dresser, B. Eur. pts. lxxvii.–lxxix.

Dafila acuta: its second recorded occurrence in the Outer Hebrides; R. Gray, P. Phys. Soc. Edinb. 1880, p. 361.

Erismatura mersa: on its breeding in the lakes of the Kirgis steppes; K. G. Henke, Zool. Gart. 1880, pp. 142–147.

Mareca penelope occurs nearly every winter along the coasts of North Carolina and Virginia; R. Deane, Bull. Nutt. Orn. Club, v. p. 126.

Mergus serrator obtained at Kurrachee, the first recorded occurrence in India; A. O. Hume, Str. Feath. ix. p. 268. *M. merganser*: on its distribution in Scotland during the breeding season; J. H. Buchanan, P. Phys. Soc. Edinb. 1880, pp. 189–193.

Nomonyx, g. n., similar to *Erismatura*, but with the maxillary unguis as in *Fulix*: type, *Anas dominica*, L.; R. Ridgway, Pr. U. S. Nat. Mus. i. [March, 1880] p. 15.

Querquedula formosa, ♂ juv. obtained near Sultanpore; A. O. Hume, Str. Feath. viii. p. 494. *Q. carolinensis* recorded from Devon (H. Nicholls), and Hampshire (A. Fellowes); Zool. 1880, p. 70 [? identification].

Somateria spectabilis obtained on the Californian Coast; H. W. Henshaw, Bull. Nutt. Orn. Club, v. p. 189.

COLUMBÆ.

Gymnophaps pœcilorrhoa figured; J. Gould, B. New Guinea, pt. xi.

Melopelia plumbescens, sp. n., G. N. Lawrence, Ibis, 1880, p. 238, Guiana.

Otidophaps regalis, sp. n., O. Salvin & F. D. Godman, Ibis, 1880, p. 364, figured, pl. xi., Southern New Guinea. *Otidophaps nobilis* var. n. *cervicalis*, E. P. Ramsay, P. Linn. Soc. N. S. W. iv. p. 470, Goldie River, New Guinea.

Palumbus torringtoniæ figured; W. V. Legge, B. Ceylon, (with) pt. iii.

Ptilopus hernsheimi, sp. n., O. Finsch, P. Z. S. 1880, p. 577, and J. f. O. 1880, p. 303, Kuschai, Caroline Islands. *P. ponapensis*: remarks on; *id. tom. cit.* p. 578. *Ptilopus* (*Rhamphiculus*) *marchii*, sp. n., E. Oustalet, Le Nat. 1880, p. 324. *P. fischeri* figured; J. Gould, B New Guinea, pt. xi.

Treron schalowi, sp. n., A. Reichenow, Orn. Centralbl. 1880, p. 108, Diamond Fields, South Africa.

Dididæ.

Didunculus strigirostris: note on 2 specimens; E. Deslongchamps, Ann. Mus. H. N. Caen, i. pp. 53–57.

PTEROCLETES.

Pteroclidæ.

Review of the group; M. Bogdanow, Mél. biol. 1880, pp. 49–55. *Pterocles sewerzowi*, sp. n., distinguished from *P. alchata* (Central Asia); *P. elliotti*, sp. n., distinguished from *P. exustus* (Abyssinia), *id. l. c.*

GALLINÆ.

Tetraonidæ.

Lagopus mutus: [on its domestication]; A. Girtanner, Zool. Gart. 1880, pp. 71–82.

Lagopotetrix dicksoni [apparently a new name given to a hybrid between *Lagopus* and *Tetrix*], W. A. Malm, Œfv. Ak. Forh. 1880, pp. 17–31.

Tetrastes griseiventris, sp. n., M. A. Menzbier, Bull. Mosc. lv. pt. i. pp. 105–116, figured, pl. iv, distinguished from *T. bonasia*.

Phasianidæ.

Ammoperdix bonhami figured; H. E. Dresser, B. Eur. pls. lxxvii.–lxxix.

Francolinus (*Scleroptera*) *schuetti*, sp. n.; J. Cabanis, J. f. O. 1880, p. 351, Angola.

Gallus lafayettii figured; W. V. Legge, B. Ceylon, iii. p. 736 (2 pls.).

Galloperdix bicalcarata figured ; Legge, *tom. cit.* p. 741.

Numida ellioti, Barlett [*cf.* Zool. Rec. xiv. *Aves*, p. 53] exhibited ; P. L. Sclater, P. Z. S. 1880, p. 539, and apparently = *N. pucherani*, Hartl.

Phasianus reevesi ♂ and *P. colchicus* ♀ : hybrids between these two species exhibited ; Lord Lilford, P. Z. S. 1880, p. 421.

Cracidæ.

See Sclater, P. L.

Crax globicera, *C. erythrognatha*, *C. globulosa*, *C. viridirostris*, *C. incommoda* figured ; P. L. Sclater, Tr. Z. S. x. pt. xiii. pls. lxxxix.–xciii.

Mitua salvini figured ; *id. tom. cit.* pl. xcv.

Nothocrax urumutum figured ; *id. tom. cit.* pl. xciv.

Pauxis galeata : exhibition of adult ♀ showing that it does not always assume plumage of ♂ ; *id.* P. Z. S. 1880, p. 648.

Megapodiidæ.

See Schlegel, H.

Æpypodius, subg. n., for *Talegallus pyrrhopygius* and *Talegallus bruijni*, sp. n., Island of Waigou ; E. Oustalet, C. R. xc. pp. 906–908.

Megacephalon maleo from Celebes : on its osteology ; C. G. Giebel, Z. ges. Naturw. (3) v. pp. 205–208.

Megapodius sanghirensis, sp. n., H. Schlegel, Notes Leyden Mus. ii. p. 91, Sanghi.

Talegallus bruijni, sp. n., see *Æpypodius*, suprà.

FULICARIÆ.

Rallidæ.

Megacrex inepta figured ; J. Gould, B. New Guinea, pt. xi.

Porphyrio alleni figured ; H. E. Dresser, pts. lxxvii.–lxxix.

Porzana œnops, sp. n., P. L. Sclater & O. Salvin, P. Z. S. 1880, p. 161, Sarayacu, Ecuador.

Rallus insignis, sp. n., P. L. Sclater, P. Z. S. 1880, p. 66, figured pl. viii., Island of New Britain. *R. sulcirostris*, Wallace, and its allies : note on ; *id.* Ibis, 1880, pp. 309–312, figured (as *Hypotœnidia sulcirostris*), pl. vi., with woodcut of head, p. 311. *R. longirostris*, Bodd., and its geographical races ; R. Ridgway, Bull. Nutt. Orn. Club, v. pp. 138–140.

ALECTORIDES.

Gruidæ.

Balearica chrysopelargus (A. H. Licht.) is the proper name for the species usually known as *B. regulorum* ; W. B. Tegetmeier, P. Z. S. 1880, pp. 93 & 94.

Grus americana and *G. canadensis* : on the convolution of the trachea ; T. S. Roberts, Am. Nat. xiv. pp. 108–114, with two woodcuts. *G.*

americana : notes on ; J. D. Cator, *tom. cit.* p. 773. *Grus fraterculus*, Cassin : the second known specimen obtained at Rio Verde, Mexico, and the characters distinguishing it from *G. canadensis* pointed out ; J. A. Allen, Bull. Nutt. Orn. Club, v. p. 123. Remarks on : R. Ridgway, *tom. cit.* pp. 187 & 188 ; E. Coues, *l. c.*

Otididæ.

Eupodotis denhami : note on a specimen in the Zoological Gardens ; W. A. Forbes, P. Z. S. 1880, p. 477. *Eupodotis edwardsi* : note on, with especial reference to its gular pouch ; Sir W. Elliot, *tom. cit.* p. 486.

Otis tarda : for records of an unusual number of occurrences in England, see Zool. 1880, pp. 25, 26, 110, 114, 296 ; on its migrations in France, J. E. Harting, *tom. cit.* p. 252.

LIMICOLÆ.

Charadriidæ.

Ægialitis jerdoni, new name for the smaller Ringed Plover of Southern India, and its distinctive characters shown : W. V. Legge, P. Z. S. 1880, pp. 38 & 39.

Hiaticula ruficapilla : this Australian species obtained near Otaki, New Zealand ; T. W. Kirk, Tr. N. Z. Inst. xii. p. 246.

Scolopacidæ.

Actiturus bartramius [*longicaudus*] obtained in the London market ; J. E. Harting, Zool. 1880, p. 508, exhibited, *id.* P. Z. S. 1880, p. 543.

Arquatella couesi, sp. n., Aleutian Islands and Coast of Alaska, with comparative characters of *A. maritima* and *A. ptilocnemis* ; R. Ridgway, Bull. Nutt. Orn. Club, v. pp. 160–163.

Gallinago cœlestis [i.e., the common Snipe] figured ; H. E. Dresser, B. Eur. pts. lxxvii.–lxxix.

Limosa hæmastica : note on, with measurements ; E. Coues, Bull. Nutt. Orn. Club, v. p. 59.

Macrorrhamphus scolopaceus (Say) : remarks on its habits and its distinctness from *M. griseus* ; N. T. Lawrence, Bull. Nutt. Orn. Club, v. pp. 154–157, also R. Ridgway, *tom. cit.* pp. 157–160.

GAVIÆ.

Laridæ.

Hydrochelidon leucoptera obtained at the Andamans ; A. O. Hume, Str. Feath. viii. p. 495.

Larus audouini obtained on an island off the coast of Spain ; Lord Lilford, Ibis, 1880, pp. 480–483 : the specimens presented to the Zoological

Gardens under this name in 1874 prove to be *L. leucophæus* [*cachinnans*] ; id. *l. c.*

Stercorariinæ: on their abundance, especially *S. pomatorrhinus*, on the Norfolk coast in the autumn of 1879 ; H. Stevenson. Tr. Norw. Soc. iii. pp. 99–119. Large arrivals on the British coasts; for details, localities, and remarks, see Zool. 1880, pp. 18–21, 90–97, 511.

Sterna anglica and *S. fuliginosa* in Maine; R. Deane, Bull. Nutt. Orn. Club, v. p. 63. *S. caspia* probably breeds in Florida; G. A. Boardman, *tom. cit.* p. 64 : its eggs described from the coast of Virginia; R. Ridgway, *tom. cit.* p. 221.

TUBINARES.

Procellariidæ.

See Saunders, H.

Œstrelata hæsitata figured; H. E. Dresser, B. Eur. pts. lxxvii.–lxxix.

PYGOPODES.

Colymbidæ.

Colymbus glacialis figured; H. E. Dresser, B. Eur. pts. lxxvii.–lxxix.

Podicipidæ.

Podiceps fluviatilis figured ; H. E. Dresser, B. Eur. pts. lxxvii.–lxxix.

Alcidæ.

On the moult of the bill, or parts of its covering, in certain *Alcidæ*; R. Ridgway, Bull. Nutt. Orn. Club. v. p. 126. [Independent observations on the North Pacific species confirm L. Bureau's discoveries : *cf.* Zool. Rec. xvi. *Aves*, p. 6]. On the Moult of the bill in certain *Mormonidæ*; E. Coues, *tom. cit.* p. 127.

Alca impennis figured; H. E. Dresser, B. Eur. pts. lxxvii.–lxxix.

IMPENNES.

Spheniscidæ.

See Milne-Edwards, A.

Eudyptes: exhibition of a specimen of this genus which appeared to indicate a shedding of the horny beak.

CRYPTURI.

See Schlegel, H.

RATITÆ.

CASUARII.

Casuarius bennetti: remarkably interesting field-notes on its habits in New Britain; W. Powell, P. Z. S. 1880, pp. 493–495.

Dromæus novæ-hollandiæ: remarks upon its wind-pipe; A. W. Malm, Œfv. Ak. Forh. 1880, pp. 33–43, pl. vi.

STRUTHIONES.

Struthio asiaticus, Milne-Edw.: description and figure of the bones in the Brit. Mus. upon which this species was based; its identity with *S. camelus* affirmed; and other remarks on fossil remains from the Siwalik Hills; W. Davies, Geol. Mag. (2) vii. p. 18.

Rhea americana: preliminary communication on its gastric gland; E. Remouchamps, Bull. Ac. Belg. (2) l. pp. 115 & 116. Remarks on: *id.* Arch. Biol. i. pp. 583–594, pl. xxxv.

Dinornithidæ.

See Colenso, W.

ODONTORNITHES.

See Vogt, C., Owen, R.

Marsh, O. C. *Odontornithes*: A Monograph of the Extinct Toothed Birds of North America, with 34 plates and 40 woodcuts. U.S. Geol. Expl. of the 40th Parallel. Washington: 1880, 4to, pp. 201.

An admirable monograph of the 9 genera and 20 species of fossil birds found in the Cretaceous formation of America. *Hesperornis* forms the order *Odontolcæ*, with teeth in grooves; *Ichthyornis* represents the order *Odontormæ*, with teeth in sockets; and *Archæopteryx* (*Saururæ*) is united with these under the sub-class *Odontornithes*.

REPTILIA AND BATRACHIA.

BY

G. A. BOULENGER.

PHYSIOLOGICAL AND ANATOMICAL.

Reference may be made, as before, to the Reports and Analyses in JB. Anat. Phys. viii. Abth. i. & ii., and also, for the literature of 1879, to Zool. JB. Neap., ii. (the Batrachians and Reptiles by C. K. Hoffmann).

BORN, G. Nachträge zu "Carpus und Tarsus." Morph. JB. vi. pp. 49–77, pl. i.

Treats of the tarsus and carpus in the *Batrachia Ecaudata*, *Lacertilia Cionocrania*, and Chamæleons.

FAUNÆ.

EUROPE.

J. v. Bedriaga publishes an extensive paper on the geographical distribution of the European *Batrachia*; this paper includes a systematic catalogue of the species, the total number of which is 33, viz., 18 *Caudata* and 15 *Ecaudata*. Bull. Mosc. 1880, pp. 321–362.

BÖTTGER, O. Studien an palæarktischen Reptilien und Amphibien. Ber. Offenb. Ver. 1880, pp. 81–95.

Additions to the faunæ of the Tatra Mountains, Dalmatia and S. Austria, Eubœa, and the Caucasus.

Spain, Portugal, and Balearic Islands.

BOSCA, E. Catalogue des Reptiles et Amphibiens de la Péninsule Ibérique et des Iles Baléares. Bull. Soc. Z. Fr. 1880, pp. 240–287.

This catalogue enumerates 55 species, viz., 7 *Batrachia Caudata*, 13 *Batrachia Ecaudata*, 12 *Ophidia*, 17 *Lacertilia*, and 6 *Chelonia*.

Italy.

Giglioli, E. H. Elenco dei Mammiferi, degli Uccelli e dei Rettili ittiofagi appartenenti alla Fauna italica, e Catalogo degli Anfibi e dei Pesci italiani. Firenze: 1880, 8vo (*Reptilia* and *Batrachia*, pp. 14–18).

This catalogue of Batrachians mentions 11 tailed and 10 tailless species. It is to be observed that Giglioli is not yet convinced as to the specific distinctness of *Rana fusca* and *agilis*.

E. De Betta writes on the geographical distribution of the venomous snakes in Europe, and especially in Italy; Atti Ist. Ven. (5) vi. pp. 357–392.

Asia.

Western Asia.

Böttger, O. Die Reptilien und Amphibien von Syrien, Palæstina und Cypern. Ber. Senck. Ges. 1879–80, pp. 132–219, pls. iii. & iv.

72 Reptiles, including *Crocodilus vulgaris*, and 8 Batrachians, are enumerated, with notes on their synonymy and geographical distribution. A new genus and species of Snake and a new species of *Ophiops* are described.

Baluchistan.

Hubrecht, A. A. W. Note on 9 species of Reptiles and Frogs from Baluchistan. P. Z. S. 1880, pp. 620 & 621.

Western Siberia.

O. Finsch gives a list of the Reptiles and Frogs collected by him in Western Siberia: 7 Reptiles and 3 Batrachians. No special attention has been paid to *Rana*, which stands here as "*Rana temporaria*, Linn.," without further identification. Verh. z.-b. Wien, xxix. pp. 281 & 282.

China.

Fauvel, A. A. Alligators in China. J. N. China Soc. (n.s.) xiii. [1879] pp. 1–36.

Lataste, F. *Batrachia* from Northern China, 4 species are mentioned, 3 of which are described. Bull. Soc. Z. Fr. 1880, pp. 61–69.

Japan.

Hilgendorf, F. On the Collection of Reptiles and Batrachians made by him in Japan. 24 species are enumerated, with short notes on most of them. 2 new snakes are described. SB. Nat. Fr. 1880, pp. 112–121.

Africa.

Northern Africa.

Lataste, F. Descriptions of new species of Reptiles from Algiers. Le Nat. 1880, pp. 299, 306, & 325.

Peters, W. On some Reptiles collected in the Oasis Kufra, Tripoli.

21 species are mentioned, one new genus and one new species are described. MB. Ak. Berl. 1880, pp. 305–309.

Eastern Africa.

GÜNTHER, A. New species of Reptiles from E. Africa. 2 new genera and 7 new species described. Ann. N. H. (5) vi. pp. 234–238, with woodcuts.

Madagascar.

PETERS. W. On a Collection of Reptiles and Frogs from Nossi Bé and Madagascar. 30 species are mentioned in this paper, 2 of them are described as new. MB. Ak. Berl. 1880, pp. 509–511.

BÖTTGER, O. Diagnoses of new Reptiles and Frogs from Nossi Bé. Zool. Anz. 1880, pp. 279 & 567.

AUSTRALIA.

GÜNTHER, A. Descriptions of new species of Reptiles and Batrachians from Australia, collected by Hr. Dämel for the Godeffroy Museum. J. Mus. Godeffr. xii. [1876] pp. 45–47.

AMERICA.

California.

LOCKINGTON, W. N. List of Californian Reptiles and *Batrachia* collected by Mr. Dunn and Mr. W. J. Fisher in 1876. Am. Nat. xiv. p. 295.

Mexico and Central America.

BOCOURT, F. Mission Scientifique au Mexique et dans l'Amérique Centrale; iii.e partie, Études sur les Reptiles et les Batraciens. Paris: 1879, fo. 6e livr. pp. 361–440, pls. xxi.–xxii. D.

This part contains the conclusion of the *Gerrhonotidæ*, the *Cercosauridæ*, and the *Scincidæ*.

SUMICHRAST, F. Contribution à l'histoire naturelle du Mexique. Bull. Soc. Z. Fr. 1880, pp. 162–190.

The author enumerates the Reptiles and Batrachians of the Isthmus of Tehuantepec, the number of which is 91 ; 5 *Chelonia*, 2 *Crocodilia*, 23 *Lacertilia*, 40 *Ophidia*, 19 *Batrachia Ecaudata*, 1 tailed and 1 apodal Batrachian. Several of these species are only generically determined, and the author presumes they may be new to science.

Ecuador.

BOULENGER, G. A. Reptiles et Batraciens recueillis par M. Emile de Ville dans les Andes de l' Équateur. Bull. Soc. Z. Fr. 1880, pp. 41–48.

This paper mentions 32 species, with notes upon some of them, and contains diagnoses of five new species, viz., 2 Lizards, 1 Snake, and 2 Frogs.

O'Shaughnessy, A. W. E. Notes on some species of *Anolis* from Ecuador, and description of a new species. P. Z. S. 1880, pp. 491–493.

REPTILIA.

CHELONIA.

Bronn, H. G. Klassen und Ordnungen des Thierreichs. Band vi. Abth. iii. pp. 177–400, pls. xxiv.–xlviii. *Reptilia*, by C. K. Hoffmann.

This part concludes the general and contains the systematic arrangement and geographical distribution of the *Chelonia*.

Vaillant, L. Sur la disposition des vertèbres cervicales chez les Chéloniens. C. R. xci. pp. 795–798.

A long and important memoir on the same subject in Ann. Sc. Nat. x. art 7, 106 pp. pls. 25–31. Vaillant describes and figures the cervical vertebræ of a certain number of species belonging to the principal genera, and points out great differences in their mode of articulation. Although so much has been written on the osteology of the *Chelonia*, this subject had not before been treated in a general manner. The author proposes to divide the *Chelonia* into three families: 1, *Chelonida*, with two tribes, *Sphargidina* and *Chelodina*; 2, *Trionychida*; 3, *Testudinida*, with two tribes, *Chelydina* and *Chersemydina*, the latter containing two sections, *Chelydreæ* and *Testudineæ*.

Heude, P. M. Mémoire sur les Trionyx, in "Mémoires concernant l'histoire naturelle de l'Empire Chinois," 1er cahier. Paris: 1880, 4to, pp. 1–38, pls. i.–ix.

The Rev. P. M. Heude, a Jesuit missionary, has undertaken the study of the *Trionychidæ* of China. From this study, based on hundreds of specimens from various localities, the author comes to the conclusion that the Chinese species of this family are as numerous as those actually known of the Order *Chelonia*, recent and fossil. Of course, with the small number of Chinese specimens of the genus *Trionyx* in European Museums, it is impossible to ascertain the degree of exaggeration of this statement; the Recorder thinks it, however, useful to observe that the genera, and most of the species, are established on very trifling characters, some of which will probably prove to be monstrous.

The following are the genera and species described in this paper:—

Yuen, g. n., p. 18, for *Y. leprosus*, p. 20, *maculatus*, p. 22, pls. i. & i. *a*, *elegans*, *viridis*, and *pallens*, p. 23, spp. nn.

Psilognathus, g. n., for *P. lævis*, sp. n., p. 24, pl. ii.

Temnognathus, g. n., p. 25, for *T. mordax*, sp. n., p. 26, pl. iii.

Gomphopelta, g. n., for *G. officinæ*, sp. n., p. 27, pl. iv.

Cœlognathus, g. n., for *C. novem-costatus*, sp. n., p. 29, pl. v.

Tortisternum, g. n., for *T. novem-costatus*[*-tum*], sp. n., p. 31, pl. vi.

Ceramopelta, g. n., for *C. latirostris*, sp. n., p. 33, pl. vii.

Coptopelta, g. n., p. 34, for *C. septem-costata*, sp. n., p. 35, pl. viii.

Cinctisternum, g. n., p. 36, for *C. bicinctum*, sp. n., p. 37, pl. ix.

A short note on the extinct Land-Tortoises of Mauritius and Rodriguez, by A. C. Haddon, J. L. S. xv. p. 59.

Pelomedusa. This genus contains only one species, *P. gehafie* and *nigra* being identical with *P. galeata*; Boulenger, Bull. Soc. Z. Fr. 1880, p. 146, with woodcuts.

Chelonia depressa, sp. n., Garman, Bull. Mus. C. Z. vi. p. 124, East Indies and N. Australia. *C. agassizi*, Dum. & Boc., redescribed; *id. l. c.* p. 126.

Thalassochelys kempi, sp. n., *id. l. c.* p. 123, Gulf of Mexico.

CROCODILIA.

Behrens, W. Untersuchungen über den Processus uncinatus der Vögel und Crocodile. Inaug.-Diss. Götting. 1880, 8vo, 36 pp.

[Not seen by the Recorder.]

Crocodilus vulgaris, Cuv. Its occurrence in Palestine; Böttger, Ber. Senck. Ges. 1879–80, p. 199, pl. iv.

Crocodilus palustris. Notes on the breeding of this species in Ceylon, and on the care the female bestows upon her eggs and young; S. Waytialingam, P. Z. S. 1880, p. 186.

Alligator sinensis, sp. n., A. A. Fauvel, J. N. China Soc. (n.s.) xiii. (1879), pp. 1–36, with fig.; Vaillant, Ann. Sc. Nat. (vi.) ix. art. 8, China.

Alligator sclerops: biological and anatomical notes on this species, by H. Weyenbergh, Periód. Zool. Argent. iii. [1878] pp. 74–82.

LACERTILIA.

Blanchard, R. Recherches sur la structure de la peau chez les Lézards. Bull. Soc. Z. Fr. 1880, pp. 1–36, pls. i.-iii.

This study is based chiefly upon *Lacerta ocellata.*

Wiedersheim, R. On the dentition of Lizards. Zool. Anz. 1880, p. 493.

Chamæleontidæ.

Chamæleon vulgaris, var. n. *recticrista*, from S.W. Asia; Böttger, Ber. Senck. Ges. 1879–80, p. 198.

Chamæleon cephalolepis, sp. n., Günther, Ann. N. H. (5) vi. p. 237, Comoro Island.

Chamæleon ebenaui, sp. n., Böttger, Zool. Anz. 1880, p. 280, Madagascar.

Chamæleon furcifer, sp. n., Vaillant and Grandidier, Bull. Soc. Philom. (7) iv. p. 148, Madagascar.

In a foot-note, p. 149, Vaillant proposes to divide the genus *Chamæleon* into four sections, according to the shape of the head; these sections he names *Chamæleones*, *Superciliares*, *Leiocerati*, and *Trachycerati.*

Chamæleon kersteni, Peters, is referred to the genus *Rhampholeon*; Günther, *l. c.* p. 238.

Geckotidæ.

Scalabotes, g. n., allied to *Hemidactylus*; Peters, MB. Ak. Berl. 1880, p. 795. For *S. thomensis*, sp. n., *id. ibid.* fig. 1, S. Thomé, W. Africa.

Ptyodactylus oudrii, sp. n., Lataste, Le Nat. 1880, p. 299, Algiers.

Pachydactylus laticauda, sp. n. (= *P. cepedianus*, Böttg.), Böttger, Zool. Anz. 1880, p. 280, Madagascar.

Geckolepis maculatus, sp. n., Peters, *l. c.* p. 509, pl. iii., N.W. Madagascar.

Nephrurus, g. n. (*Gymnodact.*), Günther, J. Mus. Godeffr. xii. [1876], p. 46. For *N. asper*, sp. n., *id. ibid.*, Australia.

Tropiocolotes, g. n., (*Stenodact.*), Peters, *l. c.* p. 306. Differs from all other genera of Geckos in being entirely covered with keeled, imbricated scales. For *S. tripolitanus*, sp. n., *id. ibid.* fig. 1, Tripoli.

Agamidæ.

Agama tournevillii, sp. n., Lataste, Le Nat. 1880, p. 325, Algiers.

Uromastix princeps, sp. n., O'Shaughnessy, P. Z. S. 1880, p. 445, pl. xliii., Zanzibar.

Iguanidæ.

Anolis devillii, Boulenger, Bull. Soc. Z. Fr. 1880, p. 42; *A. buckleyi*, O'Shaughnessy, *l. c.* p. 492, pl. xlix.: spp. nn., Ecuador.

Liocephalus formosus, sp. n., Boulenger, *l. c.* p. 43, Ecuador.

Lacertidæ.

Lacerta ocellata pater, subsp. n., Lataste, *l. c.* p. 306, Algiers.

Lacerta oxycephala, Fitz., and *judaica*, Camerano, described with great details, and compared with the races of *L. muralis* by Bedriaga, Arch. f. Nat. 1880, pp. 250–273. *L. oxycephala* figured, pl. xi.

Zerzoumia, g. n. Intermediate between *Notopholis* and *Tropidosaura*; Lataste, *l. c.* p. 299; for *Z. blanci*, sp. n., *id. ibid.*, Algiers.

Psammodromus cinereus, Bp., is specifically distinct from *P. hispanicus*, Pitz.; Lataste, Rev. Int. Sc. iii. p. 177.

Ophiops schlueteri, sp. n., Böttger, Ber. Senck. Ges. 1879–80, p. 176, ol. iii. fig. 3, Syria and Cyprus.

Acanthodactylus boskianus, var. *syriaca*, Böttger, = *A. savignii* (Aud.); *id. l. c.* p. 178.

Zonuridæ.

Chamæsaura miodactyla, sp. n., Günther, Ann. N. H. (5) vi. p. 235, Peri Bush, E. Africa.

Gerrhonotus planifrons, sp. n., Bocourt, Miss. Sc. Mex. p. 361, pl. xxi. E, fig. 1, Oaxaca.

Gerrhonotus moreleti, Bocourt, fig. 1, *auritus*, Cope, fig. 2, *vasconcelosii*, Boc., fig. 3, and *autoges*, Cope, fig. 4, figured by Bocourt, *l. c.* pl. xxi.

Gerrhonotus (*Barissia*) *imbricatus*, Wiegm., p. 363, pl. xxi. B, figs. 1 & 2, and *rudicollis*, Wiegm., p. 367, pl. xxi. B, fig. 3, described and heads figured by Bocourt, *l. c.*

Cercosauridæ.

Bocourt, Miss. Sc. Mex. p. 370, has arranged the genera of this family in a synopsis, according to the classification proposed by Peters.

Leposoma dispar, sp. n., Peters, MB. Ak. Berl. 1880, p. 217, fig. 2, Colombia. The name *Leposoma*, Spix, has been changed into *Lepidosoma*, by Wagler, as being misspelt. This is not the case, and therefore Peters reintroduces the original spelling.

Scincidæ.

Euprepis ocellatus, sp. n., Bocourt, Miss. Sc. Mex. p. 414, pl. xxii. C, fig. 8, N. America.

Euprepis maculatus, Gray, p. 410, pl. xxii. C, fig. 3, and *auratus*, Schn., p. 412, pl. xxii. C, fig. 7, described and head figured by Bocourt, *l. c.*

Mabouya metallica, sp. n. (= *Eumeces mabouia*, var. *c*, D. & B.), Bocourt, *l. c.* p. 400, pl. xxii. fig. 1.

Mabouya agilis, Raddi, p. 395, pl. xxii. B, fig. 2, *sloanii*, Daud., p. 401, pl. xxii. B, fig. 3, *fulgida*, Cope, p. 403, pl. xxii. B, fig. 4, *frenata*, Cope, p. 404, pl. xxii. C, fig. 6, *cepedii*, Coct., p. 406, pl. xxii. B, fig. 5, *dorsovittata*, Cope, p. 407, pl. xxii. C, fig. 2, described and heads figured by Bocourt, *l. c.*

Riopa fischeri, sp. n., Bocourt, *l. c.* p. 416, pl. xxii. F, fig. 1, Puerto Cabello.

Gongylus ocellatus bedriagai, subsp. n., Boscá, An. Soc. Esp. ix. p. 50, Spain and Portugal.

Gongylus johannæ, sp. n., Günther, Ann. N. H. (5) vi. p. 236, Comoro and Johanna Islands.

Eumeces capito, p. 429, pl. xxii. D, fig. 8, United States, *callicephalus*, p. 431, pls. xxii. D, fig. 2, & xxii. E, fig. 2, Mexico, *hallowelli*, p. 435, pl. xxii. E, fig. 7, California, spp. nn., Bocourt, Miss. Sc. Mex.

Eumeces laticeps, Schn., p. 424, pl. xxii. D, fig. 6, *quinquelineatus*, L., p. 426, pl. xxii. E, fig. 10, *skiltonianus*, B. & G., p. 433, pls. xxii. A, fig. 3, & xxii. E, fig. 3, *lynxe*, Wiegm., p. 437, pl. xxii. E, fig. 9, *brevirostris*, Gthr., p. 489, pl. xxii. A, fig. 7, & xxii. E, fig. 1 *a*, redescribed and heads figured by Bocourt, *l. c.*

Delma orientalis, sp. n., Günther, J. Mus. Godeffr. xii. [1876] p. 45, Peak Downs, Australia.

Lygosoma heterodactylum, sp. n., *id. ibid.*, Peak Downs.

Sepacontias, g. n., *id.* Ann. N. H. (5) vi. p. 235, for *S. modestus*, sp. n., *id. ibid.*, Mpwapwa, E. Africa.

Acontias hildebrandti, sp. n., Peters, MB., Ak. Berl. 1880, p. 510, N. W. Madagascar.

Diploglossus (*Celestus*) *sagræ*, Coct., p. 378, pl. xxii. fig. 1, *pleii*, D. & B., p. 381, pl. xxii. fig. 4, *bilobatus*, O'Sh., p. 382, pl. xxii. A, fig. 1, *steindachneri*, Cope, p. 388, pl. xxii. fig. 3, *occiduus*, Shaw, p. 385,

pl. xxii. fig. 2; *D. mille-punctatus*, O'S., p. 388, pl. xxii. A, fig. 5, *fasciatus*, Fitz., p. 389, pl. xxii. fig. 5, *monotropris*, Kuhl, p. 391, pl. xxii. fig. 6. Described and head figured by Bocourt, Miss. Sc. Mex.

Rhodona fragilis, sp. n., Günther, J. Mus. Godeffr. xii. [1876] p. 45, Peak Downs, Australia.

Amphisbænidæ.

Geocalamus, g. n., allied to *Baikia*; Günther, Ann. N. H. (5) vi. p. 234, for *G. modestus*, sp. n., *id. ibid.*, Zanzibar.

Monopeltis (*Phractogonus*) *jugularis*, sp. n., Peters, MB. Ak. Berl. 1880, p. 219, fig. 1, W. Africa.

OPHIDIA.

Emery, C. Intorno alle glandole del capo di alcuni Serpenti proteroglifi. Ann. Mus. Genov. xv. pp. 546–558, with woodcuts.

On the venomous gland of Snakes, and especially *Acanthophis australis*, *Pelamis bicolor*, and *Platyurus fasciatus*.

A. T. de Rochebrune distinguishes and characterizes in the rachis of the *Ophidia* the several regions of other *Vertebrata*. C. R. xci. pp. 551–553.

On copulation in the *Ophidia*; Lataste, Bull. Ass. Fr. viii. [1879], pp. 765 & 766.

Typhlopidæ.

Typhlops depressus, sp. n., Peters, MB. Ak. Berl. 1880, p. 220, fig. 3, Duke of York Island.

Typhlops (*Ophthalmidion*) *mucronatus*, sp. n., Böttger, Zool. Anz. 1880, p. 279, Madagascar.

Onychocephalus simoni, Böttger, figured by Böttger, Ber. Senck. Ges. 1879–80, pl. iii. fig. 1.

Leptocalamus trilineatus, sp. n., Peters, MB. Ak. Berl. 1880, p. 221, fig. 2, Brazil.

Uropeltidæ.

Plectrurus aureus, sp. n., Beddome, P. Z. S. 1880, p. 182, Wynaad.

Boidæ.

Morelia variegata, Gray, described and figured by McCoy, Prodr. Zool. Vict., Dec. ii. pl. xiii. [1878].

Python breitensteini, sp. n., Steindachner, SB. Ak. Wien, lxxxii. Abth. 1, p. 267, Borneo.

Piesigaster, g. n. Allied to *Chilabothrus*, D. & B., but differing from it by the præ-frontals, which are divided into small scales, by the contact of not more than two supero-labials with the eye, and by the two large

præ-nasals, which are in contact on the middle of the snout. Seoane, Abh. Senck. Ges. xii. p. 217. For *P. bœttgeri*, sp. n., *id. l. c.* p. 218, pl., Philippines.

Colubridæ.

Brachyorrhus albus, Kuhl, var. n. *conjunctus*, Fischer, Arch. f. Nat. 1880, p. 226.

Rhabdosoma duboisi, sp. n., Boulenger, Bull. Soc. Z. Fr. 1880, p. 47, Ecuador.

Elapomorphus erythronotus, sp. n., Peters, MB. Ak. Berl. 1880, p. 222, S. Paul, Brazil.

Micrelaps, g. n. Allied to *Elapomorphus*. Böttger, Ber. Senck. Ges. 1879–80, p. 136. For *M. muelleri*, sp. n., *id. l. c.* p. 137, pl. iii. fig. 2, Jerusalem.

Ungalia taczanowskii, sp. n., Steindachner, SB. Ak. Wien, lxxx. Abth. 2, p. 522, pl., Peru.

Xenodon punctatus, sp. n., Peters, MB. Ak. Berl. 1880, p. 221, fig. 3, Brazil.

Chrysopelea viridis, sp. n., Fischer, Arch. f. Nat. 1880, p. 222, pl. ix. figs. 13–17, Tabukan, Sangi.

Labionaris filholi, Brocchi, ex. typ., sec. Strauch, = *Ogmodon vittatus*, Ptrs.; Peters, *l. c.* p. 223.

Dipsas subæqualis, Fischer, *l. c.* p. 224, pl. ix. figs. 18–21 (locality not stated); *D. betsileana*, Günther, Ann. N. H. (5) v. p. 238, S.E. Betsileo, Madagascar: spp. nn.

Tachymenis vivax. Its occurrence in Cyprus; Günther, *l. c.* p. 436.

Ophites orientalis, Hilgendorf, SB. nat. Fr. 1880, p. 115, figs. 1–5; *O. japonicus*, Günther, Ann. N. H. (5) vi. p. 462: spp. nn., Japan.

Elapidæ.

Elaps sundevalli, Smith. The type examined and a short account of it given, with figures of the head and vent; this snake is not an *Elaps*, but should be referred to the genus *Elapsoidea*, Barb. Peters, MB. Ak. Berl. 1880, p. 797, fig. 2.

Hoplocephalus dæmeli, sp. n., Günther, J. Mus. Godeffr. xii. [1876], p. 46. Australia.

Hoplocephalus flagellum, McCoy, and *H. coronoides*, Gthr., described and figured by F. McCoy, Prodr. Zool. Vict., Dec. ii. pl. xi. [1878].

Denisonia ornata, Krefft, = *Hoplocephalus maculatus*, Steind.; Günther, *l. c.*

Diemenia superciliosa, Fischer, *D. microlepidota*, McCoy, and *D. aspidorhyncha*, McCoy, described and figured by F. McCoy, *l. c.* Dec. iii. pl. xxiii. [1879].

Furina bicucullata, McCoy, described and figured; *id. op. cit.* Dec. iv. pl. xxxii. [1879].

Acanthophis antarctica (Shaw), described and figured; *id. op. cit.* Dec. ii. pl. xii. [1878].

Viperidæ.

Vipera berus. On its occurrence in the Veneto ; Ninni, Atti Soc. Ital. xxii. A reply by De Betta ; Atti Ist. Ven. (5) vi. pp. 1015–1020.

Vipera aspis. Note on the breeding season of this species, by Lessona, Atti Acc. Tor. xv. p. 613.

Vipera berus, L., p. 361, *aspis*, L., p. 379, *ammodytes*, L., p. 385. Notes on these species by De Betta, Atti Ist. Ven. (5) vi.

Trigonocephalus halys, Pall. Note by De Betta, *l. c.* p. 388.

Botriechis scutigera, p. 218, pl. viii. figs. 8 & 9, and *nummifera*, p. 222, pl. viii. figs. 10–12, Guatemala, spp. nn , Fischer, Arch. f. Nat. 1880.

Trimeresurus riukiuanus, sp. n., Hilgendorf, SB. Nat. Fr. 1880, p. 118, figs. 6–10, Japan.

BATRACHIA.

Kastschenko, N. Ueber die Genese und Architectur der Batrachierknochen. Arch. mikr. Anat. xix. pp. 1–52, pls. i. & ii.

Kuhn, A. Ueber das häutige Labyrinth der Amphibien. *Op. cit.* xvii. pp. 479–550.

Nussbaum, M. Zur Differenzirung des Geschlechts im Thierreich. *Op. cit.* xviii. pp. 1–121, pls. i.–iv.

This work contains details upon sexual organs in *Batrachia.*

Parker, W. K. Structure and Development of the Skull in the *Batrachia.* Part iii. Abstract in P. R. Soc. xxx. pp. 435–438.

Van Bambeke, C. Nouvelles Recherches sur l'Embryologie des Batraciens. Archives de Biologie, i. pp. 305–380, pls. xi.–xiv.

This memoir is divided into two parts. The first treats of the envelopes of the ovum, and of the external embryonary transformations in the tailed *Batrachia—Axolotl, Triton alpestris, helveticus*, and *tæniatus*; the second is devoted only to the study of the division of the ovum in the same species, and in two Ecaudata, *Pelobates fuscus* and *Bufo vulgaris.*

The author distinguishes five envelopes round the ovum, and enters into some details concerning their synonymy, which is in great disorder. In the transformation of the embryo, to the moment it leaves the egg 17 periods are defined. Finally, the author compares the results obtained by him with those obtained by Goette, Bütschli, O. Hertwig, Scott and Osborn, and Beneke.

ECAUDATA.

On the sexual characters of the *Batrachia Ecaudata*; L. Camerano, Atti Acc. Tor. xv. pp. 683–702, with woodcuts.

On the green colouration of the skeleton of *Pseudis paradoxa* ; id. *l. c.* pp. 789–794. [The Recorder has examined the type specimen of *Pseudis minuta* in the British Museum, and thinks it useful to state that, con-

trary to what has been noticed by Prof. Peters, the bones do not exhibit any trace of green. This odd colouration is certainly not constant in a species, the Recorder having recently observed it in a specimen of *Rana halecina*; he has met with it in *Pseudis paradoxa*, in two species of *Chiromantis*, in *Hyla venulosa*, and in *Trachycephalus marmoratus*.]

Duval, M. Recherches sur la spermatogenèse chez la Grenouille. Rev. Montp. (2) ii. pp. 121–143, pls. iii. & iv.

Lessona, M. Sulla ghiandola frontale degli Amfibi Anuri. Atti Acc. Tor. xv. pp. 581–590, pl. xiv.

Nussbaum, M. Ueber die Endigung der Wimpertrichter in der Niere der Anuren. Zool. Anz. 1880, pp. 514–517.

Siebert, G. Die Respiration des Frosches im Verhältniss zur Circulation. Inaug.-Diss., Königsberg, 1880, 8vo, 32 pp. 1 pl.

[Not seen by the Recorder.]

Thering, H. v. Ueber die Wirbelsäule von *Pipa*. Morph. JB. vi. pp. 297–314, with woodcuts.

Wiedersheim, R. Zur Anatomie des Froschgehirns. Zool. Anz. 1880, pp. 497–499, with woodcuts.

Rana esculenta, L. Lataste splits *R. esculenta* into two sub-species, giving the sub-specific name *viridis*, Rösel, to that inhabiting Europe, N. Africa, and W. Asia; that of *marmorata*, Hallow., to that from E. Asia. The latter fully described. Bull. Soc. Z. Fr. 1880, p. 61.

Rana plancii, sp. n., Lataste, *l. c.* p. 64, China.

Ranæ temporariæ. Boulenger publishes a supplement to his monograph of these species. Additional notes on the geographical distribution of *Rana fusca*, *arvalis*, and *agilis*, and two species characterized, viz., *R. nigricans*, Hallow., and *R. pretiosa*, Baird & Gir. Bull. Soc. Z. Fr. 1880, pp. 207–209.

Rana dybowskii, Gthr., = *R. fusca*; id. *l. c.* p. 207.

Rana agilis. Its discovery in Strasburg; Böttger, Zool. Anz. 1880, p. 551.

Limnodytes ulcerosus, sp. n., *id. l. c.* p. 282, Madagascar.

Hemimantis horrida, sp. n, *id. ibid.*, Madagascar.

Hylodes devillii and *glandulosus*, spp. nn., Boulenger, Bull. Soc. Z. Fr. 1880, p. 47, Ecuador.

Hyla perezi, sp. n, Bosca, An. Soc. Esp. ix. p. 181, Spain, Portugal, France; = *H. arborea* var. *meridionalis*, Böttger, Ber. Senck. Ges. 1879–80, p. 212.

Hyla fordi, sp. n., Günther, J. Mus. Godeffr. xii. [1876] p. 47, Australia.

Nototrema marsupiatum. The tadpole described by Boulenger, Bull. Soc. Z. Fr. 1880, p. 48.

Hylomantis, g. n., Peters, MB. Ak. Berl. 1880, p. 223. Characters of *Hyla*, but no vomerine teeth. *H. fallax*, sp. n., *id. l. c.* p. 224, fig. 4, E. Australia.

Cophyla, g. n. Closely allied to *Microhyla*, Tsch., but with the habit of

Hyla. Böttger, Zool. Anz. 1880, p. 281. *C. phyllodactyla*, sp. n., *id. ibid.*, Madagascar.

Chiroleptes brevipalmatus, sp. n, Günther, J. Mus. Godeffr. xii. [1876] p. 47, Australia.

Dyscophus sanguineus, sp. n., Böttger, Zool. Anz. 1880, p. 567, Madagascar.

Bombinator igneus. Note on its skeleton, by L. Camerano, Atti Acc. Tor. xv. pp. 445–450, with woodcuts.

Alytes obstetricans, Laur. Albinos, tadpole and young figured by Lataste, Actes Soc. L. Bord. xxxiv. pl. xi. figs. 1 & 2.

Alytes obstetricans boscai, Lataste, figured ; *id. l. c.* figs. 3–5.

Dendrobates ebenaui, sp. n., Böttger, Zool. Anz. 1880, p. 281, Madagascar.

Bufo. A monograph of the Palæarctic and Æthiopian species, by G. A. Boulenger, P. Z. S. 1880, pp. 545–574, pls. l.–lii. 10 species are described; a variety of *B. viridis*, Laur., *B. mauritanicus*, Schleg., and a variety of *B. regularis*, Reuss, are figured.

Bufo vulgaris, Laur. Divided by Lataste into two subspecies : *cinereus*, Schn., the old European form, and *japonicus*, Schleg., from Japan and China. The latter fully described ; Bull. Soc. Z. Fr. 1880, p. 66.

Bufo variabilis, var. n. *balearica*, Böttger, Zool. Anz. 1880, p. 642.

Rhombophryne, g.n., allied to *Breviceps*, but with vomerine teeth; Böttger, *l. c.* p. 567. *R. testudo*, sp. n., *id. l. c.* p. 568, Madagascar.

Rhinophrynus dorsalis. Sumichrast states that during copulation the male seizes the female round the waist. Bull. Soc. Z. Fr. 1880, p. 187.

CAUDATA.

Fraisse, F. Eingenthümliche Structurverhältnisse im Schwanze erwachsener Urodelen. Zool. Anz. 1880, pp. 12 & 13.

Gasco, F. Gli amori del Tritone alpestre (*Triton alpestris*, Laur.) e la deposizione delle sue uova. Ann. Mus. Genov. xvi. pp. 5–58.

Gasco has fully elucidated the mode of fecundation of the Newts. The male deposits his spermatozoa on the ground, where they are gathered by the gaping lips of the female's cloaca. The same author also describes at great length the development of *Triton alpestris* ; l. c. pp. 83–147, pls. i.–iv.

A note on very large larvæ of Newts ; O. Hamann, Jen. Z. Nat. xiv. pp. 567–576, pl. xxvi. [From the figure given of these larvæ, they cannot possibly belong to *Triton cristatus* ; they are very likely those of *T. alpestris*.—Rec.]

Parker, W. K. On the development of the skull in the Urodele Batrachians. Abstract in P. Z. S. 1880, p. 544.

Pfitzner, W. Die Epidermis der Amphibien ; I. Untersuchungen über Bau und Entwickelung der Epidermis des gefleckten Salamanders. Morph. JB. vi. pp. 468–526, pls. xxiv. & xxv.

This paper contains, besides the anatomical part, very interesting

remarks on the habits and reproduction of *S. maculosa*, and especially on a case of copulation.

Stöhr, P. Zur Entwickelungsgeschichte des Urodelschädels. Z. wiss. Zool. xxiii. pp. 477–526, pls. xxix. & xxx.

An important contribution to the study of the development of the skull in the tailed *Batrachia*.

Van Bambeke, C. Formation des Feuillets embryonnaires et de la Notocorde chez les Urodèles. Bull. Ac. Belg. (2) l. pp. 83–91.

The author has especially investigated the Axolotl and *Triton alpestris*.

Weismann, A. Transformacion del Ajolote mexicano en Amblystoma. Nat. Mex. v. pp. 31–57.

Wiedersheim, R. Ueber die Vermehrung des Os centrale im Carpus und Tarsus des Axolotls. Morph. JB. vi. pp. 581–583, pl. xxx.

Triton montandoni, sp. n., Boulenger, Bull. Soc. Z. Fr. 1880, pp. 37 & 157, pl. vii., Moldavia.

Pelonectes boscai, Lat. Böttger [see Zool. Rec. xvi. *Rept.* p. 17] having stated that both Peters and himself considered *P. boscai* as a variety of *Triton palmatus*, Lataste publishes a very polemical reply. He observes that those naturalists who do not choose to devote some of their time to the study of Newts in their living state, and in all the changes they undergo with age, sex, and season, are not able to distinguish properly these Urodeles, nor to perceive the true affinities between the species. Rev. Int. Sc. iii. pp. 173–177.

Notes on the genera *Pelonectes* and *Cynops*, and *Cynops pyrrhogaster*, Boié, described; Boulenger, Bull. Soc. Z. Fr. 1880, p. 38.

Triturus viridescens. Observations upon the habits of this species by S. Monks, Am. Nat. xiv. pp. 371–374.

Pleurodeles waltli. Its breeding in the menagerie of the Jardin des Plantes; Vaillant, C. R. xci. pp. 127 & 128, Bull. Soc. Accl. 1880, p. 3, Bull. Soc. Philom. (7) iv. p. 127, Ann. N. H. (5) vi. pp. 244–246.

A detailed account of the skeleton of this species by R. Wiedersheim, Jen. Z. Nat. xiv. pp. 25–38, pl. i.

Salamandra maculosa. Remarks on the larvæ of this species by Beneke, Zool. Anz. 1880, p. 13.

Spelerpes fuscus, Bp. Its discovery in France (Alpes Maritimes) mentioned by Lataste, Le Nat. 1880, p. 289.

APODA.

On the so-called tentacle of the *Apoda*; R. Wiedersheim, Zool. Anz. 1880, p. 493.

Cœcilia polyzona, p. 215, pl. viii. figs. 1–4, and *natans*, p. 217, pl. viii. figs. 5–7, spp. nn., Fischer, Arch. f. Nat. 1880, Colombia.

Dermophis brevirostris, Peters, = *Siphonops thomensis*, Bocage: Peters, MB. Ak. Berl. 1880, p. 223.

Geotrypetes, g. n., for *Cœcilia seraphini*; Peters, SB. Nat. Fr. 1880, p. 53.

PISCES.

BY

G. A. Boulenger.

PHYSIOLOGICAL, ANATOMICAL, AND GENERAL.

Reference may be made as before to the Reports and Analyses in JB. Anat. Phys. viii. Abth. i. & ii., and also, for the literature of 1879, to Zool. JB. Neap. ii. (the Fishes by F. Steindachner).

Bellonci, J. Über den Ursprung des Nervus opticus und den feineren Bau des Tectum opticum der Knochenfische. Z. wiss. Zool. xxxv. pp. 23–29, pls. i. & ii.

Boas, J. E. V. Ueber den Conus arteriosus bei *Butirinus* und bei anderen Knochenfischen. Morph. JB. vi. pp. 527–533, pl. xxvi.

Davidoff, M. v. Ueber das Skelet der hinteren Gliedmasse der Fische. Morph. JB. vi. pp. 125–128 & 433–468, pls. xxi.–xxiii.

In the *Ganoidei Holostei* and the *Physostomi*, probably also in the other *Teleostei*, the bone generally termed "Becken," or Pubic, does not correspond to the Pubis of *Selachia*, *Sturiones*, and *Batrachia*, but to the Basale metapterygii of *Selachia*.

Day, F. On the Air-Bladders of Fish. Zool. 1880, pp. 97–104.

Denissenko, G. Mittheilung über die Gefässe der Netzhaut der Fische. Arch. mikr. Anat. xviii. pp. 480–484, pl. xxii. fig. *a*.

Girdwoyn, M. Pathologie des Poissons. Paris: 1880, fo., 19 pp., 11 pls.

A treatise on the diseases and anomalies in the ova and embryos.

Günther, A. An Introduction to the Study of Fishes. Edinburgh: 1880, 8vo, pp. 720, with woodcuts.

Intended to meet the requirements of those who are desirous of studying the elements of Ichthyology; to serve as a book of reference to zoologists generally; and to supply those who have frequent opportunities

of observing fishes, with a ready means of obtaining information. The article "Ichthyology" in the Encyclopædia Britannica, is the only publication which had partly satisfied such requirements.

[Günther, A.]. The Zoology of the Voyage of H.M.S. 'Challenger' [vol. i.]. Part vi. Report on the Shore Fishes. London: 1880, 4to, 82 pp., 32 pls.

This large contribution is divided in four parts: 1, the Fish Fauna of the shores of the Atlantic; 2, that of the Antarctic and of shores abutting on it; 3, that of the temperate zone of the South Pacific; 4, that of the tropical zone of the South Pacific. The number of new species is 94.

Hoffman, C. K. Vorläufige Mittheilung zur Ontogenie der Knochenfische. Zool. Anz. 1880, pp. 607–610 & 629–634.

Lütken, C. Spolia Atlantica. Bidrag til Kundskab om Formforandringer hos Fiske under deres Vœxt og Udvikling, særligt hos nogle af Atlanterhavets Hojsfiske. Dan. Selsk. Skr. xii. pp. 413–613, pls. i.–v. (with summary in French).

An extensive and very useful contribution to the knowledge of the changes of form which the fishes, chiefly those of the Atlantic, undergo during their growth.

Nussbaum, M. Zur Differenzirung des Geschlechts im Thierreich. Arch. mikr. Anat. xviii. pp. 1–121, pls. i.–iv.

This work contains details upon sexual organs in Fishes.

Rabl-Rückhard, H. Das gegenseitige Verhältniss der Chorda, Hypophysis und des mittleren Schädelbalkens bei Haifisch Embryonen, nebst Bemerkungen über die Deutung der einzelnen Theile des Fischgehirns. Morph. JB. vi. pp. 535–570, pls. xxvii. & xxviii.

Sappey, P. C. Études sur l'appareil mucipare et sur le système lymphatique des Poissons. Paris: 1880, fo., 64 pp., 12 pls.

Solger, B. Neue Untersuchungen zur Anatomie der Seitenorgane der Fische. III. Die Seitenorgane der Knochenfische (*Dipnoi*, *Ganoidei*, *Teleostei*). Arch. mikr. Anat. xviii. pp. 364–390, pl. xvii.

Schneider, A. Ueber die Nerven von *Amphioxus*, *Ammocœtes*, und *Petromyzon*. Zool. Anz. 1880, p. 330.

Wiedersheim, R. Die spinalartigen Hinnerven von *Ammocœtes* und *Petromyzon planeri*. Zool. Anz. 1880, p. 446.

A reply to Schneider's note on the subject.

FAUNÆ.

Northern Atlantic.

Collett, R. Den Norske Nordhavs-Expedition, 1876–78. Zoologi:

Fiske. (The Norwegian North-Atlantic Expedition. Zoology : Fishes.) Christiania : 1880, imp. 4to, 166 pp., 5 pls.

This work, which is also given in English, contains extensive observations on the synonymy, food, and geographical distribution of 32 species. The plates are beautifully executed.

Europe.

Day, F. The Fishes of Great Britain and Ireland. London : 1880, 8vo.

The first fascicle of this important work contains 64 pages and 27 beautiful plates. Extensive descriptions and synonyms, with remarks on the economic uses and various modes of capture of the British species of the families *Percidæ*, *Mullidæ*, *Sparidæ*, *Scorpænidæ*, and a part of that of the *Cottidæ*, form this first fascicle.

Lloyd Patterson, R. Fish and Fishing in Belfast Lough. P. Belf. Soc. 1880, pp. 234–266.

Heincke, F. Die *Gobiidæ* und *Syngnathidæ* der Ostsee, nebst biologischen Bemerkungen. Arch. f. Nat. 1880, pp. 301–354.

3 species of *Gobiidæ* and 4 of *Syngnathidæ* inhabit the Baltic.

Beneke, B. Fische, Fischerei, und Fischzucht in Ost- und Westpreussen. Königsberg : 1880, 8vo, pts. 1 & 2. 320 pp., with many illustrations.

An account of all the fishes of Prussia, with short descriptions and notes on their habits.

Häpke, L. Fische und Fischerei im Wesergebeite (Zweiter Beitrag). Abh. Ver. Brem. vi. pp. 577–616.

Fraisse, P. Die Fische des Maingebeites von Unterfranken und Aschaffenburg. Würzburg : 1880, 8vo, 19 pp.

[Not seen by the Recorder.]

Giglioli, E. H. Elenco dei Mammiferi, degli Uccelli e dei Rettili ittiofagi appartenenti alla Fauna italica, e Catalogo degli Anfibi e dei Pesci italiani. Firenze : 1880, 8vo (Pisces, pp. 18–55).

This list includes 571 species of fishes.

Vinciguerra, D. Appunti ittiologici sulle collezioni del Museo Civico di Genova. iii. Intorno ai *Blennioidi* del Golfo di Genova. Ann. Mus. Genov. xv. pp. 430–453, with woodcuts.

One new species is described.

Emery, C. Le specie del genere *Fierasfer* del Golfo di Napoli e regione limitrofe ; in "Fauna und Flora des Golfes von Neapel," ii. Leipzig : 1880, 4to, 76 pp., 9 pls. [Also in Atti Ac. Linc. (3) vii. pp. 167–254, pls. i.–ix.]

H. E. Sauvage has published notes on some fishes collected by M. Letourneux in Epirus, Corfu [and Lake Mareotis, Lower Egypt] ; 3 species, 1 of which is new, were collected in Corfu, and 1 in Epirus. Bull. Soc. Philom. (7) iv. pp. 211–215.

Asia.

O. Finsch records 27 species of fishes from Western Siberia; Verh. z.-b. Wien, xxix. pp. 282–290.

Steindachner, F. Über einige Fischarten aus dem nördlichen Japan, gesammelt von Professor Dybowski. SB. Ak. Wien, lxxxii. Abth. i. pp. 256–266.

5 new species, 2 of which are the types of new genera, are described.

W. Peters, MB. Ak. Berl. 1880, pp. 921–927, gives a list of the fishes from Ningpo sent by the Chinese Government to the Berlin Fish Exhibition. 82 species are enumerated, and one new genus and 2 new species established.

The same author, *l. c.* pp. 1029–1037, in notes on a collection of fishes made in Hongkong by Dr. Gerlach, states 7 species to be new, 2 of them being types of new genera.

Day, F. On the Fishes of Afghanistan. P. Z. S. 1880, pp. 224–232.

This paper contains notes upon a great number of species, and descriptions of 3 species, 2 of which are new.

Africa.

H. E. Sauvage gives a note on some fishes collected by M. Letourneux in [Epirus, Corfu, and] Lake Mareotis, Lower Egypt. 5 species, 1 of which is new, were collected in the latter. Bull. Soc. Philom. (7) iv. pp. 211–215.

A. T. de Rochebrune describes new species of fishes from Senegambia; Bull. Soc. Philom. (7) iv. pp. 159–169.

Steindachner, F. Über eine Sammlung von Flussfischen von Tohizona auf Madagascar. SB. Ak. Wien, lxxxii. Abth. i. pp. 238–253.

14 species, 1 of which is new, are described, and 2 new genera established.

Australia.

Klunzinger, C. B. Die v. Müllersche Sammlung australischer Fische in Stuttgart. SB. Ak. Wien, lxxx. Abth. i. pp. 325–430, pls. i.–ix.

This extensive paper is preceded by a very useful list of all that has been published on the fishes of Australia and the neighbouring regions. 1 genus and 21 species are described as new.

Macleay, W. On the *Mugilidæ* of Australia. P. Linn. Soc. N. S. W. iv. pp. 410–427.

Kirk, T. W. Additions to the List of New Zealand Fishes. Tr. N. Z Inst. xii. p. 308.

North America.

Report of U.S. Commission of Fish and Fisheries. VI., for 1878. Washington : 1880, large 8vo, 988 pp.

Consists of—A. Inquiry into the decrease of food-fishes; B. The propagation of food-fishes in the waters of the United States.

Lockington, W. N. Notes on the *Salmonidæ* of California. Am. Nat. xiv. pp. 366-368.

——. On the *Clupeidæ* of the Pacific Coast. *L. c.* pp. 518 & 519.

——. On New and Rare Fishes of the Pacific Coast. *L. c.* pp. 595–600.

South America.

Günther, A. A Contribution to the Knowledge of the Fish Fauna of the Rio de la Plata. Ann. N. H. (5) vi. pp. 7–13.

59 species mentioned, 9 of which are described as new.

L. Vaillant gives an account of the *Siluridæ* collected by Dr. Jobert in Calderon, Upper Amazons. 34 species are recorded ; 3 of them are described as new. Bull. Soc. Philom. (7) iv. pp. 150–159.

St. Paul's Island.

Sauvage, H. E. Mémoire sur la Faune ichthyologique de l'île St. Paul. Arch. Z. expér. viii. pp. 1–46, pls. i.–iii.

18 species have been found up to now in this interesting station; 3 are described as new.

PALÆICHTHYES.

CHONDROPTERYGII.

Parker, T. J. On the Intestinal Spiral Valve in the Genus *Raia*. Tr. Z. S. xi. pp. 49–61, pls. xi. & xii.

——. On the Venous System of the Skate (*Raia nasuta*). Tr. N. Z. Inst. xiii. pp. 413–418, pl. xv.

On the *Batoidei* collected in the Amazons by Dr. Jobert ; Vaillant, Bull. Soc. Philom. (7) iv. p. 251.

Carcharias (*Scoliodon*) *crenidens*, sp. n., Klunzinger, SB. Ak. Wien, ixxx. Abth. i. p. 426, pl. viii. fig. 3, Queensland.

Scyllium ventricosum, sp. n., Garman, Bull. Mus. C. Z. vi. p. 167, Valparaiso.

Spinax granulosus, sp. n., Günther, Zool. Challenger Exp. i. pt. 6, p. 19, pl. ii. fig. c, S.W. coast of S. America.

Rhina squatina (L.) described and figured by F. McCoy, Prodr. Zool. Vict., Dec. 4, pl. xxxiv. [1879].

Rhinobatus lentiginosus, Florida, and *planiceps*, Payla, Callao, and Galapagos Islands, spp. nn., Garman, *l. c.* p. 168.

Platyrrhina exasperata, Jord. & Gill, is referred to *Trigonorrhina*; id. *l. c.* p. 170.

Trigonorrhina alveata, sp. n., *id. l. c.* p. 169.

Raia platana, p. 11, pl. iii., and *microps*, p. 12, pl. iv., Rio de la Plata, *murrayi*, p. 15, pl. v., Kerguelen Island, *brachyura*, p. 20, pl. vi., Magellan Straits, and *nitida*, p. 27, pl. xiv. fig. A, Twofold Bay, Australia, spp. nn., Günther, *l. c.*

Raia hyperborea, Collett, described and figured by Collett, Norsk. Nordh. Exp. p. 9, pl. i. figs. 1 & 2.

Trygon brachyurus, Buenos Aires, and *reticulatus* (= *T. hystrix*, Günth. Cat.), Surinam, Günther, Ann. N. H. (5) vi. p. 8; *T. lata*, p. 170, Sandwich Islands, *longa*, p. 170, Mexico, and *brevis*, Atlantic Coast of America, p. 171, Garman, Bull. Mus. C. Z. vi.: spp. nn.

Urolophus kaianus, sp. n., Günther, Zool. Challenger Exp. i. pt. 6, p. 37, Ki Islands.

Pteroplatea vaillanti, sp. n., De Rochebrune, Bull. Soc. Philom. (7) iv. p. 159, Senegambia.

GANOIDEI.

Boas, J. E. V. Ueber Herz und Arterienbogen bei *Ceratodus* und *Protopterus*. Morph. JB. vi. pp. 321–354, pls. xiii.–xv.

The heart and *conus arteriosus* of these genera are studied comparatively with those of *Lepidosteus*, *Polypterus*, and *Amia*. The author finishes by considerations on the natural position of *Ceratodus*, *Protopterus*, and *Lepidosiren* near their allies, the osseous Ganoids and the Batrachians.

A. Cisow has published an extensive memoir on the auditory organ of the *Ganoidei*; Arch. mikr. Anat. xviii. pp. 486–519, pls. xxiii. & xxiv.

Wiedersheim, R. Zur Histologie der Dipnoër-Schuppen. Arch. mikr. Anat. xviii. pp. 122–129, pl. v.

Protopterus annectens. Its osteology and neurology described by Wiedersheim; Jen. Z. Nat. xiv. pp. 156–192, pls. vii. & viii.

TELEOSTEI.

Henneguy, L. F. A note on some facts concerning the early phenomena in the development of the *Teleostei*. Bull. Soc. Philom. (7) iv. p. 132.

Rauber, A. Formbildung und Formstörung in der Entwicklung von Wirbelthieren. Morph. JB. vi. pp. 129–184, pls. vii.–x., & woodcuts.

Monstrous embryos of Salmon, Trout, and Pike are studied in this paper.

Trois, E. F. Richerche sul sistema línfatico dell' *Uranoscopus scaber*. Atti Inst. Venet. (5) vi. pp. 19–36, pl.

ACANTHOPTERYGII.

Percidæ.

Lates colonorum, Gthr., figured by F. McCoy, Prodr. Zool. Vict., Dec. 2, pl. xiv. [1878].

Centropristis annularis, p. 6, pl. i. fig. C, Pernambuco, and *pleurospilus*, p. 37, pl. xvi. fig. D, Ki Islands, spp. nn., Günther, Zool. Challenger Exp. i. pt. 6.

Propoma, g. n., *id. l. c.* p. 39. Closely allied to *Heterognathodon*, but differs in having 9 dorsal spines only, in lacking the canine teeth in the upper jaw, and in having considerably smaller scales on the back. For *P. roseum*, sp. n., *id. ibid.* pl. xx. fig. B, Ki Islands.

Anthias megalepis, sp. n., Günther, *l. c.* p. 37, pl. xvi. fig. E, Ki Islands.

Anthias extensus, Klunz., redescribed and figured by Klunzinger, SB. Ak. Wien. lxxx. Abth. i. p. 339, pl. ii.

Pseudanthias hypselosoma, sp. n., Bleeker, Abh. Ver. Hamb. vii. p. 29, New Guinea.

Bathyanthias, g. n., Günther, *l. c.* p. 6 ; for *B. roseus*, sp. n., pl. i. fig. B, Coast of Brazil.

Serranus cruentatus, Pts., = *S. lineo-ocellatus*, Guich., = *S. nigri*, Gthr. ; Steindachner, SB. Ak. Wien, lxxx. Abth. i. p. 172.

Serranus novem-cinctus, Kner, redescribed by Sauvage, Arch. Z. expér. viii. p. 7.

Plectropoma dentex, C. & V., redescribed and figured by Klunzinger, SB. Ak. Wien. lxxx. Abth. i. p. 337, pl. i. fig. 1.

Polyprion kneri, Steind., redescribed by Günther, *l. c.* p. 24.

Polyprion cernium, Val., redescribed by Sauvage, *l. c.* p. 12.

Dules ambiguus, Rich. (= *Dules auratus*, Casteln. and *Ctenolabrus macquariensis*, Gthr.), redescribed by Klunzinger, *l. c.* p. 348.

Dules novem-aculeatus, Steind., = *Lates colonorum*, Gthr. ; *id. l. c.* p. 342.

Ambassis marianus, sp. n., Günther, *l. c.* p. 32, Queensland.

Ambassis klunzingeri, Steind. : on its occurrence in Madagascar ; Steindachner, SB. Ak. Wien, lxxxii. Abth. i. p. 238.

Ambassis muelleri, Klunz. (= *A. urotœnia*, Klunz., *nec* Bleek.), redescribed and figured by Klunzinger, *l. c.* p. 346, pl. i. fig. 3.

Apogon conspersus, Klunz., figured ; *id. l. c.* pl. iii. fig. 2.

Apogon punctatus, id. *l. c.* p. 345, pl. iii. fig. 3, King George's Sound ; *A. monogramma*, fig. B, *septem-striatus*, fig. A, *arafuræ*, fig. C, Günther, *l. c.* p. 38, pl. xvi., Arafura Sea : spp. nn.

Acropoma philippinense, sp. n., Günther, *l. c.* p. 51, Philippines.

Macquaria australasica, C. & V. (= *Murrayia guentheri*, Casteln.), redescribed by Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 352.

Gerres jonesi, Gthr., redescribed by Günther, *l. c.* p. 10.

Pristipoma rostratum (Rapp, MS.), sp. n., Steindachner, SB. Ak. Wien, lxxx. Abth. i. p. 119, Cape of Good Hope.

Pseudopristipoma, g. n., for *Pristipoma lucurum*, C. & V. ; Sauvage, Bull. Soc. Philom. (7) iv. p. 220.

Symphisanodon, g. n., Bleeker, Abh. Ver. Hamb. vii. p. 28, for *S. typus*, sp. n., *id. ibid.*, New Guinea.

Squamipinnes.

Pomacanthus, *Holacanthus*, *Chætodon*, *Tholichthys*, *Ephippus*. Notes on these genera; Lütken, Dan. Selsk. Skr. xii. pp. 569 & 608, pl. v. figs. 6–11.

Chætodon unicolor, sp. n., Sauvage, *l. c.* p. 222, Martinique.

Chætodon luciæ, sp. n., De Rochebrune, Bull. Soc. Philom. (7) iv. p. 160, Senegambia.

Chætodon aureo-fasciatus, Macl., redescribed by Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 360.

Chætodon (*Tetragonopterus*) *nigro-punctatus*, sp. n., Sauvage, *l. c.*, Mascate.

Holacanthus duboulayi, Gthr., redescribed by Klunzinger, *l. c.* p. 361.

Chelmo muelleri, sp. n., *id. ibid.*, Australia.

Sparidæ.

Pimelepterus sandwicensis, sp. n., Sauvage, Bull. Soc. Philom. (7) iv. p. 221, Sandwich Islands.

Pimelepterus indicus, C. & V. (= *P. tahmel*, Klunz., *nec* Forsk.), redescribed and figured by Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 357, pl. vii.

Cirrhitidæ.

Cirrhites guichenoti, sp. n., Sauvage, Bull. Soc. Philom. (7) iv. p. 221, Réunion.

Chilodactylus monodactylus, Carmich., and *aspersus*, Rich., redescribed; *id.* Arch. Z. expér. viii. p. 23.

Mendosoma elongatum, Kner, redescribed; *id. l. c.* p. 20.

Nema[*to*]*dactylus concinnus*, Rich., redescribed; *id. l. c.* p. 22.

Latris hecatia, Rich., redescribed; *id. l. c.* p. 17.

Scorpænidæ.

Sebastes. Notes on the 13 Japanese species of this genus, by Hilgendorf, SB. nat. Fr. 1880, pp. 166–172. *S. ventricosus*, Schleg., and *joyneri*, Gthr., = *S. inermis*, C. & V., *ex. typ.*; id. *l. c.* p. 172. *S. matsubaræ*, p. 170, *nivosus*, p. 171, *tri-vittatus*, p. 171, *steindachneri*, p. 172, and *glaucus*, p. 172, spp. nn., *id. l. c.*, Japan [no descriptions given].

Sebastes hexanema, p. 40, pl. xvii. fig. B, Ki Islands, *oblongus*, p. 64, pl. xviii., Japan, *macrochir*, p. 65, pl. xxvii. Japan, spp. nn., Günther, Zool. Challenger Exp. i. pt. 6. *S. joyneri*, Gthr., redescribed; *id. l. c.* p. 64.

Sebastes taczanowskii, sp. n., Steindachner, SB. Ak. Wien, lxxxii. Abth. i. p. 256, pl. ii. fig. 1, N. Japan.

Sebastes percoides (Soland.) described and figured by F. McCoy, Prodr. Zool. Vict., Dec. 4, pl. xxxiii.

Sebastes marinus: notes upon this species, by Collett, Norsk. Nordh. Exped. p. 15, pl. i. figs. 3 & 4.

Sebastes scorpænoides, Guich., figured by Klunzinger, SB. Ak. Wien, lxxx. Abth. i. pl. v. fig. 1.

Sebastes (*Sebastichthys*) *mouchezi*, Sauv., redescribed; Sauvage, Arch. Z. expér. viii. p. 15.

Scorpæna thomsoni, p. 24, pl. xii., Juan Fernandez, and *miostoma*, p. 65, Japan, spp. nn., Günther, *l. c.*

Lioscorpius, g. n., *id. l. c.* p. 40; for *L. longiceps*, sp. n., *ibid.* pl. xvii. fig. C, Ki Islands.

Zanclor [*r*] *hynchus*, g. n., *id. l. c.* p. 15; for *Z. spinifer*, sp. n., *ibid.* pl. viii. fig. A, Kerguelen Island.

Tetraroge longipinnis, C. & V., var. n. *nuda*; id. *l. c.* p. 66, Japan.

Minous pictus, sp. n., *id. l. c.* p. 41, pl. xviii. fig. D, Arafura Sea.

Teuthididæ.

Teuthis sutor, C. & V., redescribed; Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 393.

Berycidæ.

Beryx muelleri, sp. n., Klunzinger, *l. c.* p. 359, pl. iii. fig. 1, King George's Sound.

Rhamphoberyx = *Myripristris*, immature; Lütken, Dan. Selsk. Skr. xii. pp. 428 & 591.

Myripristis kaianus, sp. n., Günther, *l. c.* p. 39, Ki Islands.

Rhynchichthys and *Rhinoberyx* = *Holocentrum*, juv.; Lütken, *l. c.* pp. 828 & 591, pl. ii. figs. 1–7.

Holocentrum sancti-pauli, sp. n., Günther, *l. c.* p. 4, pl. i. fig. A, St. Paul's Rocks.

Kurtidæ.

Pempheris muelleri (= ? *P. compressus*, White, Günth.), p. 380, pl. vi., and *multiradiatus*, p. 381, spp. nn., Klunzinger, SB. Ak. Wien, lxxx. Abth. i., King George's Sound.

Sciænidæ.

Micropogon ornatus, sp. n., Günther, Zool. Challenger Exp. i. pt. 6. p. 13, pl. vii. fig. A, Rio de la Plata.

Umbrina reedi, id. *l. c.* p. 25, pl. xiii. fig. A, Juan Fernandez; *U. muelleri*, Klunzinger, *l. c.* p. 372, Queensland: spp. nn.

Sciæna sauvagii, sp. n., De Rochebrune, Bull. Soc. Philom. (7) iv. p. 161, Senegambia.

Corvina australis, sp. n., Günther, *l. c.* p. 33, Queensland.

Corvina (*Johnius*) *jacobi*, sp. n., Steindachner, SB. Ak. Wien, lxxx. Abth. i. p. 121, San Diego, California.

Pachyurus (*Lepi*[*do*]*pterus*) *adspersus*, p. 123, S.E. Brazil, *bonariensis*,

p. 129, La Plata, spp. nn., *id.* l. c. *P.* (*L.*) *schomburgki*, Gthr. (= *P. nattereri*, Steind.), p. 129, and *P. squamipinnis*, Agass. (=*P. lundi*, Reinh.), p. 131, redescribed; *id. l. c.*

Otolithus fauveli, sp. n., Peters, MB. Ak. Berl. 1880, p. 922, Ningpo.

Ancylodon atricauda, sp. n., Günther, *l. c.* p. 12, Rio de la Plata.

Xiphiidæ.

The young of *Xiphias* and *Histiophorus* described and figured by Lütken, Dan. Selsk. Skr. xii. p. 441 & 592, pl. ii. figs. 9 & 10.

Trichiuridæ.

Trichiurus and *Gempylus*. Observations on these genera. Lütken, *l. c.* pp. 448 & 593, pls. ii. fig. 12, & iii. figs. 3–8.

Thyrsites atun, Euphr., redescribed by Sauvage, Arch. Z. expér. viii. p. 29.

Acronuridæ.

Acanthurus and *Acronurus*. On these genera, Lütken, *l. c.* pp. 579 & 609, pl. v. figs. 3–5.

Carangidæ.

Carangina. Lütken, *l. c.* pp. 532 & 604, proposes to divide this group into 6 genera: *Trachyurus*, Cuv. (Gthr.), *Megalepis*, Blkr., *Decapterus*, Blkr., *Caranx*, Cuv., *Gallichthys*, Cuv., and *Selene*, Lac.

Carangichthys = *Caranx*, juv., *id. l. c.* pp. 534 & 604.

Vomer, *Argyriosus* and *Platystomus* are only different ages of *Selene*; id. *l. c.* pp. 542 & 605.

Selene (*Argyriosus*) *vomer*. The young figured; *id. l. c.* pl. v. fig. 1.

Stromateus, *Schedophilus*, *Trachynotus*, *Micropteryx*, and *Seriola*. Notes upon these genera; *id. l. c.* pp. 521 & 602, pls. ii. fig. 9, & iii. fig. 16, & iv. figs. 7–11.

Lepidomegas, g. n., Thominot, Bull. Soc. Philom. (7) iv. p. 173. Very much resembles *Seriola*, but has not the first dorsal spine directed forwards, and wants the two small spines in front of the anal fin. *L. mueller*, sp. n., *id. ibid.*, New Zealand.

Seriolella velaini, sp. n., Sauvage, Arch. Z. expér. viii. p. 32, pl. i. fig. 2, St. Paul Island.

Xystrophorus, Rich., is the very young state of *Naucrates ductor*; Lütken, *l. c.* pp. 504 & 600, pl. iii. figs. 14 & 15.

Chorinemus and *Paropsis*. Notes upon these genera; *id. l. c.* pp. 103 & 600, pl. iv. fig. 6.

Sparatodon, g. n., De Rochebrune, Bull. Soc. Philom. (7) iv. p. 162. Distinguished from *Temnodon* by the greater size of the scales, the absence of spines in front of the anal fin, the absence of denticulations on the præ-operculum, and the shape and arrangement of the teeth. For *S. nalnal*, sp. n., *id. ibid.*, Senegambia.

Psettus, *Zanclus*, and *Platax*. Notes upon these genera ; Lütken, Dan. Selsk. Skr. xii. pp. 557 & 606.

Antigonia muelleri, sp. n., Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 380, pl. v. fig. 3.

Blepharis, *Scyris*, and *Hynnis* are based upon different ages of *Gallichthys* ; Lütken, *l. c.* pp. 538 & 604.

Cyttidæ.

Zeus and *Zenopsis*. Notes on the species of these genera ; Lütken, *l. c.* pp. 553 & 606.

Coryphænidæ.

Coryphæna equisetis, L., and *hippurus*, L. (= *C. fasciolatus*, Pall.), described ; Lütken, *l. c.* pp. 483 & 597, pl. iii. figs. 9–13.

Brama rayi. On the young of this species, of which *Taractes* is also a young form ; *id. l. c.* pp. 491 & 598, pl. iv. figs. 1 & 2.

Pterycombus brama, figured ; *id. l. c.* pl. iv. fig. 4.

Pteraclis. Notes on this genus; *id. l. c.* pp. 502 & 191. *P. velifer*, Pallas (?), figured, pl. fig. 3.

Nomeidæ.

Psenes, *Cubiceps*, and *Navarchus*. Notes upon these genera by Lütken, *l. c.* pp. 513 & 661.

Psenes pellucidus, p. 516, Surabaya Straits, and *maculatus*, p. 518, Atlantic, spp. nn., *id. l. c.*

Scombridæ.

Scomber pneumatophorus, De la Roche, described and figured by F. McCoy, Prodr. Zool. Vict., Dec. 3, pl. xxviii. [1879].

Scomber punctatus, Couch, = *S. scomber*, L. ; F. Day, J. L. S. xv. p. 146, pl. vii.

Thynnina. Observations on *Thynnus* and other allied genera united in the group *Thynnidæ* ; Lütken, *l. c.* pp. 460 & 595, pl. iii. figs. 1 & 2.

Trachinidæ.

Uranoscopus kaianus, sp. n., Günther, Zool. Challenger Exp. i. pt. 6, p. 43, pl. xix. fig. A, Ki Islands.

Champsodon vorax, Gthr., redescribed and figured ; *id. l. c.* p. 52, pl. xxiii. fig. A.

Acanthaphrites, g. n., *id. l. c.* p. 43. *A. grandisquamis*, sp. n., *ibid.* pl. xviii. fig. A, Ki Islands.

Pseudochromis novæ-hollandiæ, sp. n., Steindachner, SB. Ak. Wien, lxxx. Abth. i. p. 160, Port Denis.

Opisthognathus darwiniensis, Macl., redescribed by Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 381.

Opisthognathus microlepis, Peters, redescribed ; Günther, *l. c.* p. 52.

Pseudochromis muelleri, sp. n., Klunzinger, *l. c.* p. 370, Port Darwin, Australia.

Notothenia microps, p. 16, pl. viii. fig. D, *squamifrons*, p. 16, pl. viii. fig. C, *acutus*, p. 17, *marionensis*, p. 17, Kerguelen Island, and *elegans*, p. 21, pl. xi. fig. C, Cape Virgins, spp. nn., Günther, *l. c.*

Notothenia filholi, sp. n., Sauvage, Bull. Soc. Philom. (7) iv. p. 228. Campbell Island.

Eleginus magellani, sp. n., *id. l. c.* p. 223, Magellan Straits.

Bovichthys veneris, sp. n., *id.* Arch. Z. expér. viii. p. 25, St. Paul Island.

Caulolatilus. On the Pacific species of this genus, *C. anomalus* (Cooper), and *C. affinis*, Gill, = *C. princeps* (Jenyns); Lockington, P. Ac. Philad. 1880, pp. 13–19.

Batrachidæ.

Batrachus dussumieri, C. & V., redescribed; Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 386.

Batrachus muelleri, sp. n., *id. l. c.* p. 387, pl. ix. fig. 1, Port Darwin.

Pediculati.

Lophius naresi, sp. n., Günther, *l. c.* p. 56, pl. xxv., Admiralty Islands.

Tetrabrachium, g. n., *id. l. c.* p. 45. *T. ocellatum*, sp. n., *ibid.* pl. xix. fig. C, New Guinea.

Cottidæ.

Centridermichthys uncinatus (Reinh.) redescribed and figured; Collett, Norsk. Nordh. Exped. p. 29.

Icelus hamatus, Kröyer, redescribed and figured; *id. l. c.* p. 34, pl. i. fig. 8.

Cottunculus microps, Collett. Described and figured; *id. l. c.* p. 18, pl. i. figs. 5 & 6.

Gymnacanthus pistilliger (Pall.) redescribed; *id. l. c.* p. 26.

Platycephalus sculptus, p. 41, pl. xvii. fig. A, Arafura Sea, and *rudis*, p. 66, pl. xxix. fig. B, Japan, spp. nn., Günther, Zool. Challenger Exp. i. pt. 6.

Platycephalus speculator, Klunz., figured; Klunzinger, SB. Ak. Wien, lxxx. Abth. i. pl. iv. fig. i.

Platycephalus muelleri, sp. n., *id. l. c.* p. 368, pl. iv. fig. 2, Australia.

Trigla picta, p. 24, pl. xiii. fig. A, Juan Fernandez, and *leptacanthus*, p. 42, pl. xviii. fig. B, Ki Islands, spp. nn., Günther, *l. c.*

Lepidotrigla spiloptera, sp. n., *id. l. c.* p. 42, pl. xviii. Arafura Sea.

Triglops pingeli, Reinh., redescribed and figured; Collett, Norsk. Nordh. Exped. p. 38, pl. i. figs. 9 & 10.

Cataphracti.

Agonus (*Brachyopsis*) *barkani*, p. 253, pl. v. and *annæ*, p. 254, pl. vi. figs. 1–16, spp. nn., San Francisco, Steindachner, SB. Ak. Wien, lxxxii. Abth. i.

Podothecus peristethus, Gill, ? = *Agonus acipenserinus*, Tiles, *id. l. c.* p. 255.

Agonus decagonus, Schneid., redescribed and figured; Collett, *l. c.* p. 44, pl. ii. figs. 11 & 12.

Peristethus truncatum, p. 7, pl. ii. fig. A, Pernambuco, and *murrayi*, p. 52, pl. xxxii. fig. A, Sea of Banda, spp. nn., Günther, *l. c.*

Dactylopterus volitans (= *Cephalacanthus spinarella*). Several phases of growth described and figured; Lütken, Dan. Selsk. Skr. xii. pp. 417 & 590, pl. i. figs. 1–5.

Discoboli.

Eumicrotremus spinosus (Müll.) redescribed and figured; Collett, Norsk. Nordh. Exped. p. 47, pl. ii. fig. 13.

Liparis lineatus (Lepech.) redescribed, p. 50, and *bathybii*, Collett, redescribed and figured, p. 52, pl. ii. fig. 14; *id. l. c.*

Careproctus reinhardti, Kröyer, redescribed and figured; *id. l. c.* p. 57, pl. ii. figs. 15 & 16.

Gobiidæ.

Gobius amiciensis, C. & V., p. 41, *davidi*, Sauv., p. 45, *guamensis*, C. & V., p. 46, and *capensis*, Casteln., p. 49, redescribed; Sauvage, Bull. Soc. Philom. (7) iv.

Gobius maindroni, p. 40, Senegal, *suppositus* (= *obscurus*, Casteln., *nec* Peters), p. 41, Swan River, *infaustus*, p. 42, Melbourne, *olorum*, p. 43, Swan River, *boscii*, p. 44, Martinique, *andræi*, p. 44, Ecuador, *caledonicus*, p. 46, New Caledonia, *deilus*, p. 47, Poulo Condor, *simplex*, p. 48, Bagamoyo, *harmandi*, p. 49, Poulo Condor and Cochin China, *zelei*, p. 223, Macassar, spp. nn., Sauvage, *l. c.*

Gobius stamineus, C. & V., redescribed by Günther, Zool. Challenger Exp. i. pt. 6, p. 59.

Gobius sandvicensis, p. 60, Honolulu, and *jokohamæ*, p. 67, Japan, spp. nn., *id. l. c.*

Gobius casamancus, sp. n., De Rochebrune, Bull. Soc. Philom. (7) iv. p. 163, Senegambia.

Gobius newberrii, Girard., redescribed; Steindachner, SB. Ak. Wien, lxxx. Abth. i. p. 135.

Gobius kraussi, p. 134, pl. xi. fig. 2, Surinam, *cotticeps*, p. 237, pl. i. fig. 1, Society Islands, *lævis*, p. 138, Japan, *breunigi*, p. 140, Japan, spp. nn., *id. l. c.*

Gobius bifrenata, Kner, redescribed; Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 383.

Gobius ruthensparri, Euphr., figured, Heincke, Arch. f. Nat. 1880, pl. xvi. fig. 5.

Gobius (*Oxyurichthys*) *cælidotus* (C. & V., MS.), sp. n., Sauvage, *l. c.* p. 50, Java.

Gobiosoma longipinne, sp. n., Steindachner, *l. c.* p. 145, Gulf of California.

Gobiodon flavus, Poulo Condor, and *venustus*, Red Sea, spp. nn., Sauvage, Bull. Soc. Philom. (7) iv. p. 51.

Typhlogobius, g. n., Steindachner, *l. c.* p. 141. Distinguished from *Cristalogobius* by the dentition and the atrophy of the eyes. For *T. californiensis*, sp. n., *id. l. c.* p. 142, San Diego, California.

Tridentiger, Gill. Steindachner, *l. c.* p. 147, discusses the characters upon which *Trichonophorichthys*, Gill, and *Trichonopogon*, Blkr., are founded, and comes to the conclusion that probably the first, and certainly the second, must be united with *Tridentiger*.

Tridentiger squamistrigatus, Hilgend., and *barbatus*, Gthr., redescribed, *id. l. c.* pp. 149 & 151.

Sicydium elegans, sp. n., *id. l. c.* p. 152, Society Islands.

Sicydium nigrescens, sp. n., Günther, *l. c.* p. 60, pl. xxvi. fig. C, Hawaii.

Lentipes seminudus, sp. n., *id l. c.* p. 61, Honolulu.

Eleotris brasiliensis, p. 53, Bahia, *E.* (*Giuris*) *vanicolensis*, p. 54, Vanicolo, and *laglaizii*, p. 54, Manilla, *E.* (*Culius*) *belizianus*, p. 56, Belize, and *vitianus*, p. 56, Fiji, *E.* (*Eleotriodes*) *melbournensis*, p. 57, Melbourne, spp. nn., Sauvage, Bull. Soc. Philom. (7) iv.

Eleotris maculata, Dum., renamed *dumerili* ; id. *l. c.* p. 52.

Eleotris nudiceps, Casteln., redescribed ; *id. l. c.* p. 53.

Eleotris (*Giuris*) *davidi*, Sauv., redescribed ; *id. l. c.* p. 55.

Eleotris perniger, Cope, redescribed ; Steindachner, SB. Ak. Wien, lxxx. Abth. i. p. 155.

Eleotris africana, p. 153, pl. iii. fig. 1, Sierra Leone, *heterura*, p. 154, pl. ii. fig. 1, locality ?, *sclateri*, p. 157, Society Islands, spp. nn., *id. l. c.*

Eleotris tohizonæ, sp. n. ?, *id. op. cit.* lxxxii. Abth. i. p. 245, pl. ii. fig. 2, Madagascar.

Eleotris cyprinoides, C. & V. (?), figured ; Klunzinger, SB. Ak. Wien, lxxx. Abth. i. pl. v. fig. 2.

Eleotris macrodon, Bleek., redescribed ; *id. l. c.* p. 385.

Eleotris reticulatus, sp. n., *id. ibid.*, pl. iv. fig. 3, Port Darwin.

Cayennia, g. n. (group *Trypauchenina*). Body naked, its hind part only covered with elongate, cycloid scales. Sauvage, Bull. Soc. Philom. (7) iv. p. 57. For *C. guichenoti*, sp. n., *ibid.*, Cayenne.

Callionymus lunatus, Schleg., redescribed ; Günther, *l. c.* p. 67.

Callionymus phasis, p. 28, pl. xv. fig. C, Twofold Bay, Australia, and *kaianus*, p. 43, pl. xix. fig. B, Ki Islands, spp. nn., *id. l. c.*

Luciogobius guttatus, Gill, redescribed ; Steindachner, SB. Ak. Wien, lxxx. Abth. i. p. 144.

Blenniidæ.

Blennius goreensis, C. & V., redescribed by Sauvage, Bull. Soc. Philom. (7) iv. p. 216.

Blennius nigrescens, id. *l. c.* p. 215 ; *B. bouvieri*, De Rochebrune, Bull. Soc. Philom. (7) iv. p. 164, Senegambia ; *B. canevæ*, Vinciguerra, Ann. Mus. Genov. xv. p. 448, Gulf of Genova : spp. nn.

Lumpenus medius, Reinh., p. 62, pl. ii. fig. 17, *maculatus*, Fries, p. 67,

pl. ii. fig. 18, and *lampetriformis*, Walb., redescribed by Collett, Norsk. Nordh. Exp.

Petroscirtes oualanensis, sp. n., Günther, Zool. Challenger Exp. i. pt. 6, p. 37, Ki Islands.

Petroscirtes lineo-punctatus (Guichen., MS.), sp. n., Sauvage, Bull. Soc. Philom. (7) iv. p. 216, Japan.

Salarias doliatus, p. 217, Atlantic, *brasiliensis*, p. 217, Brazil, *harmandi*, p. 218, Poulo-Condor, *cervus*, C. & V., MS., p. 218, Red Sea, *montanoi* and *reyi*, p. 219, Luçon, *id.* l. c.; *S. muelleri*, p. 388, and *punctillatus* (? = *S. spaldingi*, Macl.), p. 389, Klunzinger, SB. Ak. Wien, lxxx. Abth. i., Hobson's Bay and Port Darwin : spp. nn.

Clinus pedatipennis, sp. n., De Rochebrune, Bull. Soc. Philom. (7) iv. p. 165, Senegambia.

Clinus marmoratus, Casteln., redescribed; Sauvage, *l. c.* p. 220.

Cristiceps argentatus, Risso, redescribed ; Klunzinger, *l. c.* p. 392.

Tripterygium marmoratum, Macl., redescribed by Klunzinger, who doubts whether *Lepidoblennius haplodactylus*, Steind., is specifically distinct from it ; *l. c.* p. 389.

Centronotus dybowskii, p. 259, and *taczanowskii*, p. 261, pl. iii. fig. 1, spp. nn., Steindachner, SB. Ak. Wien, lxxxii. Abth. i., North Japan.

Blennophis (*Ophioblennius*) *webbi*, Val. The adult described ; *id. op. cit.* lxxx. Abth. i. p. 159.

Neozoarces, g. n., *id. op. cit.* lxxxii. Abth. i. p. 263, for *N. pulcher*, sp. n., *id. l. c.* p. 264, pl. vi. fig. 2, N. Japan.

Atherinidæ.

Atherina elongata, sp. n., Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 394, pl. iii. fig. 4, King George's Sound.

Atherinicthys brevi-analis, sp. n., Günther, Zool. Challenger Exp. i. pt. 6, p. 25, Valparaiso.

Tetragonurus atlanticus, Lowe, = *T. cuvieri*, Reinh.; Lütken, Dan. Selsk. Skr. xii. pp. 437 & 592.

Mugilidæ.

Mugil platanus, sp. n., Günther, Ann. N. H. (5) vi. p. 9, Buenos Aires.

Mugil joyneri, Gthr., redescribed ; *id.* Zool. Challenger Exp. i. pt. 6, p. 68.

Mugil tongæ, id. *l. c.* p. 58, Tongatabu; *M. muelleri*, Klunzinger, *l. c.* p. 395, King George's Sound : spp. nn.

Gastrosteidæ.

Gastrosteus japonicus, sp. n., Steindachner, SB. Ak. Wien, lxxxii. Abth. i. p. 264, pl. iii. fig. 2, North Japan.

Fistulariidæ.

Fistularia, *Centriscus*, and *Centriscops*. On these genera: Lütken, *l. c.* pp. 584 & 610, pl. i. figs. 6–8.

Fistularia serrata, Cuv., recharacterized; Günther, Zool. Challenger Exp. i. pt. 6, p. 68.

Fistularia depressa, sp. n., *id. l. c.* p. 69, pl. xxxii. fig. D, Japan.

Centriscidæ.

Centriscus armatus, sp. n., Sauvage, Arch. Z. expér. viii. p. 36, St. Paul Island.

Ophiocephalidæ.

Channa sinensis, sp. n., Sauvage, Bull. Soc. Philom. (7) iv. p. 58, China.

Trachypteridæ.

Trachypterus arawatæ, sp. n., Clarke, Tr. N. Z. Inst. xiii. p. 197, fig., Arawata, Jackson's Bay.

ACANTHOPTERYGII PHARYNGOGNATHI.

Pomacentridæ.

Pomacentrus fasciatus, C. & V., redescribed; Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 397.

Pomacentrus hamii, sp. n., De Rochebrune, Bull. Soc. Philom. (7) iv. p. 165, Senegambia.

Heliastes bicolor, id. *l. c.* p. 166, Senegambia; *H. flavicauda*, p. 7, pl. xxx. fig. D, Pernambuco, and *roseus*, p. 45, pl. xx. fig. D, Ki Islands, Günther, *l. c.*: spp. nn.

Labridæ.

Cossyphus frenchi, sp. n. (? = *Trochocopus rufus*, Macl.), Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 400, King George's Sound.

Anampses fidjensis, Sauvage, Bull. Soc. Philom. (7) iv. p. 224, Fiji; *A. neoguinaicus*, Bleeker, Abh. Ver. Hamb. vii. p. 27, pl. v., New Guinea: spp. nn.

Julis obscura, sp. n, Günther, Zool. Challenger Exp. i. pt. 6, p. 61, pl. xxvi. figs. A & B, Honolulu.

Stethojulis filholi, sp. n., Sauvage, *l. c.* p. 225, Fiji.

Platychœrops, g. n. Intermediate between *Chœrops* and *Heterochœrops*, Steind.; Klunzinger, *l. c.* p. 399. For *P. muelleri*, sp. n., *ibid.* pl. viii. fig. 2, King George's Sound.

Xiphochilus quadrimaculatus, sp. n., Günther, *l. c.* p. 45, pl. xx. fig. C, Arafura Sea.

Labrichthys rubra, Casteln., redescribed; Klunzinger, *l. c.* p. 403.

Labrichthys isleanus, Sauv., p. 39, pl. iii., and *lantzi*, Sauv., p. 37, pl. ii., redescribed and figured; Sauvage, Arch. Z. expér. viii.

Chilinus pulchellus, sp. n., *id.* Bull. Soc. Philom. (7) iv. p. 224, Fiji.

Pseudoscarus filholi, sp. n., *id. l. c.* p. 225, Fiji.

Chromides.

Chromis cæruleo-maculatus, p. 166, and *faidherbei*, p. 167, spp. nn., De Rochebrune, Bull. Soc. Philom. (7) iv., Senegambia.

Chromis niloticus, Han. On young specimens of this species; Sauvage, Bull. Soc. Philom. (7) iv. p. 211.

Ptychochromis, g. n., for *Tilapia oligacanthus*, Blkr.; Steindachner, SB. Ak. Wien, lxxxii. Abth. i. p. 248, pl. i.

Hemichromis letourneuxi, p. 212, Lake Mareotis, and *saharæ*, p. 226, Sahara, spp. nn., Sauvage, *l. c.*

Hemichromis desguezii, sp. n., De Rochebrune, *l. c.* p. 168, Senegambia.

Paretroplus dami, Blkr., redescribed; Steindachner, *l. c.* p. 247.

Acara (*Heros*) *imperialis*, sp. n., *id. op. cit.* lxxx. Abth. i. p. 161, Rio Negro.

ANACANTHINI.

Lycodidæ.

Lycodes. Collett has recorded the extensive bibliography of the genus, and attempted to reduce to their true number the twenty forms as yet described. Norsk. Nordh. Exped. pp. 77–84. *L. esmarki*, Coll., p. 84, pl. ii. figs. 19–21, & iii. fig. 22, *frigidus*, Coll., p. 96, pl. iii. figs. 23 & 24, *pallidus*, Coll., p. 110, pl. iii. figs. 26 & 27, *seminudus*, Reinh., p. 113, pl. iv. fig. 28, and *muræna*, Coll., p. 116, pl. iv. figs. 29–31, described; *id.* l. c. *L. luetkeni*, sp. n. (= *L. reticulatus*, Coll., *nec* Reinh.), *id. l. c.* p. 103, pl. iii. fig. 25, North Atlantic.

Lycodes macrops, sp. n., Günther, Zool. Challenger Exp. i. pt. 6, p. 21, pl. xi. fig. B, Antarctic Ocean.

Gymnelis viridis (Fabr.), redescribed and figured: Collett, Norsk. Nordh. Exp. p. 123, pl. iv. fig. 32.

Hypolycodes, g. n. Differs from *Lycodes* in the gill-openings being wide, and the ventral fins equal in length to the pectorals; Hector, Tr. N. Z. Inst. xiii. p. 194. *H. haasti*, sp. n., *id. ibid.*, Waimarama, East Coast, Wellington.

Gadidæ.

Gadus saida, Lepech., redescribed and figured; Collett, *l. c.* p. 126, pl. iv. fig. 33.

Onos reinhardti (Kröyer), p. 131, pl. iv. fig. 34, and *septentrionalis* (Collett), p. 138, pl. iv. figs. 35 & 36, redescribed and figured: *id. l. c.*

Læmonema longifilis, sp. n., Günther, Zool. Challenger Exp. i. pt. 6, p. 13, pl. vii. fig. B, Rio de la Plata.

Motella capensis, Kaup, redescribed; Sauvage, Arch. Z. expér. viii. p. 42.

Ophidiidæ.

Ophidium muræ nolepis, sp. n., Günther, *l. c.* p. 46, pl. xx. fig. A, Ki Islands.

Genypterus australis, Casteln., described and figured; F. McCoy, Prodr. Zool. Vict., Dec. 3, pl. xxvii. fig. 1. [1879].

Gadopsis gracilis, McCoy, described and figured; *id. ibid.* fig. 2.

Muræ nolepis, g. n., *id. l. c.* p. 17; for *M. marmoratus*, sp. n., Günther, *l. c.* p. 18, pl. viii. fig. B, Kerguelen Island.

Hypoptychus, g. n., Steindachner, SB. Ak. Wien, lxxxii. Abth. i. p. 257. Represents a special group, *Hypoptychina*, to be placed between the *Ammodytina* and *Congrogadina*. For *H. dybowskii*, sp. n., *id. ibid.* pl. ii. fig. 3, North Japan.

Rhodichthys regina, Collett, described; Collett, Norsk. Nordh. Exped. p. 154.

Fierasfer, Cuv. The species occurring in the Bay of Naples and its vicinity are discussed by C. Emery in "Fauna und Flora des Golfes von Neapel," ii. (*anteà*, p. 3). *F. acus*, Cuv. (of which *Porobranchus lineatis*, Kaup, and *Helminthostoma dellechiajii*, Cocco, are larval forms), and *F. dentatus*, Cuv. (of which *Eucheliophis tenuis*, Putnam, is a larval form), are described in their adult state, with their metamorphoses and anatomy. Also in Atti Ac. Rom. (3) vii. Mem. Sci. fis. pp. 167–254, pls. i.–ix.

Pleuronectidæ.

Hippoglossoides platessoides (Fabr.), redescribed; Collett, Norsk. Nordh. Exped. p. 144.

Hippoglossoides (*Hippoglossina*) *punctatissimus*, sp. n., Steindachner, SB. Ak. Wien, lxxx. Abth. i. p. 167, Japan.

Pœcilopsetta, g. n., Günther, *l. c.* p. 48; for *P. colorata*, sp. n., *ibid.* pl. xxii. fig. B, Ki Islands.

Arnoglossus tenuis, sp. n., *id. l. c.* p. 55, Hong Kong.

Anticitharus, g. n., *id. l. c.* p. 47; for *A. polyspilus*, sp. n., p. 48, pl. xxii. fig. A, Ki Islands.

Lepidopsetta, g. n., *id. l. c.* p. 18; for *L. maculata*, sp. n., *ibid.* pl. xxx. fig. C, Prince Edward's Island. Also *L. isolepis*, sp. n. (= *L. umbrosa*, Lockingt., *nec* Girard), Lockington, Am. Nat. xiv. p. 597, Pacific coast of North America.

Samaris maculatus, sp. n., Günther, *l. c.* p. 47, pl. xxi. fig. A, Ki Islands.

Pseudorrhombus boops, Hect., redescribed; *id. l. c.* p. 26.

Pseudorrhombus ocellatus, sp. n., *id. l. c.* p. 56, pl. xxiv., Admiralty Islands.

Pseudorrhombus moorii, sp. n., Thominot, Bull. Soc. Philom. (7) iv. p. 175, Melbourne.

Pseudorrhombus muelleri, Klunz., figured; SB. Ak. Wien, lxxx. Abth. i. pl. ix. fig. 2.

Rhomboidichthys cornutus, p. 7, pl. ii. fig. B, Coast of Brazil, *angusti-*

frons, p. 46, pl. xxi. fig. B, Arafura Sea, and *spilurus*, p. 47, pl. xxi. fig. A, New Guinea, spp. nn., Günther, *l. c.*

Thysanopsetta, g. n., *id. l. c.* p. 22; for *T. naresi*, sp. n., *ibid.* pl. xi. fig. A, Cape Virgins.

Lophonectes, g. n., *id. l. c.* p. 28; for *L. gallus*, sp. n., p. 29, pl. xv. fig. B, Port Jackson.

Pleuronectes jokohamæ, sp. n., *id. l. c.* p. 69, Japan.

Pleuronectes microcephalus, Donov., redescribed; Steindachner, SB. Ak. Wien, lxxx. Abth. i. p. 165. *P. pallasi*, sp. n., *id. l. c.* p. 163, pl. ii. fig. 3, Kamtschatka.

Rhombosolea monopus, Gthr., redescribed; *id. l. c.* p. 170.

Læops, g. n., Günther, *l. c.* p. 28; for *L. parviceps*, sp. n., *ibid.* pl. xv. fig. A, Arafura Sea.

Nematops, g. n., *id. l. c.* p. 57; for *N. microstoma*, sp. n., *ibid.* pl. xxiv. fig. C, Admiralty Islands.

Solea kaiana, id. *l. c.* p. 49, pl. xxi. fig. C, Ki Islands; *S. uncinata*, Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 408, King George's Sound: spp. nn.

Solea (*Achirus*) *poropterus*, Blkr. (?), described; Klunzinger, *l. c.* p. 408.

Synaptura arafurensis, sp. n., Günther, *l. c.* p. 49, Arafura Sea.

Glyptocephalus cynoglossus (L.), redescribed; Collett, Norsk. Nordh. Exp. p. 150.

Cynoglossus joyneri, Gthr., redescribed and figured; Günther, *l. c.* p. 70, pl. xxx. fig. A. *C. interruptus*, sp. n., *id. ibid.* fig. B, Japan.

PHYSOSTOMI.

Siluridæ.

Cnidoglanis nudiceps, Günther, Zool. Challenger Exp. i. pt. 6, p. 49, Arafura Sea; *C. muelleri*, Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 411, Port Darwin, Australia: spp. nn.

Copidoglanus tandanus, Mitch., redescribed; Klunzinger, *l. c.* p. 410.

Cranoglanis, g. n., Peters, MB. Ak. Berl. 1880, p. 1030; for *C. sinensis*, sp. n., *ibid.* fig. 1, Hongkong.

Pangasius (*Pseudopangasius*) *bocourti*, sp. n., Sauvage, Bull. Soc. Philom. (7) iv. p. 229, Phnom Peuk, Laos.

Platystoma fasciatum, L., var.; Steindachner, SB. Ak. Wien, lxxx. Abth. i. p. 172.

Platystoma verrucosum, sp. n., Vaillant, Bull. Soc. Philom. (7) iv. p. 151, Upper Amazons.

Piramutana macrospila, sp. n., Günther, Ann. N. H. (5) vi. p. 10, pl. ii., Rio de la Plata.

Platystomatichthys hippoglossoides, Walb., redescribed; Collett, Norsk. Nordh. Exp. p. 142.

Pimelodus platanus, Günther, Ann. N. H. (5) vi. p. 10, Parana; *P. grosskopffi*, Steindachner, *l. c.* p. 186, Cauca: spp. nn.

Pseudarius philippinus, sp. n., Sauvage, Bull. Soc. Philom. (7) iv. p. 226, Luçon.

Hemiarius harmandi, sp. n., *id. l. c.* p. 230, Siam.

Ancharius, g. n., Steindachner, SB. Ak. Wien, lxxxii. Abth. i. p. 251; for *A. fuscus*, sp. n., *id. l. c.* p. 251, pl. iii. fig. 3, & pl. iv., Madagascar.

Doras calderonensis, sp. n., Vaillant, Bull. Soc. Philom. (7) iv. p. 151, Upper Amazons.

Callichthys fasciatus, Cuv. On the habits of this species; Carbonnier, C. R. xci. pp. 940–942, & Bull. Soc. Z. Fr. 1880, pp. 288–290.

Chætostomus cochliodon, sp. n., Steindachner, SB. Ak. Wien, lxxx. Abth. i. p. 187, Cauca.

Plecostomus cordovæ, sp. n., Günther, Ann. N. H. (5) vi. p. 11, Cordova.

Loricaria maculata, Bloch. Vaillant notices considerable differences owing to the age of the specimens; Bull. Soc. Philom. (7) iv. p. 157.

Loricaria valenciennesi, sp. n., *id. ibid.*, Upper Amazons.

Otocinclus, Cope, belonging to the group *Hypostomatina*, recharacterized; *id. l. c.* p. 145.

Otocinclus joberti, sp. n., *id. ibid.*, Upper Amazons.

Scopelidæ.

Saurus kaianus, sp. n., Günther, Zool. Challenger Exp. i. pt. 6, p. 50, pl. xxiii. fig. c, Ki Islands.

Scopelus muelleri, Gmel., redescribed; Collett, Norsk. Nordh. Exp. p. 158.

Aulopus japonicus, sp. n., Günther, *l. c.* p. 72, Japan.

Cyprinodontidæ.

Fundulus bermudæ, Gthr., redescribed and figured; Günther, *l. c.* p. 10, pl. xxxii. fig. B.

Fundulus letourneuxi, sp. n., Sauvage, Bull. Soc. Philom. (7) iv. p. 214, Corfu.

Scombresocidæ.

Belone jonesi, Goode, redescribed; Günther, *l. c.* p. 10.

Belone græneri, sp. n., Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 414, Port Darwin, Australia.

Scombresox saurus. The transformations which this species undergoes with age are described and figured; Lütken, Dan. Selsk. Skr. xii. pp. 464 & 607.

On the southern limits of the distribution of the Flying Fish in the Indian Ocean; E. v. Danckelman, Arch. f. Nat. 1880, pp. 280–284.

Galaxiidæ.

Galaxias attenuatus, Jen., redescribed; Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 412.

Galaxias campbelli, sp. n., Sauvage, Bull. Soc. Philom. (7) iv. p. 229, Campbell Island.

Salmonidæ.

Arthur, W. Notes on some Specimens of Migratory *Salmonidæ*. Tr. N. Z. Inst. xiii. pp. 175–193, pls. iv. & v.

Salmo macrostoma, sp. n., Günther, Zool. Challenger Exp. i. pt. 6, p. 71, pl. xxxi. fig. A, Japan.

Retropinna richardsoni, Rich., redescribed; Klunzinger, *l. c.* p. 413.

Argentina sphyræna, L., described and figured; *A. hebridica*, Yarrell, is not specifically distinct from it. F. Day, J. L. S. xv. p. 78, pl. iv.

Clupeidæ.

Engraulis surinamensis, Blkr., p. 173, and *atherinoides*, L., p. 177, redescribed; Steindachner, SB. Ak. Wien, lxxx. Abth. i.

Engraulis nattereri, p. 174, Para, *januarius*, p. 176, Rio Janeiro, and *peruanus*, p. 178, Callao, spp. nn., *id. l. c.*

Engraulis japonica, Gthr., *nec* Schleg., renamed *chinensis*; Günther, *l. c.* p. 72.

Clupea muelleri, Klunzinger, *l. c.* p. 416, New Zealand; *C. brasiliensis*, p. 182, Rio Janeiro, and *amazonica*, p. 183, Para, Steindachner, *l. c.*: spp. nn.

Pellonula bahiensis, sp. n., Steindachner, *l. c.* p. 181, pl. iii. fig. 2, Bahia.

Cyprinidæ.

Labio decorus, sp. n., Peters, MB. Ak. Berl. 1880, p. 1031, fig. 2, Hongkong.

Semilabeo, g. n., *id. l. c.* p. 1032; for *S. notabilis*, sp. n., *ibid.* fig. 3, Hongkong.

Lobochilus pierrii, sp. n., Sauvage, Bull. Soc. Philom. (7) iv. p. 233, Bien Hoa.

Barbus gerlachi, Peters, *l. c.* p. 1034, fig. 5, Hongkong; *B. milesi*, Day, P. Z. S. 1880, p. 228, Afghanistan: spp. nn.

Barbus maculatus, C. & V., var.; Günther, Zool. Challenger Exp. i. pt. 6, p. 53.

Barbus (*Labeobarbus*) *brevifilis*, sp. n., Peters, *l. c.* p. 1033, fig. 4, Hongkong.

Probarbus, g. n., Sauvage, Bull. Soc. Philom. (7) iv. p. 232. Allied to *Barbus*; for *P. jullieni*, sp. n., *ibid.*, Laos.

Cyclochilichthys jullieni, sp. n., *id. l. c.* p. 230, Laos.

Puntius pierrii, sp. n., *id. l. c.* p. 232, Bien Hoa.

Pseudogobio productus, sp. n., Peters, *l. c.* p. 1035, fig. 6, Hongkong.

Paratylognathus, g. n. Characters of *Tylognathus*, but the scales small and numerous; no pores on the snout; 4 barbels. Sauvage, *l. c.* p. 227. For *P. davidi*, sp. n., *id. ibid.*, Sze-tchuan.

Distæchodon, g. n., Peters, *l. c.* p. 924; for *D. tumirostris*, sp. n., *id. l. c.* p. 925, Ningpo.

Luciosoma harmandi, sp. n., Sauvage, *l. c.* p. 231, Laos.

Rasbora philippina, sp. n., Günther, *l. c.* p. 55, Hongkong.

Leuciscus kakuensis, sp. n., *id. l. c.* p. 72, pl. xxxi. fig. B, Japan.

Scaphiodon aculeatus, C. & V., redescribed; F. Day, P. Z. S. 1880, p. 227.

Scaphiodon microphthalmus, sp. n., *id. ibid.*, Afghanistan.

Bola harmandi, sp. n., Sauvage, *l. c.* p. 231, Cambodia.

Hemiculter dispar, sp. n., Peters, *l. c.* p. 1035, fig. 7, Hongkong.

Characinidæ.

Curimatus platanus, sp. n., Günther, Ann. N. H. (5) vi. p. 12, Rio de la Plata.

Prochilodus longirostris, sp. n., Steindachner, SB. Ak. Wien, lxxx. Abth. i. p. 188, Cauca.

Tetragonopterus caucanus, id. *l. c.* p. 189, Cauca; *T. cordovæ*, Günther, *l. c.* p. 12, Rio de Cordova: spp. nn.

Brycon labiatus and *rubricauda*, spp. nn., Steindachner, *l. c.* p. 188, Cauca.

Chalcinus paranensis, sp. n., Günther, *l. c.* p. 13, Parana.

Muræniдæ.

Cattie, S. T. Ueber die Genitalien der männlichen Aale und ihre Sexualunterschiede. Zool. Anz. 1880, p. 330.

On this subject, see also Hermes, SB. Nat. Fr. 1880, p. 27.

Congromuræna megastoma, sp. n., Günther, Zool. Challenger Exp. i. pt. 6, p. 73, Japan.

Ophichthys schneideri, sp. n., Steindachner, SB. Ak. Wien, lxxx. Abth. i. p. 184. [Locality not stated.]

LOPHOBRANCHII.

Syngnathus caretta, sp. n. (= *S. modestus*, Klunz., *nec* Günth.), Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 419.

Syngnathus superciliaris, sp. n., Günther, *l. c.* p. 30, Port Jackson.

Doryichthys pleurotænia, id. *l. c.* p. 62, pl. xxvi. fig. D, Honolulu; *D. juillerati*, De Rochebrune, Bull. Soc. Philom. (7) iv. p. 168, Senegambia.

Belonichthys sancti-pauli, sp. n., Sauvage, Arch. Z. expér. viii. p. 45, pl. i. fig. 1, St. Paul Island.

Ichthyocampus papuensis, sp. n., *id.* Bull. Soc. Philom. (7) iv. p. 228, New Guinea.

Cœlonotus vaillanti, sp. n., Juillerat, Bull. Soc. Philom. (7) iv. p. 176, Madagascar.

Solenognathus fasciatus, sp. n., Günther, *l. c.* p. 30, pl. xiv. fig. B, Twofold Bay.

Hippocampus villosus, sp. n., *id. l. c.* p. 8, pl. i. fig. D, Bahia.

PLECTOGNATHI.

Monacanthus filicauda, p. 50, pl. xxiii. fig. D, New Guinea, *tessellatus*, p. 54, pl. xxiii. fig. B, Philippines, and *modestus*, p. 73, Japan, spp. nn., Günther, Zool. Challenger Exp. i. pt. 6.

Monacanthus trachylepis, Gthr., redescribed; Klunzinger, SB. Ak. Wien, lxxx. Abth. i. p. 422.

CYCLOSTOMATA.

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CONCHOLOGICAL JOURNALS.

Journal de Conchyliologie, edited by H. CROSSE and P. FISCHER, xxviii. or (3) xx. Paris: 8vo, 398 pp., 13 pls.

Malakozoologische Blätter, continued by S. CLESSIN, (2) ii. Cassel: 8vo, 210 pp., 3 pls.

Jahrbuch der deutschen malakozoologischen Gesellschaft, edited by W. KOBELT, vii. Frankfurt-a.-M.: 8vo, 383 pp., 12 pls.

Nachrichtsblatt der deutschen malakozoologischen Gesellschaft, edited by W. KOBELT, xiii. Frankfurt-a.-M.: 8vo, 116 pp.

Bullettino della Società malacologica Italiana, vi. Pisa: 8vo, 278 pp., 1 pl.

The Journal of Conchology, vol. iii., Nos. 1–4. London: 8vo, 128 pp.

MANUALS.

A new edition of the French translation of WOODWARD'S well-known manual of *Mollusca* by P. FISCHER, is published at Paris, part 1, 112 pp., 104 figs.

W. TRYON has published a second volume of his manual of Conchology, containing only the *Muricinæ* and *Purpurinæ*.

Kobelt has published a further part of his "Illustrirtes Conchylienbuch," containing the end of the *Stylommatophora*, the *Basommatophora* (*Limnæidæ*, &c.), *Solenoconchæ*, and a part of the Bivalves.

Anatomy and Physiology.

1. *General Morphology.*

J. W. Spengel essays to prove the derivation of the asymmetry in the intestines of many Gastropods, chiefly the *Prosobranchia* (M. E.), from a torsion of the hinder part of the originally symmetrical body, by which the heart is turned round, its anterior end with the origin of the aorta becoming posterior, its left auricle right-hand, the left gill right, and *vice versâ*; the visceral nerves were originally also symmetrical, and their chief commissure at the hinder end of the body behind the heart and vent; but by this torsion, the left chief branch of the visceral nerves was conducted across the median line below the intestine, the right above it, and their commissure advanced forwards above the aorta and intestine. This is considered to be the origin of the singular noose-like conformation of the commissure which was pointed out first by H. v. Ihering in a part of those *Mollusca* [see Zool. Rec. xiii. *Moll.* p. 19]. The symmetrical structure of the body which is most shown in *Chiton* and in the Bivalves, is therefore the more primitive, and the Pteropods, although they have some important points of resemblance to the Cephalopods (*e.g.*, the cephalic cones), are essentially separated from them by the asymmetrical arrangement of their intestines. Z. wiss. Zool. xxxv. pp. 333–373, pl. xvii.

W. Brooks thinks that the paired arms of the Cephalopods cannot be homologous to the single foot of the Gastropods, but are paired outgrowths from the foot region; the homology goes no farther than the parts of the yelk during the stage of segmentation. Am. J. Sci. (3) xx. pp. 288–291.

2. *Muscular System and Movement.*

H. Simroth makes some general remarks on the locomotion of the *Mollusca*. The snails and the *Turbellaria* are the only animals which move by true gliding, the foot continually adhering to the bottom, not loosening and re-fixing itself step by step, but advancing by extension of the longitudinal muscles [*cf.* Zool. Rec. xvi. *Moll.* p. 13]. The same mechanism is employed by the freshwater snails, which creep and do not swim along the surface of water. *Cyclas* ascends vertical objects by fixing its shell by very fine byssus-threads, step by step. Z. ges. Naturw. (2) v. pp. 500–504.

The presence of striated muscles in the adductors of the genus *Pecten* is stated by R. Blanchard, Rev. Int. Sci. 1880, No. 4, and by Constance, Bull. Soc. Brest, 1879. They are not found, according to Blanchard, in the adductors nor in any other part of *Mytilus*, *Anodonta*, and *Unio*; earlier statements by other authors concerning them seem to be doubtful or wrong. Abstract in J. R. Micr. Soc. iii. p. 930.

Physiological experiments on the muscles of the Bivalves, the current of electricity being the most powerful agent on them, by CONSTANCE, Bull. Soc. Brest, 1879; abstracts in Rev. Sci. Nat. ii. p. 117, and J. R. Micr. Soc. iii. p. 765.

Chemical notes on the muscular substance of several *Mollusca*. "Taurine" found in the adductor muscles of various Bivalves and in the muscles of some Gastropods; probably "tyrosine" in the muscles of *Eledone*. C. F. KRUKENBERG, Vergl. physiol. Studien, ii. pp. 8, 9, 13, 30–35.

3. *Formation of the Shell.*

LONGE & MER have examined the formation of the shell in land snails, especially *Helix*. They have found near the anterior margin of the mantle a peculiar modification of its structure, which they name "appareil cutogène," consisting, first, of a furrow or groove parallel to the margin, and, secondly, behind it, of a layer of bottle-shaped cells which appears upon an antero-posterior section, like an epithelial wedge buried in the substance of the mantle (epithelial organ). The glandular cœca at the bottom of the pallial groove secrete mucus, perhaps conchioline; the bottle-shaped cells secrete granules, soluble in potash; both assist in forming the cuticle of the shell. This apparatus exists in the embryo when still enclosed in the ovular envelopes, and continues during the whole of growth of the snail. In the adult, the bottle-shaped cells and glandular cœca of the furrow are gradually atrophied, but the furrow remains, thus explaining why the aperture in most adult *Helix* is first slightly narrowed and then turned outwards. The deeper calcareous layers of the shell are secreted, as is well known, by the whole surface of the mantle. When a part of the shell has been injured and is re-formed, calcareous rods first appear, which gradually become enlarged at the extremities and acquire the form of small sacs, being further converted into spheres, the dimensions of which are increased by concentric deposits with radiating striæ; these finally come in contact with each other and form a continuous stratum. C. R. vol. xc. pp. 430–432; Ann. N. H. (5) v. pp. 430–432.

4. *Digestion.*

Chemical observations on the hepatic fluid in various *Mollusca* by C. F. KRUKENBERG; *Chiton* agrees in this respect with the other *Mollusca* and differs from the *Vermes* in the want of "tryptical enzyme"; in *Tethys*, the hepatic fluid has no peptic power: Vergl. physiol. Studien, i. pp. 58–60. Spectroscopical note on the pigments of the liver in various *Mollusca*; pp. 182, 188 & 189, table. "Taurine" and small quantities of urea found in the liver of some *Mollusca*; pp. 30–33. A large quantity of fat exists in the liver of many *Mollusca*, and fat is scarce only in *Mytilus edulis*; p. 41.

Three different sorts of cells found in the liver of *Arion*, *Helix*, and *Limax*—fermenting cells, liver cells, and others filled with colourless granules of carbonate of lime; this third sort of cells is wanted in

Limnæa stagnalis and *Planorbis corneus*, and is very scarce in *Succinea amphibia*. The liver of the land-snails unites, therefore, the function of the liver with that of the pancreas in the Vertebrates. Barfurth, Zool. Anz. iii. pp. 499–502 ; abstract in J. R. Micr. Soc. iii. p. 929.

5. *Excretion and Secretion.*

Peculiar circumbuccal glands of unknown use (more numerous in *Doridium*), a gland at the hinder part of the foot, a renal gland and another of red colour and unknown function, all in *Gastropteron*, described by Vayssière, Ann. Sci. Nat. (6) ix. art. 1, p. 60 *et seq.*

W. Vigelius has published his observations on the organ of excretion in the *Cephalopoda* [see Zool. Rec. xvi. *Moll.* p. 14] at large in Niederl. Arch. Zool. v. pp. 115–184; abstract in J. R. Micr. Soc. iii. pp. 926–928.

T. Barrois states the existence of a cavity, plicated and lined with glands opening at the hinder end of the foot, in *Tellina baltica* (L.) and *Scrobicularia piperata* (Gm.). In *Donax anatinus* (Lam.), the same cavity is observed, but its walls are only covered with cylindrical epithelium, and there is no trace of gland-cells. He regards these all as representing the byssal apparatus of other Bivalves. Bull. Sci. Nord (2) iii. p. 193; abstract in J. R. Micr. Soc. iii. p. 765.

Note on the occurrence of uric acid in the renal organ of various *Mollusca*, partly compiled from previous authors, partly from original observation, by C. F. Krukenberg, *l. c.* ii. pp. 18, 19, 23, 24, & 27.

Manganese, but no iron, found in the secretions of the organ of Bojanus in *Pinna squamosa*, by Krukenberg, *l. c.* ii. pp. 24 & 25.

6. *Nervous System.*

H. Simroth describes the pedal nerve of *Paludina*. This is formed by a pair of strong longitudinal strings, connected by four transverse commissures, three of which are very conspicuous even in the embryo. The ladder-like structure of the pedal nerves is therefore found also in the higher forms of *Prosobranchia* or *Arthrocochlides*, contrary to Ihering's theory. Z. wiss. Zool. xxxv. pp. 141–150, woodcut; abstract in J. R. Micr. Soc. (2) i. pp. 27 & 28.

J. Chatin's paper on the nervous centres in *Loligo* (Guide Nat. 1880, No. 3, p. 79) has not been seen by the Recorder.

The nervous system of *Gasteropteron* is carefully described by Vayssière, who finds an intercerebroid sub-œsophagean commissure and a double anastomosis of the pedal trunks. Ann. Sci. Nat. (6) ix. No. 1, pp. 57–69.

7. *Action of Poisons.*

Observations on the action, absorption, and elimination of venomous substances in the Cephalopods, by E. Yung, C. R. xci. pp. 238 & 306. Other observations on the influence of alkaline and acid substances on the Cephalopods ; *id. l. c.* p. 439 ; abstract in J. R. Micr. Soc. iii. pp. 765

& 929. Critical note on these statements, and some original observations, stating that curare acts much more powerfully on Gastropods than on Cephalopods and Heteropods, and almost not at all on Bivalves, by C. F. Krukenberg, Vergl. physiol. Studien, i. pp. 35, 117–123, iii. p. 178, footnote.

Helix pomatia perishes in an atmosphere filled with camphor after three hours; Krukenberg, *op. cit.* i. p. 95. Strychnine has no serious influence on this snail; *id. l. c.* p. 100.

See also *Cephalopoda*, Chromatophores.

8. *Organs of Sense.*

Eyes of *Pecten maximus*, *jacobæus*, and *opercularis*, described by S. J. Hickson, Q. J. Micr. Sci. xx. pp. 443–455; abstract in J. R. Micr. Soc. (2) i. p. 230. Their number varies in different individuals from 80 to 120. The lens is multicellular, there is a highly developed tapetum, and the optic nerve, passing up the side of the eye-cup, bends over, and spreads itself over the anterior surface of the retina, behind which the pigment is situated. They have, therefore, more likeness to the eyes of the *Vertebrata* than those of any other *Invertebrata*, even *Onchidium*, but their development must of course be essentially different. Their functions appear to be very limited.

Organ of Smell. D. Sochlæzewer discusses the question of the seat of smell in land snails. He proves by experiments with oil of turpentine that it is not in the feelers, as La Pluche (1772), Moquin-Tandon, and Velten supposed, but near the mouth. The so-called organ of Semper at the entrance of the mouth is essentially of glandular structure, and contains no sensitive cells, but the pedal gland, which is opened beneath the mouth and secretes slime, contains conspicuous sensitive cells in its epithelium, which are described and figured by the author, and he thinks therefore, with Deshayes and Leidy, that probably this gland is the seat of smell. His researches have been made chiefly in *Limax cinereo-niger*. Z. wiss. Zool. xxxv. pp. 30–46, pl. iii.; abstract in J. R. Micr. Soc. (2) i. p. 24.

Peculiarly fine furrows, arranged in two lines on the lateral parts of the body and more intensely coloured in *Doridium*, and analogous wart-like prominences on both sides of a common axis in *Bulla hydatis*, are regarded as the organ of smell by Vayssière, Ann. Sci. Nat. (6) ix. Art. 1, pp. 110 & 111.

J. W. Spengel states the existence of a peculiar sensitive organ in the mantle cavity of most *Mollusca*, near the gills, which he thinks to be the seat of the sense of smell. It has been described by former authors as a rudimentary gill or a ciliferous prominence; Gegenbaur alone suspected in the *Pteropoda* its sensory and especially olfactory nature. It has been found also in the Bivalves. Z. wiss. Zool. xxxv. pp. 373–381, pls. xviii. & xix.

Abstract of Todaro's paper on the gustal organ in *Pterotrachea* [Zool. Rec. xvi. *Moll.* p. 16] in Arch. Z. expér. viii. p. l., and in J. R. Micr. Soc. (2) i. p. 228.

9. *Organs of Generation.*

A. Batelli has published several histological observations on the genital organs of *Helix pomatia* and *nemoralis*, with various critical and historical notes. Atti Soc. Tosc. iv. [1879], pp. 203–225, pls. xv. & xvi.

Spermatophere of the *Helicidæ*, or *capreolus*. Historical notes and description of that of *Austenia*, and other Indian species, by H. H. Godwin-Austen. P. Z. S. 1880, pp. 289–291, 295–297, pl. xxiv. fig. 6, pl. xxvi. figs. 2–5, pl. xxvii. figs. 8 *a*, *b*, *c*.

C. Semper opposes Pfeffer's theory as to the identity of flagellum and sac with calcareous particles, and states that in *Nanina wallacii* and some others the so-called flagellum consists of a loop formed by the vas deferens and the upper end of the penis. Nachr. mal. Ges. 1880, pp. 8–12.

The genital organs of *Zonites algirus* are described histologically and physiologically by H. Rouzaud, in a pamphlet of 8 pp., not seen by the Recorder.

The generative organs of the young *Helix aspersa* (Müll.) described, and their development compared with those of other snails, by M. Jourdain, Rev. Sci. Nat. 1880, p. 449; abstract in J. R. Micr. Soc. iii. p. 608.

10. *Embryology.*

A very valuable survey of the state of our knowledge concerning the development of the *Mollusca* is given by F. M. Balfour, in his Manual of Comparative Embryology, i. pp. 187–241 (German translation, i. pp. 217–279), with many woodcuts.

W. H. Brooks has published a paper on the acquisition and loss of a food-yelk in Molluscan eggs, in Studies of the Biological Laboratory at Hopkins University, iv. pp. 105–116 [not seen by the Recorder].

Development of *Loligo pealii* (Lesueur) described by W. H. Brooks, Anniversary Mem. Bost. Soc. 1880, 22 pp., 4 pls. [Not seen by the Recorder.]

H. Fol has published a rather extended paper on the development of the aquatic and terrestrial *Pulmonata*, from original observations, compared with the statements and views of previous authors; he rejects in many points the results given by Rabl [Zool. Rec. xvi. *Moll.* p. 17], in some, also those by Lankester and Ihering. Among the aquatic *Pulmonata*, the genus *Planorbis* offers much less difficulties for embryological studies than *Limnæa*; among the terrestrial, *Limax* is the most fitted for them. The velum is very small in the embryo of the *Pulmonata*, and quite rudimentary as regards its locomotory function, but, nevertheless, a part of it which contains contractile ramified cells is highly developed, and is connected with the movement of the nutritive fluids.. The larval heart changes its situation during the development of the embryo, migrating from the ventral to the dorsal side. The blastopore remains as a distinct opening, and very probably becomes the mouth in *Limax* (probably also in other *Pulmonata*), whereas in *Paludina* (*Pectinibranchiata*) it appears to become the vent. The nervous ganglia have their origin in an invagi-

nation of the ectoderm in the terrestrial *Pulmonata*, and in a thickened spot of the mesoderm in the aquatic; but the mesoderm itself originates in the ectoderm. The origin of the pulmonary cavity is the same in both terrestrial and aquatic species, and is independent of the kidney (opposed to the statement of Ihering). There is a pair of renal organs in the larva, which disappear afterwards; the later permanent kidney is developed only on one side of the body, and wanting or rudimentary on the other. The asymmetry in the structure of the body begins very early in the embryo, soon after the segmentation of the yelk, and it cannot be stated that it is caused by any distinct organ. The contractile sinus at the end of the foot in the larva of the terrestrial *Pulmonata* is formed by a part of the wall of the body, and, on account of its situation, is not identical with the contractile parts in the foot of the aquatic *Pulmonata*. The author comes to the conclusion that the embryonal development of the *Mollusca* agrees remarkably with that of the *Vermes*, *Polyzoa*, *Brachiopoda*, *Echinodermata*, and even *Cœlenterata*; whereas the *Arthropoda* and the *Chordoniæ* (*Vertebrata* and *Tunicata*) exhibit two other types of development. Arch. Z. expér. viii. pp. 103–232, pls. ix.–xviii.; abstract in J. R. Micr. Soc. iii. pp. 414 & 605.

C. Rabl maintains his views and statements as to the first development of *Planorbis* against Fol's criticism, and adds only that what had been described as "pedicle of invagination" by Lankester is not a residue of the process of invagination, but a distinct development of a part of the small-sized endodermic cells, and that the number of cells is not 24, but 25, at the time when the separation in distinct germinal layers is beginning. Morph. JB. vi. pp. 571–580, pl. xxix.; abstract in J. R. Micr. Soc. (2) i. p. 25.

W. Wolfson's paper on the embryology of *Lymnœus* [*Limnæa*] *stagnalis*, written in Russian, in Sap. Acad. xxxvi. [1879] No. 2, is abstracted by the author in German; Mél. Biol. x. pp. 351–377. The author describes the segmentation of the egg, and comes to the result that the intestine is originally closed at both ends, and that the vent is subsequently formed by invagination. Abstract in J. R. Micr. Soc. iii. p. 415.

W. H. Brooks gives a preliminary statement of the leading points in the development of the Pulmonates and of the Oyster, from original observations, with the following conclusions:—"The Pulmonate and the Lamellibranch resemble each other in having the blastopore converted into the shell area, and the mouth formed nearly opposite by an invagination of the ectoderm. In both groups the anus is distinct from the blastopore, and is formed after the obliteration of the latter and the formation of the mouth, but the invagination neck of the Pulmonate migrates from its primitive position to the new anus, and becomes converted into the intestine, while the intestine of the oyster appears to have no relation whatever with the invagination neck." P. Bost. Soc. xx. pp. 325–329; abstract in J. R. Micr. Soc. iii. p. 763.

S. Trinchese describes the first changes in the egg before and soon after fecundation, in two *Nudibranchiata*, *Amphorina cœrulea* (Mont.) and *Ercolania siottii* (Trinch.), with special regard to the directory

vesicles (vesicole direttrici) and the first stages of segmentation. Atti Acc. Rom. (3) vii. Mem. Sci. fis. pp. 1–54, pls. i.–vii.

Abstract of BRAUN's observations on the development of Bivalves, by BERGH, C. B. Ver. Riga, xxiii. p. 120.

Development of the American Oyster described, by W. H. BROOKS, Studies Biol. Laboratory at Hopkins University, iv. pp. 1–104, 10 pls. [not seen by the Recorder.]

The development of *Teredo* described by B. HATSCHEK, Arb. Zool. Inst. Wien, iii. pp. 1–44. The fertilized ova (the first changes of which are carefully described), are found within the gills of the mother. The shell makes its appearance very early, and becomes double, while still very thin and almost cuticular in character. The larva in a somewhat later stage is a true Trochophore, and the author points out the general likeness of *Mollusca* and *Vermes* in the first development, but he differs from Ihering in some other points concerning their relations. Abstract in J. R. Micr. Soc. iii. pp. 770–772.

A few observations concerning the development of the spermatozoids in *Helix* and *Paludina*, by E. BLOMFIELD, Zool. Anz. iii. pp. 65 & 66.

11. *Biology.*

Observations on the propagating season and fecundity of various Cephalopods and several Gastropods, by SCHNITZLEIN, MT. z. Stat. Neap. ii. pp. 166 & 173.

Some observations on the appearance of pelagic *Mollusca* at Naples, chiefly in spring and autumn; SCHNITZLEIN, *tom. cit.* pp. 163–165.

Arion empiricorum contains 86, *Limax maximus* and *Doriopsis limbata* 82 per cent. of water; KRUKENBERG, Vergl. Phys. Studien, ii. pp. 103 & 104.

CLESSIN, referring to Wiedersheim's observation on *Limnæa* living without water [Zool. Anz. ii. 1879, pp. 572 & 573], remarks that these snails are naturally able to survive for some time in wet air without water, but he doubts the possibility of accustoming them to it. Mal. Blätt. (2) ii. pp. 199 & 200.

R. P. WHITFIELD has observed that the progeny of a single individual of *Limnæa megasoma* (Say) produced during confinement in an aquarium, exhibited some changes in the soft parts, especially diminution in size and disappearance of the male organ. P. Bost Soc. xx.; abstract in Am. Nat. xiv. pp. 51, 52, & 429. W. DALL thinks that this diminution in size is due to the want of sufficient and appropriate food. Bull. Phil. Soc. Wash. iii. p. 75.

Mollusca of the depths of lakes; see Geographical Distribution, Middle Europe, Switzerland.

12. *Regeneration.*

J. CARRIÈRE has published more fully his observations on the renewal of the tentacles and eyes in *Helix pomatia*, *hortensis*, *nemoralis*, and *fruticum*; he gives an historical account of the former experiments by Spallanzani and many others in 1768-1779, ascribing the very different

results to the different and inexact methods which they used; he states that the renewal is easier when the animal is well fed, and that it fails almost surely soon after hibernation, or in the season of propagation, the animal being in the first case exhausted by long abstinence, in the second needing all its energy for another purpose; *Helix pomatia*, *arbustorum*, and *fruticum* are more sensitive than *H. nemoralis* and *hortensis*. Slugs are more difficult to be kept in confinement than snails with shells. The renewal only takes place if the supra-pharyngeal ganglion has not been injured. The mode of renewal of the eye is microscopically described; it is essentially as in its first formation in the embryo, by invagination of the surface epithelium. Studien über die Regenerations-erscheinungen, i. 1880, 56 pp., 2 pls., large'4to; abstract in J. R. Micr. Soc. iii. p. 765.

Reparation of the shell in *Limnæa elodes* described by R. Bunker, Am. Nat. xiv. pp. 522 & 523.

13. *Abnormities.*

Sinistral specimen of *Helix virgata* (Mont.), Yarmouth, and *adspersa* (Müll.), Redcar, Ashford, and Hey, J. of Conch. iii. pp. 73 & 74, & 120; of *H. globulus* (Müll.), Craven, P. Z. S. 1880, p. 619.

Sinistral variety of *Bulimus senilis*; Gassies, J. de Conch. xxviii. p. 327, pl. x. fig. 3.

Sinistral specimens of *Buccinum undatum* (L.); about 12 in 15 years found in the Sound, by J. Collin, Nat. Tidskr. (3) xii. p. 439.

Dextral specimen of *Clausilia duboisi* (Charp.); Böttger, JB. mal. Ges. vii. p. 144.

A reversed specimen of *Tellina plicata* (Val.), the hinder fold of the shell bent to the left, observed by P. Fischer, J. de Conch. xxviii. p. 234.

Böttger and Weinland call attention to the strange occurrence of very numerous scalarid and very few normal specimens of *Helix rupestris*, observed on the island Syra by H. Blanc. Nachr. mal. Ges. 1880, p. 67; JB. mal. Ges. vii. p. 362, footnote; and Kosmos, iv. pp. 211–213.

Specimens of a *Valvata*, all distorted, and *Planorbis*, less distorted, found in a marl layer of Lawdor's Lake, near St. John, New Brunswick, all extinct; Hyatt, "The Genesis of the Tertiary Species of *Planorbis*," Annivers. Mem. Boston Soc. p. 31.

Keeled and acuminated abnormities of *Buccinum undatum* (L.); Collin, Nat. Tidskr. (3) xii. p. 438.

Monstrosity of *Cyprœa tigris* (L.), back flattened, front puffy, described by Giebel, Z. ges. Naturw. (2) v. p. 664.

Albino specimens of *Helix hortensis* (Müll.) are more common in wet years, and specimens with coloured bands have the growth of the last wet year not coloured; Dietz, JB. Ver. Augsb. xxv. [1879], p. 92.

Albino varieties of *Helix obvoluta*, *rotundata*, and *Clausilia biplicata* found on heaps of loose stones in the "Muschelkalk" region near Ochsenfurt, Northern Bavaria, the first exclusively without normal specimens; by S. Clessin, Mal. Bl. (2) ii. pp. 155–157. The thickness of the shells is quite normal, and the author thinks that the want of rotten wood,

which in other localities is frequented by these species, is the cause of the abnormal coloration.

Abnormities or variations in the genital organs of *Helix pomatia* and *fruticum*; SEMPER, Reis. Philippin. Landmoll. v. p. 247.

GEOGRAPHICAL DISTRIBUTION.

a. LAND AND FRESHWATER MOLLUSCA.

1. *Arctic Region* (*Circumpolar*).

Note on the doubtful occurrence of *Limax agrestis*, and the more probable one of *Arion fuscus*, in Greenland and Siberia, by G. ROLLESTON, Zool. Anz. iii. pp. 400-405.

Neighbourhood of *Hudson's Bay*. *Hyalinia hammonis* (Ström.), *Physa fontinalis* (L.), var., and *Limnæa palustris* (Müll.); KOBELT, Nachr. mal. Ges. 1880, p. 32.

2. *Scandinavia and Russia.*

Prov. Medelpad, in *Sweden*, 62° N. lat. 21 terrestrial and 7 freshwater species collected by C. G. Anderson, determined by S. CLESSIN, Mal. Bl. (2) ii. pp. 151–154.

Central Russia. 5 species of *Unio*, including two supposed new, by CLESSIN, Nachr. mal. Ges. 1880, pp. 79–81.

Podolia. 10 terrestrial and 13 freshwater species from the alluvial deposits of the river Bug, enumerated by S. CLESSIN, Mal. Bl. (2) ii. pp. 200–203; they are all Central European; a species of *Hyalina* and a variety of *Buliminus tridens* are described as new.

3. *British Fauna.*

R. RIMMER has published a treatise of 240 pp. on the land and freshwater shells of the British Islands, with illustrations of all the species.

Hertfordshire. *Vertigo moulinsiana* (Dupuy); GROVES, Tr. Hertf. Soc. i. p. 81, pl. i.

Yarmouth. *Helix caperata*, 3 varieties; ASHFORD, J. of Conch. iii. p. 73.

Isle of Wight. *Bulimus acutus* var. *bizona*, and varieties of *Helix virgata* and *caperata*; id. *l. c.* p. 120.

Ireland, King's County. *Helix ericetorum*, varieties; *id. l. c.* p. 120.

Living specimens of *Bulimus detritus* found at *Scarborough*, but probably introduced with barley; MASON, J. of Conch. iii. p. 118.

4. *Central Europe.*

The European species of *Succinea* and *Sphærium* are described and figured by KOBELT in his continuation of Rossmässler's Iconographie, vii. pp. 66–78 & 83–90, pls. ccii.–cciv., ccvii. & ccviii.

The marshlands on the German Coast between the mouths of the Weser and the Elbe support a very scanty number of terrestrial shells, viz., *Helix arbustorum* and *hispida*, *Carychium minimum*, *Succinea putris*, and *pfeifferi*, but a more considerable number of freshwater shells. Borcherding, Nachr. mal. Ges. 1880, pp. 21–23. *Vitrina diaphana* (Dr.) found at Bremen; *id. l. c.* p. 83.

Arngast Island, Jade, N. Germany. Only *Succinea oblonga*, *Pupa muscorum*, and *Vitrina pellucida* have been found here. Huntemann, Abh. Ver. Bremen, vii. p. 143.

Danzig. Note on its malacological fauna, *Hyalina petronella* and *contracta*, *Helix umbrosa*, *personata*, *Planorbis vorticulus* and *riparius*, *Valvata naticina*, and *Pisidium scholtzi* being the more remarkable; Schumann, in "Danzig in naturwissenschaftlicher und medizinischer Beziehung," 1880, pp. 93–95. Some notes on its freshwater shells, including *Unio crassus* (Retz.) in the River Radaune, by S. L. Schultze, Schr. Ges. Danzig, iv. p. 178.

Westphalia. P. Hesse adds *Hyalina draparnaldi* and *subterranea* to the malacological fauna of this province, and states the numerical relations of the small shells found in the alluvial deposits of the rivers; 4711 specimens were collected, belonging to 37 species; *Helix costata* and *pulchella* formed 31 per cent. of them, *Carychium minimum* 17, *Cionella lubrica* 10, *Hyalina nitida* and *radiatula* 8, *Succinea putris* nearly 8, *S. oblonga* 6, *Helix hispida*, *Pupa pygmæa*, and *Cionella acicula* each 5 per cent. JB. zool. sect. Westf. Mus. 1880, pp. 66–73.

Westphalia, Osnabrück. 40 terrestrial and 35 freshwater species enumerated by F. Borcherding, Nachr. mal. Ges. 1880, pp. 89–96; the most remarkable among them is *Hyalina draparnaldi* (Beck). *Helix bidens* found in Westphalia; Hesse, *tom. cit.* p. 17.

Pyrmont. 53 terrestrial and 27 freshwater species enumerated by P. Hesse. The more remarkable are *Vitrina diaphana*, *Cionella menkeana*, *Cyclostoma elegans*, and *Acme polita*; *Buliminus detritus* and *tridens*, *Planorbis corneus*, *vortex*, and *Paludina contecta* [*listeri*] are wanting. Mal. Bl. (2) ii. pp. 1–11.

Schöneberg (*near Cassel*). 20 species of land shells, including *Daudebardia rufa* and *Acme polita* found before here by C. Pfeiffer in 1822, enumerated by Diemar, Nachr. mal. Ges. 1880, pp. 109 & 110.

Harz. 58 terrestrial and 25 freshwater species enumerated by C. Riemenschneider, Z. ges. Naturw. (2) v. pp. 431–444. The more remarkable among them are *Helix ruderata*, *obvoluta*, *personata*, *incarnata*, *candidula*, *Buliminus detritus*, *tridens*, *Cionella menkeana*, *Pupa frumentum*, *doliolum*, *Balea fragilis*, *Clausilia biplicata*, *plicata*, *lineolata*, *parvula*, *dubia*, *Amphipeplea glutinosa*.

Eichsfeld. *Bulimus detritus* and *Clausilia lineolata* added to the former list [Zool. Rec. xvi. *Moll.* p. 22], and the numerical relations of some *Clausiliæ*, given by Böttger, Nachr. mal. Ges. 1880, p. 53.

Thuringia. Some land shells from Ihlefeld, Ruhla, Meiningen and Coburg (the latter with indication of the geognostical nature of the soil by H. Loretz), enumerated by Böttger, Nachr. mal. Ges. 1880, pp. 54–56.

Vogelsberg (*Hesse*). On the occurrence of some terrestrial and freshwater shells, and their predilection for limestone and beech trees by KINKERLIN, Nachr. mal. Ges. 1880, pp. 44–48 & 68.

Taunus. Some land shells from the "Rossert" mentioned by KINKERLIN. Nachr. mal. Ges. 1880, pp. 58–60.

Eifel. 22 terrestrial species collected by C. JICKELI, enumerated by O. BÖTTGER, Nachr. mal. Ges. 1880, pp. 15–17.

Odenwald. Some land shells mentioned by A. ANDREAE. Nachr. mal. Ges. 1880, pp. 61 & 62.

Schwarzwald. Vitrina heynemanni (Koch) and *Clausilia cana* (Held). BÖTTGER & STERKI, Nachr. mal. Ges. 1880, p. 84.

Ochsenfurt, near Würzburg. 54 terrestrial and 29 freshwater species enumerated by S. CLESSIN, the freshwater Mollusks are comparatively scarce and apparently diminishing in comparison with former times. Mal. Bl. (2) ii. pp. 138–150.

Swabian Alps (*Jura*). 27 species of land shells by V. DEGENFELD-SCHŒNBURG. Nachr. mal. Ges. 1880, pp. 13–17.

Switzerland. Several species from different parts in the North-eastern cantons mentioned by BÖTTGER, JB. mal. Ges. vii. pp. 35–37. *Planorbis corneus* found at Schaffhausen, STERKI, Nachr. mal. Ges. 1880, p. 84.

Jura of Switzerland. 22 terrestrial species (including *Hyalina*, sp. n., and 1 freshwater, *Limnæa peregra*, enumerated by BÖTTGER, JB. mal. Ges. vii. pp. 37 & 38.

Tirol. C. HELLER enumerates (chiefly from Gredler's observations) 80 species and 10 varieties of Mollusks which live in the high mountains of Tirol, to which 24 of them are confined, these are chiefly species of *Vitrina*, *Helix*, section *Campylæa*, and of *Clausilia*. Verh. z.-b. Wien, xxx. pp. 122–126.

Alps. Some terrestrial shells from the northern slope of the Bavarian and Austrian Alps enumerated by VON DEGENFELD-SCHŒNBURG, Nachr. mal. Ges. 1880, pp. 12 & 13; others by P. HESSE, *tom. cit.* pp. 40–44 & 68. Additional remarks to the former paper on the *Mollusca* of Reichenhall by E. v. MARTENS, *tom. cit.* pp. 62 & 63.

Chur and Glarus. 15 terrestrial shells enumerated by BÖTTGER, Nachr. mal. Ges. 1880, pp. 57 & 58, including *Hyalinia lucida* (Drap.) = *draparnaldi* (Beck).

Canton Vaud. 39 terrestrial and 7 freshwater species from the northern shore of the Lake of Geneva, enumerated by BÖTTGER, JB. mal. Ges. vii. pp. 38–40.

Canton Wallis. 37 terrestrial species collected by H. Simon near Siders (Sierre) enumerated by O. BÖTTGER, JB. mal. Ges. vii. pp. 31–35. *Hyalina dubreuili* (Clessin) and *Pupa strobeli* (Grdlr.) are new for Switzerland. [All the species are essentially Central-European, *Buliminus quadridens* alone is rather southern.—REC.]

Lakes of Switzerland. The Mollusks living in their depths, chiefly some species of *Pisidium* and *Valvata antiqua*, enumerated by ASPER in the General Catalogue of the International Exhibition for Fishery in Berlin, 1880, p. 203 (Special Catalogue of the Swiss section, pp. 5 & 131–140), and Zool. Anz. iii. pp. 132–134, 200–206. 16 peculiar species of

Pisidium and 1 of *Limnæa*, *L. abyssicola*, found in the depths of 13 different lakes in Switzerland, enumerated by H. Suter-Naef, Zool. Anz. iii. pp. 207 & 208.

Central France. L. Brevière [title *suprà*] enumerates 49 terrestrial and 50 freshwater species observed in the Département de la Nièvre, the more remarkable among them are *Helix carthusiana* (Müll.), *plebeia* (Drap.), *fasciolata* (Poir.), *Clausilia parvula* (Stud.), *Pupa cylindracea* (Dacosta), *Physa acuta* (Drap.), *Limnæa canalis* (Villa), *Pomatias obscurum* (Drap.), *Paludinella* [*Bythinella*] *abbreviata* (Mich.), *Anodonta elongata* (Holandre), *Unio rhomboideus* (Schröt.), *moquinianus* (Dupuy), *subtilis* (Drouet), and *requieni* (Mich.).

Valley of Mont Dore, Dép. Puy de Dôme. 22 terrestrial and only 4 freshwater species, viz., 2 *Limnæa*, 1 *Ancylus*, and *Hydrobia reyniesi*, enumerated by P. Fischer. The most remarkable is *Helix limbata* (Drap.); the rest much resemble the more northern fauna. *Helix hortensis* and its variety with rose-coloured peristome is present, but the true *nemoralis* is wanting. *Arion empiricorum* occurs only in the black, not in the red variety. J. de Conch. xxviii. pp. 289–299.

Lyon. A. Locard has published a new treatise on its land and freshwater *Mollusca*, with special regard to their varieties. Ann. Soc. Agric. Lyon (5) ii. pp. 567–1045.

5. *South-western Europe.*

Dép. Hérault. Dubreuil has published a third edition of his catalogue of the terrestrial and fluviatile *Mollusca* of this department. Montpellier: 1880, 144 pp.; it is also contained in Rev. Montp. (2) i.

Pyrenees. 68 species observed near Aulus, Dép. Ariège, including several new, by P. Fagot, Bull. Soc. agric. Pyr. Or. 1880, pl. Notes on some species from the Dép. Haute-Garonne and Hautes-Pyrénées, also with some new, by the same, Bull. Soc. Toulouse, 1880; abstract, J. de Conch. xxix. pp. 86 & 87. Bibliographical note on all papers concerning the malacological fauna of the Dép. Pyrénées-Orientales, by P. Fagot, Bull. Soc. Toulouse, 1879.

G. Servain's "Étude sur les Mollusques recueillis en Espagne et en Portugal" (St. Germain: 1880, 176 pp.), has not been seen by the Recorder.

Barcelona. A. Bofili enumerates in a separate paper [title *suprà*] 56 species of land *Mollusca* observed on the plain of Barcelona, viz., 1 *Testacella*, 1 *Succinea*, 33 *Helix*, 6 *Bulimus*, 1 *Cœcilianella*, 2 *Ferussacia* 8 *Pupa*, 2 *Clausilia*, 1 *Carychium*, and 1 *Cyclostomus*.

Southern Portugal. Malacological notes by H. v. Maltzan, in his work, "Zum Cap S. Vincent, Reise durch das Königreich Algarvien" (Frankfurt-a.-M.: 1880, 8vo, 154 pp.).

6. *Italy.*

Historical notes on the knowledge of the Italian land and freshwater *Mollusca*, by E. de Betta, Atti Ist. Ven. (5) vi. pp. 419–431.

List of 72 Italian freshwater *Mollusca*, with localities, by Mme. Paulucci, Catalogo della sezione Italiana dell' Esposizione internazionale di Pesca in Berlino, 1880, pp. 194–209 (German edition, pp. 40–42). The same authoress gives a list of the Italian species of *Sphærium* (4), *Calyculina* (1, with 2 varieties), and *Pisidium* (12), their determinations (2 new) being reviewed by S. Clessin, Bull. Soc. mal. Ital. vi. pp. 159–181.

Vallarsa, S. Tirol. 28 land shells enumerated by V. Gredler, Nachr. mal. Ges. 1880, pp. 85–89.

Notes on some land shells of Northern Italy by N. Pini, Atti Soc. Ital. xxi. 1879, pp. 612–628.

Piedmont. List of 138 land and 68 freshwater Mollusks, including several new species, by M. Lessona. Among the more remarkable are *Helix cameroni*, sp. n., allied to *H. gougeti* (Terv.), from Spain and Algeria, and the section *Charpentieria* of *Clausilia*, which is almost confined to Piedmont, with 3 known and 2 new species. The author distinguishes four regions—(1) Alpine region, rich in species of *Vitrina*, *Clausilia*, and *Helix*, sections of *Anchistoma* and *Campylæa*; (2) Sub-Alpine; (3) Apennine, characterized by species of *Mesomphix*, *Pupa*, *Xerophila*, and *Cyclostoma*; (4) Sub-Apennine region. The number of terrestrial species is greater in the Alpine and Sub-Apennine regions; that of freshwater species in the Sub-Alpine and Sub-Apennine. Atti Acc. Rom. (3) vii. Mem. sci. fis. pp. 317–380, 4 pls.

Alpes Maritimes. Valuable notes concerning the living land snails at Mentone, and their hypsometrical distribution, by G. Nevill, P. Z. S. 1880, pp. 100 & 101. Sub-maritime and Sub-Alpine zones are distinguished, having most of their species distinct, though *Pupa quinquedentata* (Born) is common to both; *Helix nemoralis* exists only in the Sub-Alpine zone, from 1500 feet upwards.

Modena. P. Strobel publishes some critical remarks regarding Borsari's list of land and freshwater shells found near Modena. Ann. Soc. Mod. xiv. pp. 223–226.

Central Italy. Interesting notes on the distribution of some species of *Helix*, group *Iberus*, by Kobelt, JB. mal. Ges. vii. pp. 65–77; most of them are confined to calcareous soil, only *H. muralis* is also found on lava.

Corsica. Several supposed new species by Mabille, Guide Nat. 1880, No. 3.

Sardinia. 19 species of land shells, most of them widely distributed in Southern Europe, and only 2 freshwater species *Physa fontinalis* and *Limnæa teres*, enumerated by P. Magretti, Atti Soc. Ital. xxi. p. 451, & xxiii. pp. 20, 21, 29–31, & 35.

Sicily. Very valuable notes on the local distribution and gradual transitions of the characteristic species of *Helix* (groups *Macularia* and *Iberus*), in the north-western part of Sicily, by Kobelt, Ber. Senck. Ges. 1879–80, pp. 235–240, pl. v.

7. *South-east Europe.*

Karst. 91 terrestrial and 11 freshwater species from its eastern Croatian part, enumerated by D. Hirc, Verh. z.-b. Wien, xxx. pp. 519–

530; the fauna is essentially that of Southern Carniolia. Note on the same, with some new species indicated but not described, by A. Stossich, Boll. Soc. Adr. ii. pp. 1-10.

Croatia. 52 terrestrial, 5 freshwater, and 2 submarine species, collected by E. Reitter, enumerated by Böttger, JB. mal. Ges. vii. pp. 224–235, with some new species.

Montenegro, Southern Dalmatia, and Southern Croatia. 60 terrestrial and 10 freshwater shells, among the former 3 new, collected by E. Reitter, enumerated by Böttger, Ber. offenb. Ver. xix.–xxi. pp. 100–115.

Greece. 19 species of terrestrial shells (none new) collected by J. von Bedriaga on the Cyclades, in Morea and Rumelia, are enumerated by Böttger, *l. c.* pp. 86–99. Two new species of *Helix* described by P. Godet, Bull. Soc. Neuch. xii. pp. 24–28.

8. *Western and Central Asia.*

Transcaucasia, Siberia, and Central Asia. Several species of *Helix* and *Buliminus*, among which some new, described and figured by v. Martens, Conchol. MT. pp. 6–18, 24–32, pls. iii., iv. & vi.

Russian Armenia. 19 terrestrial and 12 freshwater species collected by A. Brandt and some others from the adjacent shores of the Caspian Sea, are enumerated by E. v. Martens, Mél. biol. x. pp. 379–400. The new or remarkable species will be mentioned below. The following species have been found in Lake Goktscha:—*Planorbis carinatus* var. *dubius* (Hartm.), *marginatus* (Drap.), *albus* (Müll.), *Limnæa stagnalis* varr. *lacustris* (Stud.), *turgida* (Menke), and *goktschana* (Mouss.), *L. lagotis* (Schrank), *ovata* var. *papilla* (Hartm.), and *Pisidium pusillum* (Jenyns). There is therefore a remarkable likeness to the shells of the lakes of Switzerland.

Some notes on the *Mollusca* of the Lake Tschaldyr-Göl, by A. Brandt, Zool. Anz. iii. p. 114. They are very scarce, because the lake offers very few localities in which water-plants grow.

Talysch. Some new species by Böttger, JB. mal. Ges. vii. pp. 379–383.

Lake of Tiberias. Note on its freshwater shells by Lartet, C. R. xci. p. 500, including 3 new species of *Unio*.

9. *Northern Africa.*

Morocco. 105 terrestrial and 26 freshwater species enumerated, with valuable critical notes about many of them, by A. Morelet; 39 are peculiar, the rest Algerian or Spanish. *Helix lancerottensis* and *argonautula* (W. B.) have only been found on the western coast of Morocco and the Canary Islands, but it is impossible to give good reasons for attributing their origin to either locality. *H. dehnii* was first found among gum arabic, which is only produced farther south, in the tropical parts of Africa, northwards to Cape Blanco; this seems to indicate a distribution across the desert. An historical sketch of the knowledge of the Moroccan fauna is given as introduction. J. de Conch. xxviii. pp. 1–83.

Tunis and Island Galita. A. Issel enumerates 41 terrestrial and 10

freshwater species collected partly by members of the expedition of the cutter 'Violante,' partly by Prof. Bellucci in the Regency of Tunis; 27 of them are not contained in Bourguignat's paper of the same subject of 1868. The whole fauna agrees very much with that of Algeria and Morocco. Ann. Mus. Genov. xv. pp. 239–282, with woodcuts of 3 new species.

Egypt and Abyssinia. Some new species by BOURGUIGNAT, Descriptions de diverses espèces terrestres et fluviatiles, &c., 1879.

10. *Tropical and Southern Africa.*

Zanzibar and Senegal. New species by BOURGUIGNAT, *l. c.*

Usambara Country. 12 terrestrial and 3 freshwater species, including 7 new, by A. E. CRAVEN, P. Z. S. 1880, pp. 216–219, pl. xxii.

Ujiji and Lake Tanganyika. 8 terrestrial and 13 freshwater species, including two genera, *Tiphobia* and *Neothauma* (see *Melaniidæ*, *Paludinidæ*), and 9 species new, and also an *Ætheria*; E. A. SMITH, P. Z. S. 1880, pp. 344–352, pl. xxxi. [the land shells belong to well-known forms distributed over a large part of Tropical Africa, but among the freshwater shells there are several very remarkable; *Melania tuberculata* is not among them]. 10 more new species from Lake Tanganyika, including the new genera *Neothauma* and *Syrnolopsis*, both *Melaniidæ*, and several new species of land shells from between the lakes and the east coast, collected by J. Thomson, E. C. Hore, and Dr. J. Kirk, described by E. A. SMITH, Ann. N. H. (5) vi. pp. 425–430.

Mauritius, Réunion, Rodriguez, and Seychelles. 150 land, 23 freshwater species, and 21 from brackish water, enumerated, with their literature. Only 3 terrestrial species occur also in other parts of the world, and are probably introduced in these islands; 4 freshwater species are also Indian, 4 are also found on the continent of Africa; among the inhabitants of brackish water only 3 are hitherto not found in other countries, 11 are found also in Polynesia. Generally speaking, the terrestrial fauna is peculiar and also special for each island; the predominating genera and subgenera of the freshwater fauna, and the species of the brackish water fauna, are Indo-Polynesian rather than African. E. v. MARTENS, in Möbius Beitr. Meeresfaune Maur. pp. 181–215.

Madagascar. Some new freshwater shells by H. CROSSE, J. de Conch. xxviii. pp. 140 & 150. 3 new species from Nossi-bé by A. E. CRAVEN, P. Z. S. 1880, pp. 215 & 216, pl. xxii.

Transvaal. 13 terrestrial and 4 freshwater species, including 9 new, and 1, *Unio caffer*, from the Orange Free State, by A. E. CRAVEN, P. Z. S. 1880, pp. 614–619, pl. lvii.

Algoa Bay, 2, and *Natal*, 1, new terrestrial species, by CRAVEN, P. Z. S. 1880, pp. 618 & 619.

11. *Southern and Eastern Asia.*

East Indies and S. China. Several new species of *Stenothyra* and

Assiminea, and 1 *Hydrobia*, subg. *Belgrandia*, the last from Port Canning, near Calcutta, by G. NEVILL, J. A. S. B. xlix, pt. 2, pp. 159–166.

Very valuable notes on some land and freshwater shells from Southern India, the Andamans, and Burma, several new, by W. T. BLANFORD, *tom. cit.* pp. 181–222, pls. ii. & iii.

China. 14 supposed new species of *Anodonta* and 41 [!] of *Corbicula*, from the provinces Nganhue, Kiangsi, and adjacent regions, by HEUDE, Conchyliologie Fluviatile, 6th & 10th fascicules.

Note on some freshwater and land shells from Chusan, by A. FAUVEL, Mém. Soc. Cherb. xxii. pp. 333 & 334 [the so-called *Paludina vivipara* is very probably *chinensis* (Gray)].

Sumatra. 16 terrestrial and 10 freshwater species collected by J. F. Snelleman are described by M. M. SCHEPMAN in the official work, Midden-Sumatra, vol. iv. pt. 3; also the radula of some of them have been examined.

12. *Australia and Polynesia.*

W. KOBELT discusses the geographical distribution of the land and freshwater *Mollusca* on the Melanesian Islands, Australia, and New Zealand, and enumerates the known species; JB. mal. Ges. vii. pp. 1–30. [The author is wrong in stating that the islands Waigiou and Batchian form a natural bridge from the Moluccas to New Guinea. Batchian is one of the Moluccas in the most restricted sense of this name; it lies on the west side of Halmahera. The bridge is formed by Gebi (Guébé) and Waigiou.—REC.]

Australian Islands, including the Solomon Archipelago. The localities of 18 known species of *Helix* corrected and specialized by J. BRAZIER, J. de Conch. xxviii. pp. 300–320.

New Guinea and Aru Islands. Some new land shells by TAPPARONE-CANEFRI, Ann. Mus. Genov. xvi. pp. 59–61.

Thursday Island, Torres Straits. 6 species of land shells, 1 new, by BRAZIER, P. Linn. Soc. N. S. W. iv. pp. 393–396.

New Caledonia. J. B. GASSIES publishes a new volume of its land and freshwater *Mollusca*, adding 5 genera and a number of species to those already known. Some new species described; *id.* J. de Conch. xxviii. pp. 325–329.

A resemblance between the malacological fauna of New Zealand and that of New Caledonia suggested by CROSSE, J. de Conch. xxviii. p. 367.

South Australia. Some notes on its freshwater shells by R. TATE, Tr. R. Soc. Adelaide, iii. pp. 102–104 & 171. *Unio sturti* (Ad.) common in rainwater holes at Umbum, eaten by the natives; CHANDLER, *tom. cit.* p. 171.

New Zealand. Patula 25 spp., *Vitrina* 2, *Daudebardia* 1, *Hyalina* 2, *Succinea* 1, *Tornatellina* 1, *Placostylus* 3, *Pupa* 1, *Helix* 20, *Laoma* * 1, *Paryphanta* 11, *Nanina* 1, *Limax* 1, *Milax* 2, *Arion* 1, *Janella* * 2, *Konophora* * 1, *Onchidella* 3, *Latia* * 2, *Physa* 10, *Planorbis* 1, *Auriculidæ* 7, *Cyclophorus* 2, *Paxillus* 1, *Diplommatina* 1, *Realia* 4, *Omphalotropis* 1, *Assiminea* 1, *Melanopsis* 2, *Bythinella* 7, *Potamopyrgus* * 1, *Neritina* 1,

(very doubtful), *Sphærium* 2, *Pisidium* 1, *Unio* 5 spp.—in all, 75 inoperculated and 9 operculated terrestrial, 13 inoperculated, 10 operculated, and 8 bivalve freshwater, and 8 brackish water species—are enumerated and briefly described by F. W. Hutton, Manual of the New Zealand *Mollusca*, pp. 5–40, 78, 81, 82, 90, 154, 155, 160 & 161. The genera marked with an asterisk are peculiar to New Zealand, p. iii.

Polynesia. 18 species of *Pupa* enumerated, 7 of them belonging to the new group *Ptychochilus*, 2 to *Cylindrovertilla*, 2 to *Leucochilus*, 1 to *Tesseraria* (see special part), the rest not known to the author, enumerated by Böttger, in Martens's Conchol. Mitth. pp. 45–72, 7 with several varieties figured, pls. x.–xii. *P. pediculus* (Shuttl.) generally distributed on the Polynesian Islands.

Caroline Islands. 9 species of land shells collected by O. Finsch on the Islands Ponape and Ruck ; 2 are new, of which *Tornatellina gigas* and the known *Nanina sowerbiana* (Pfr.) are of remarkably large size among the Polynesian species. A *Scarabus* of these islands appears not distinct from the known *imbrium* (Montf.) of the Philippine and Malayan Archipelago. E. v. Martens, SB. nat. Fr. 1880, pp. 143–147.

13. *North America.*

Arctic species, see before—1. *Arctic Region.*

A. G. Wetherby discusses the geographical distribution of the *Strepomatidæ* (*Melaniidæ*) and *Unionidæ* in North America, and sums up the following chief results :—

(1) The small number of species of *Unionidæ* and the entire absence of *Strepomatidæ* in the New England States, and the fact of the distribution of some of the former entirely across the continent to the Pacific coast and southward along the Atlantic.

(2) The introduction (appearance) of the *Strepomatidæ* west of the Green Mountain mass, and their division into two geographical groups, one pertaining to the western, the other to the southern fauna.

(3) The continuance of the Ohio types of *Unionidæ* westward, north of that stream, to the limits of the Mississippi drainage, and south and south-westward to western Texas, and the comparative absence of *Strepomatidæ* over this area.

(4) The introduction of new species in both families, and of new genera in the *Strepomatidæ*, so soon as we cross the Ohio and travel south.

(5) The facies of the groups of species which the streams of this part of the Ohio drainage contain, stamping them as different faunas.

(6) The anomalous fauna of the Alabama drainage, and especially the fact of its geographical isolation. The two genera *Schizostoma* and *Tulostoma* and several peculiar groups of *Goniobasis* are confined to it.

(7) The special cases of the only species of spinous *Unio* known, *U. spinosus* (Lea), only in Altamaha river at the southern end of the eastern slope of the Appalachians, and *U. collinus* (Conrad), only in New river, on the western slope of the same, and that of *Margaritana margaritifera* (L.), the only species of *Unionidæ* which is common to Europe and North America.

(8) The persistent specific character of some Mollusks and the excessive evidence of variation in others.

North America has 832 species of *Unio*; 82 of them inhabit the Ohio river. The author thinks that the present natural agencies do not suffice for explaining this distribution. J. Cincinn. Soc. iii. pp. 317–324.

Notes on the distribution and varieties of several species of *Helix*; id. *l. c.* pp. 33–40. *Hyalina milium* (Morse) found in Cincinnati; W. Doberty, *op. cit.* i. [1878] p. 23.

California. Notes on the geographical occurrence and the gradual transitions of several species of *Helix* by J. G. Cooper, P. Am. Phil. Soc. xviii. pp. 282–285. The more important of them will be mentioned in the systematic part.

Bermudas. The known land shells enumerated by Kobelt, JB. mal. Ges. vii. pp. 257 & 286.

14. *Central America and West Indies.*

Mexico. Abstract of Strebel & Pfeffer's paper [Zool. Rec. xvi. *Moll.* p. 29] by the Recorder, JB. mal. Bl. vii. pp. 92–100.

The *Auriculidæ* and *Limnæidæ* of Mexico and Central America are treated by Fischer & Crosse in the 7th (or first of vol. ii.) part of land and freshwater *Mollusca* in the "Mission scientifique au Mexique." They describe and figure 4 species of *Auriculidæ*, 2 of *Ancylus*, 2 of *Limnæa*, 14 of *Planorbis*, 2 of *Planorbula*, and figure further 2 species of *Aplexa*, pp. 1–80, pls. xxxii.–xxxvi.

Kobelt discusses the distribution of the land and freshwater shells in the West Indies, and enumerates the known species of each island; JB. mal. Ges. vii. pp. 243–286.

Hayti and Bahama Islands. Notes on their land shells, with descriptions of several new species, by D. Weinland, JB. mal. Ges. vii. pp. 338–378, pl. xii.

15. *South America.*

Ecuador. Critical notes on Miller's paper [Zool. Rec. xvi. *Moll.* p. 29] by H. Dohrn, JB. mal. Ges. vii. pp. 83–92.

Galapagos. The known land shells enumerated by Kobelt, JB. mal. Ges. vii. p. 242.

Peru. 4 new species of *Clausilia* (*Nenia*) by Böttger, Nachr. mal. Ges. 1880, pp. 111–114.

Juan Fernandez and *Masafuero.* The known land shells enumerated by Kobelt, JB. mal. Ges. vii. p. 242. They are 24 in number, including comparatively many *Succinea* and no *Bulimus*; the genus *Tornatellina* with 5 species, is rather Polynesian than American.

Argentine States. Some of Döring's new species of *Odontostomus* are figured by Kobelt, JB. mal. Ges. vii. pl. ix.

Döring's various papers on Argentine land shells, 1874–75, already mentioned in the preceding vols. of Zool. Rec., are also published in Period. Zool. Argent. i. [1874–75] & ii. [1875].

b. Marine Mollusca.

Some remarks on the importance of depth and temperature in the geographic distribution of *Mollusca* and the existence of universally distributed species; R. B. Watson, J. L. S. xv. pp. 87–89.

Some instances of "circumtropical" species, identical in the tropical parts of the Atlantic, Indian, and Pacific Ocean, but wanting in the colder seas, mentioned by E. v. Martens, Moll. Maur. p. 336.

1. *Arctic Seas.*

Barents Sea, Novaya Zemlya. 37 marine *Mollusca* collected by W. J. A. Grant, enumerated by W. S. M. D'Urban, Ann. N. H. (5) vi. pp. 265 & 266.

1 species of Cephalopod (*Ommastrephes illecebrosa*), 16 species of marine Gastropods, and 8 of marine Bivalves, collected in Cumberland Sound, W. of Baffin's Bay, by the Howgate Polar Expedition, enumerated by W. Dall, Bull. U. S. Nat. Mus. No. 15, pp. 145 & 146. The more remarkable are *Crenella faba* (Fabr.) and *Glycymeris kurriana* (Dunker).

2. *Northern Seas of Europe.*

British Seas. Chiton scabridus, sp. n., Jeffreys, Ann. N. H. (5) vi. p. 33; and *Rossia oweni* (Ball), a mutilated specimen, picked up at Llandudno, N. Wales, E. A. Smith, *tom. cit.* p. 398.

Some sea and brackish water shells from the northern coast of Germany between the mouths of the Weser and Elbe, mentioned by Borcherding, Nachr. mal. Ges. 1880, pp. 24 & 25. They are all very common species.

Sund. 88 species of Gastropods and 67 of Bivalves, observed at Hellebäk, by J. Colin, Faunula moll. mar. Hellebækana (Nat. Tidskr. xii. pp. 415–464).

Baltic. Short note on the marine *Mollusca* in the environs of Danzig. *Cardium edule, Mytilus edulis, Mya arenaria*, and *Tellina baltica*, all of dwarf size, are the only true marine species; *Hydrobia baltica* and *Neritina fluviatilis* live here also in the sea. Schumann, in "Danzig in naturwissenschaftlicher und medizinischer Beziehung," 1880, pp. 94 & 95.

Note on the littoral zones on the coast of S.W. France: 1, region subterrestre, or Littorines; 2, Balanes; 3, Patelles; 4, Hermelles; 5, Pholades; by P. Fischer, J. de Conch. xxviii. p. 85.

List of sea shells collected at *Ile d'Yeu*, by G. Servain, in a separate pamphlet (Angers: 1880, 56 pp.), not seen by the Recorder.

Bay of Biscay. 192 species of deep-sea *Mollusca*, dredged by the French expedition of the 'Travailleur,' 1880, enumerated by J. Gwyn Jeffreys, Ann. N. H. (5) vi. pp. 315–317, & 374 & 375; and by A. Milne-Edwards, C. R. xci. p. 355, footnote, also Rep. Brit. Ass. 1880, pp. 383–387. Some new species are named, but not described.

3. *Mediterranean.*

The 15th and 16th parts of HIDALGO's Moluscos marinos de España, &c. [not seen by the Recorder], apparently contain chiefly bibliographical lists and 12 coloured plates: most of the species figured are well known as Mediterranean, the few apparently new, or rather rare and critical, will be mentioned *infrà*. Abstract in J. de Conch. xxviii. p. 274.

The number of the species of marine *Mollusca* peculiar to the Mediterranean, and absent from the adjacent parts of the Atlantic, has been reduced by the recent dredging expeditions from 222 to 181, and will probably become still more reduced in future. JEFFREYS, Rep. Brit. Assoc. 1880, pp. 601 & 602.

A list of marine *Mollusca* collected on the French shore of the Mediterranean, by E. DUBREUIL, Rev. Montp. (2) ii. pp. 304–313.

General remarks on the Mediterranean *Mollusca* exhibited in the Aquarium of the Zoological Station at Naples, by DOHRN & SCHMIDTLEIN, Leitfaden für die Aquarien der zoologischen Station zu Neapel, 1880, pp. 39–52.

49 species of Cephalopods, 19 of Pteropods [including probably larvæ of Gastropods], and 12 Heteropods, including *Janthina* and *Sagitta* [!], enumerated by N. TIBERI, Bull. Soc. mal. Ital. vi. pp. 1–49, who also begins a paper on the known *Nudibranchia* of the Mediterranean, giving a full account of the previous literature, and discussing the family *Doridæ* and *Tritoniidæ*, l. c. pp. 182–224.

The Mediterranean species of *Pleurobranchus* discussed by VAYSSIÈRE, J. de Conch. xxviii. pp. 205–216.

A list of 42 Bivalves, 6 *Solenconchæ*, 50 Gastropods, 6 Heteropods, and 15 Pteropods (the two latter chiefly dead specimens), dredged in depths about 300 mètres, between Palermo and Utica, is given by MONTEROSATO, Bull. Soc. mal. Ital. vi. pp. 51–82. He points out the considerable analogy between the deep sea fauna of the Mediterranean and that of the British Islands and Norway, and also with that of the tertiary beds of the Monte Pellegrino and Ficarazzi; 30 of the enumerated species are designed by him as being also Norwegian, 13 more British, 17 tertiary fossils of Italy. Special attention is paid to the synonymy of the less known species.

Seven marine species, all well known, from the coast of Sardinia, enumerated by P. MAGRETTI, Atti Soc. Ital. xxi. p. 451, and xxiii. pp. 20, 21, 29, 30, 31, & 40.

Note on some dredgings at Algiers, *Cancellaria cancellata* and *Nassa semistriata*, the former very common; MARION, Rev. Montp. 1878.

Adriatic. List of its *Mollusca*, by A. STOSSICH, Boll. Soc. Adr. ii. p. 55, &c. Some mistakes in it pointed out by KOBELT, Nachr. mal. Ges. 1880, p. 96. List of some species collected at Veglia; BÖTTGER, JB. mal. Ges. vii. p. 235.

Black Sea, Feodosia. 23 marine species enumerated by WEINKAUFF, Nachr. mal. Ges. 1880, pp. 38 & 39. [Only one, *Venerapis decussata* (Phil.) is hitherto not known from the Black Sea.—REC.]

4. *East Coast of North America.*

Some additions to the fauna of the North-eastern coast of America, containing species known hitherto from Northern Europe or Greenland, by A. E. VERRILL, P. U. S. Nat. Mus. 1879, pp. 165–205.

12 Cephalopods, 187 Gasteropods, 4 Pteropods, 3 *Solenoconchæ*, and 122 Bivalves are enumerated in VERRILL's Check List of the Marine *Invertebrata* from Cape Cod to the Gulf of St. Lawrence.

Cephalopods of the North-east coast of America; VERRILL, Tr. Conn. Ac. v. pp. 177–257, pls. xvii.–xxii.; Am. J. Sci. (3) xix. pp. 137 & 138, & 284–295, pls. xii.–xvi. *Parasira catenulata* (Fér.) was taken in Vineyard Sound, Mass., in 1876.

Remarkable Mollusks from the outer banks off the Southern coast of New England; *id.* Am. J. Sci. (3) xx. pp. 490–493.

Three European littoral species, viz.: *Truncatella truncatula* (Drap.), *Assiminea grayana* (Leach), and *Litorina litorea* (L.), found also in North America; *id. l. c.* pp. 250 & 251.

5. *Tropical Atlantic.*

Cape Verde Islands and Prince's Island, Gulf of Guinea. Valuable notes on 47 species of Bivalves collected there by H. DOHRN, JB. mal. Ges. vii. pp. 161–183.

670 marine species from Cuba (16 Cephalopods, 18 Pteropods, 6 Heteropods, 435 Gastropods, and 195 Bivalves), from personal observations and those made by J. Gundlach, are enumerated by R. ARANGO Y MOLINA, Faun. mal. Cubana, pp. 145–280.

W. H. DALL gives a list of 104 genera dredged in the Gulf of Mexico, 1877–78, by the U.S. Survey Steamer 'Blake,' indicates their bathymetrical range, amounting to 1568 fathoms for *Arca*, *Bulla*, *Gouldia*, *Limopsis*, *Margarita*, and *Yoldia*, and compares them with the littoral fauna, as indicated by C. B. Adams and D'Orbigny. He comes to the following conclusions:—A fair proportion, 20 per cent., have a vertical range which extends from the true littoral region to the depths of 250–2000 fathoms (abyssal region), unlimited by temperatures actually encountered. Of the species found in these depths, 10 per cent. may be termed boreal, 13 tropical, and more than 75 uncharacteristic forms. It is eminently probable that the abyssal regions have local faunæ proper to their various portions, and that there is no universal abyssal fauna, as far as Mollusks are concerned, although several ubiquitous abyssal species undoubtedly exist. The specific characters of many of the strictly abyssal species appear to exhibit a very remarkable degree of variation within supposed specific limits; the sculpture of the abyssal forms tends to slightness, the shell is thin, pale or colourless, and in spiral shells there is a tendency to a knobbing or denticulation at the suture. Bull. Mus. C. Z. vi. pp. 85–93.

6. *Indo-Polynesian Seas.*

1229 marine species of *Mollusca* from Mauritius, Bourbon, Rodriguez,

N.E. Madagascar, the Seychelle and Amirantes Islands enumerated (many collected by K. Möbius); 280 of them are not known elsewhere, 212 also from the Red Sea, 289 from the East Coast of Africa, 680 from East Indies (Ceylon, and the Malay Archipelago), 204 from the islands of the Pacific, 83 from Australia south of the tropic, only 8 from the southern extremity of Africa (Natal excluded), and 91 from the Atlantic. Many small species are hitherto only known from Mauritius, and from some of the Pacific islands. Of the littoral marine *Mollusca*, there is a nearly identical fauna from the coast of tropical East Africa through the Indian Ocean to the coral islands of the Pacific; it is predominant on the coral-reefs, and is remarkably poor in Bivalves; the fauna of the surge-beaten southern extremity of Africa is quite different from it. E. v. MARTENS, *Mollusca*, in MÖBIUS's Beiträge Meeresf. Maur. pp. 216–332, generalities, pp. 233–236.

List of 34 shells from Madagascar by F. POLLEN in the general catalogue of the International Exhibition of Fishery at Berlin, 1880, pp. 160 & 161.

Port Darwin, Torres Straits. 3 new species by G. F. ANGAS, P. Z. S. 1880, pp. 418 & 419, pl. xl.

North-east Australia. J. E. TENISON WOODS gives a very interesting sketch of the littoral fauna from Trinity Bay to Endeavour River, 17–15° S. lat., with many observations on the mode of life of many *Mollusca*, P. Linn. Soc. N. S. W. v. pp. 106–131; he distinguishes the inhabitants of the rocks, those of the mangrove swamps, and those of the coral reefs, and mentions the most characteristic Evertebrates of each. [The general feature of these faunæ is very like that of the Moluccas according to the observations of the Recorder in 1862–63,]

Some critical notes concerning the Australian localities given in the Catalogues of the Museum Godeffroy by J. BRAZIER, P. Linn. Soc. N. S. W. iv. [1879] p. 390.

Solomon Islands. The Recorder regrets to have hitherto omitted E. A. Smith's List of Marine Shells chiefly from the Solomon Islands; J. L. S. xii. [1876] pp. 535–562, pl. xxx. The new species will be mentioned *infrà*.

New Caledonia. List of marine shells by E. KITTL, Ber. Ver. Hochschul. Wien, ii. [1878] pp. 50–52.

Polynesia. 166 species of *Mitridæ*, including from Fiji Islands 120, Tonga 48, Samoa 76, Kingsmill 43, Carolines 44, Cook's 41, Society 64, Paumotu 81, Marquesas 7, and Sandwich 36, enumerated by A. GARRETT, J. of Conch. iii. pp. 1–73. New species from the Papuan and Polynesian Islands by WATSON, J. L. S. xv. pp. 87–126 & 217–230.

7. *Northern Pacific.*

British Columbia. List of marine Mollusks, containing a new species, by J. F. WHITEAVES, Canad. Nat. viii. [1878, No. 8], this fauna for the most part is Oregonian in its character (W. Dall).

Vancouver Island. 6 new species by E. A. SMITH, Ann. N. H. (5) vi. pp. 286–289.

Mid Pacific, East of Japan. *Lacuna* (*Hela*) *margaritifera*, sp. n.,

from a depth of 2050 fath., Challenger Expedition, Watson, J. L. S. xv. p. 97.

Nudibranchiate *Mollusca* from the Northern Pacific, Behring Sea, Aleutian Islands, &c., collected by Dall, described by R. Bergh, P. Ac. Philad. 1880, pp. 48–127. From Japan, collected by A. Roretz & Körbl, described also by Bergh, Verh. z.-b. Wien, xxx. pp. 156–190.

8. *Australian and Antarctic Seas.*

New species of *Trochidæ*, *Litorinidæ*, *Cerithiidæ*, and *Turritellidæ* from the Australian Seas, *Tristan d'Acunha*, *Prince Edward*, *and Kerguelen Islands*, procured by the 'Challenger' Expedition from different depths, described by Watson, J. L. S. xv. pp. 87–126 & 217–230.

Notes on some Australian sea shells by Brazier, J. of Conch. iii. pp. 123 & 124.

Port Jackson. 7 tropical species dredged by Brazier, P. Linn. Soc. N. S. W. iv. [1879], p. 428 ; they are *Typhis arcuatus* (Hinds), *Nassa coronata* (Lam.), *Mitra pacifica* (Reeve), *Turbo squamosus* (Gray), *Tornatella coccinata* (Reeve), *Tellina striatula* (Lam.), and *Venus marica* (L.)

South Australia. 16 marine species, mostly new, by G. F. Angas, P. Z. S. 1880, pp. 415–417, pl. xl. fig.

Tasmania. A number of new species described by J. E. Tenison Woods in T. R. Soc. Vict. xiv. [1878], and Pr. Soc. Tasm. 1877 & 1878 [really 1878 & 1879], not contained in the former Records, will be mentioned in the special part.

New Zealand. F. W. Hutton has published a revised and ameliorated treatise on the New Zealand *Mollusca*, with short descriptions of all the known genera and species. It contains 8 species of Cephalopods, 300 of marine Gastropods (incl. Scaphopods), 1 Pteropod, and 150 marine Bivalves. No new species are described, but many critical remarks are made, with useful information concerning the less known species. "Out of between 350 and 400 species, there is only evidence of about 64 being found anywhere else." The three genera, *Anthora* (*Trochidæ*), *Cryptoconchus* (*Chitonidæ*), and *Vanganella* (*Mactridæ*) are peculiar to New Zealand. Manual of N. Z. Mollusca, 1880.

List of 7 species of Cephalopods, 163 Gastropods, 2 Scaphopods (*Dentaliidæ*), and 84 Bivalves observed near Wellington, by T. W. Kirk, Tr. N. Z. Inst. xii. pp. 303–306 ; four new species, *id. l. c.* pp. 306 & 307, and Ann. N. H. (5) vi. p. 15.

Campbell Island. 24 species of marine Mollusks, including 11 new and 6 *Chitonidæ*, enumerated by H. Filhol, C. R. xci. pp. 1094 & 1095. The known species are *Octopus maorum*, *Pinnoctopus cordiformis*, *Euthria antarctica*, *Polytropa striata*, *Trochus coracinus*, *Margarita rosea*, *Patella luctuosa* and *fuegiensis*, *Lepidopleurus longicymba* and *circumvolutus*, *Tonicia lineolata*, *Tapes intermedia* and *Mytilus magellanicus*, most of them living in New Zealand.

Kerguelen. 58 species from the papers of E. A. Smith, Studer, and B. Watson, enumerated by P. Fischer, J. de Conch. xxviii. pp. 200–202.

La Plata. 5 new species of marine shells by E. A. Smith, Ann. N. H. (5) vi. pp. 319–322.

Palæontology of Recent Species.

Those recent species of land shells which are remarkably variable, are not represented in the tertiary period; the remarkably constant recent species are also ancient, existing as tertiary. Böttger, in Von Martens's Conchol. Mittb. i. pp. 46 & 47.

M. Neumayr discussss the relations of the tertiary to the recent *Mollusca* and proposes trinomial names for the former, as far as they can be proved to form continuous series: the term "mutation" is chosen for the members of such series, or historical variations. JB. mal. Ges. vii. pp. 201–222.

Attention may here be directed to J. W. Dawson's review of the Land Snails of the Palæozoic Era, in which 3 species of *Pupa*, 1 *Zonites* (*Conulus*) and 1 peculiar genus, *Dawsonella*, from the Carboniferous period, and 1 terrestrial shell, *Strophites grandæva*, from the Devonian, are enumerated, of which two are new and all American. The European species of *Palæorbis* are probably tubes of Annelids. Am. J. Sci. (3) xx. pp. 403–415.

A considerable number of North American generic and subgeneric types of land and freshwater *Mollusca*, especially in the families *Limnæidæ* and *Unionidæ*, and the genera *Helix* and *Pupa*, are found in the last Cretaceous and in Eocene deposits in the United States. C. A. White, Am. J. Sci. (3) xx. pp. 44–49 (two slight corrections, p. 158). Abstract in Ann. N. H. (5) vi. pp. 247–252.

F. Sandberger enumerates 20 species from the Löss of the Valley of the Main, including only 1 freshwater shell, *Limnæa truncatula* (Müll.); 17 of them still survive in the same country, several in somewhat different varieties; they do not agree throughout with the shells, which are now every year found on the bank of the river after high water, as in the latter the proportion of aquatic species is considerably larger; they indicate a somewhat different and decidedly poorer fauna, arctic or alpine. Verh. Ges. Würzb. (2) xiv. [1879] pp. 131–133.

The same author's paper (*l. c.*) on the glacial deposits near Würzburg enumerates 20 species of terrestrial shells, of which *Helix tenuilabris*, *Pupa columella* and *parce-dentata* are extinct, the rest still living in the same country.

11 terrestrial and 6 freshwater species found in limestone-tufa near Pyrmont, of which *Helix fruticum* is no longer found living in the same district; Hesse, Mal. Bl. (2) ii. pp. 11–13.

The subfossil land shells of the caves at Mentone are carefully discussed by G. Nevill, who distinguishes 6 deposits, the less ancient of which are undoubtedly contemporaneous with man and *Cervus elaphus*, though most of them are older, very probably contemporaneous with the rhinoceroses and tigers: a new genus of *Aciculidæ* (*Renea*), and several new species and varieties, are described from these older deposits. P. Z. S. 1880, pp. 94–142.

63 Quaternary land and freshwater shells from the Dép. Haute-Garonne, 31 of which are said to be extinct, are indicated by P. FAGOT, Bull. Soc. Toulouse, 1879; abstract in J. de Conch. xxix. p. 88.

Unio sinuatus (Lam.) has been found during the excavations for a new bridge over the Tiber at Ripetta, 6–11 mètres below the present level of the river, and in other diluvial and old alluvial deposits of the valley of the Tiber, but is not found living there; R. MELI, Atti Acc. Rom. (3) viii. Mem. Sci. fis. pp. 320–328, pl.

Two new sub-fossil freshwater species from the Algerian Sahara: MORELET, J. de Conch. xxviii. p. 355.

The shell-beds in the vicinity of Davenport, Iowa, have been examined by W. H. PRATY, who found in them the same freshwater species as those still living in the country; they are situated about one and a half mètres above high-water, and he thinks them to be a natural deposit, not the work of human hands. P. Davenp. Ac. ii. [1878] pp. 156–161.

Miocene fossil shells from the West Indies and Costarica, by W. M. GABB, J. Ac. Philad. (2) viii. 44 pp. 3 pls.

The appendix to the official catalogue of the New Zealand Court in the International Exhibition of Sydney (Wellington, 1880), contains (pp. 17–31) the lists of shells of several tertiary beds in New Zealand, many of which are still living species, and (pp. 31–33) the names of 108 recent New Zealand shells exhibited.

Strombus gigas (L.) found in the ground near Bonn (probably accidentally buried); TROSCHEL, Verh. Ver. Rheinl. xxxvi. p. 377.

HISTORICAL REMAINS AND CHANGES.

The few *Mollusca* mentioned by Homer are enumerated by O. KÖRNER; the Polype, *Octopus*, Tethos, an *Ascidia*, and purple-dyeing are mentioned. The author thinks that the fabulous Scylla is founded on vague knowledge of a giant Cephalopod. Arch. f. Nat. xlvi. pp. 209–213.

Helix figulina (Parr.), *Unio kotschii* (Küster) and *tumidus* (Retz), and 8 common marine shells of the Mediterranean, found within the artificial hill Hanai-tepe, in Troas, by Virchow; they may be kitchen remains, E. v. MARTENS, SB. nat. Fr. 1880, pp. 63 & 64 [*cf.* Zool. Rec. xvi. *Moll.* p. 36.]

Cypræa spadicea and *Cancellaria cooperi*, *Oliva biplicata*, *Trochiscus norrisi* and *Lucapina gigantea*, found in old graves of the natives at St. Nicolas, California; M. DE CESSAC, J. de Conch. xxviii. pp. 285 & 286.

In Florida shell-mounds, two-thirds of the shells are *Ostrea virginiana*, the rest *Mercenaria mortoni*, species of *Natica*, *Pecten*, and *Fasciolaria*; CALKINS, P. Davenp. Ac. ii. p. 228.

(Davenport shell-beds: see above, "Palæontology of Recent Species.")

Shell-mounds in Southern Brazil, Prov. Sta. Catarina, containing the living *Venus brasiliana* and the extinct *Corbula prisca*; E. v. MARTENS, SB. nat. Fr. 1880, p. 124.

Dreissena polymorpha (Pall.), found at Riga; BERGH, CB. Ver. Riga, xxiii. p. 121.

Dreissena polymorpha. J. DE QUERNE observes that it has been found

in a channel filled up for more than 300 years, and cannot therefore be of recent introduction ; Bull. Sci. Nord, (2) iii. pp. 252 & 253.

Historical note concerning the acclimatization of *Ostrea angulata* (Lam.) at the mouth of the Gironde ; P. Fischer, J. de Conch. xxviii. pp. 83 & 84.

The land shells of larger size and peculiar character in the islands Mauritius, Réunion, and Rodriguez are becoming rare, confined to the interior, or even extinct ; the introduced species are common near the shore and in the cultivated land. E. v. Martens, Mœbius's Beitr. Meeresf. Maur. p. 215.

Increasing scarceness of *Achatinella* on the Sandwich Islands, stated by O. Finsch, Nachr. mal. Ges. 1880, p. 69.

Use by Man.

Lists of, and notes on, edible *Mollusca*, from Italy, by Chiamenti, Gasco, Targioni-Tozzetti, Ninni, &c., in the general catalogue of the International Exhibition of Fishery at Berlin, 1880, pp. 28–36 ; and in the special catalogue of the Italian section, pp. 12, 61, 131–136, 173–176, and cxvi. ; German edition, pp. 13, 25, & 39.

Much information concerning the use of North American Mollusks by man, including Oysters (see *infrà*), nacre from *Haliotis kamtschatkana*, *corrugata*, *rufescens*, *cracherodi*, and *splendens*, *Trochiscus norrisi* and *Pomaulax undosus* in California, pearls and nacre from *Meleagrina fimbriata* at Panama, and several species of *Unio* from the Ohio, the cameo-shells *Strombus gigas*, *Cassis rufa*, *tuberosa*, and *madagascariensis*, and oil of squid, Massachusetts, in Brown Goode's Exhibit of the Fisheries of the United States of America at the Internationale Fischerei-ausstellung at Berlin ; Bull. U. S. Nat. Mus. No. 18, especially pp. 43, 151, & 162.

Valuable notes concerning North America, by W. Dall, Bull. U. S. Nat. Mus. No. 14, pp. 251–359 [see also Zool. Rec. xvi. *Moll.* p. 42].

A pamphlet by A. Hyatt, Oyster, Clam, and other Common Mollusks (New York : 1880, 100 pp.), has not been seen by the Recorder.

Collecting and Preserving.

Instructions for keeping living snails in confinement, and description of an apparatus for this purpose, consisting of a zinc box, covered by another box half glass and half wire-trellis ; by J. Carrière, Regenerationserscheinungen i. pp. 25 & 26.

T. C. Winkler's pamphlet on shell-collecting, " Het Verzamelen van Schelpen " (Leiden : 1880, 8vo, 22 pp.), has not been seen by the Recorder.

General Classification.

P. Fischer, J. de Conch. xxviii. p. 239, classifies the *Mollusca* as follows :—

Meroblastea		Class 1. *Cephalopoda.*
Holoblastea	Glossophora	„ 2. *Pteropoda.*
		„ 3. *Gastropoda.*
		„ 4. *Scaphopoda.*
	Aglossa	„ 5. *Pelecypoda* (*Lamellibranchia*).

J. D. Macdonald discusses the value of some characters employed in the classification of the *Mollusca*, pointing out the existence of several analogous genera, and analogous subdivisions of the *Heteropoda* and *Pulmonata*, and proposes the following system for the Gastropods :—

Division I.—MONŒCIA.

Subdivision I.—Lingual dentition typically pavimental.

Order 1.—Pneumonophora.

Suborder 1.—*Pulmonata.* (A) Terrestrial. (B) Aquatic. (C) Estuary or marine.

Order 2.—Apneumonophora.

Suborder 1.—*Nudibranchiata.* (A) *Cryptobranchiata, Phylliroe, Elysia, Limapontia,* &c. (B) *Phanerobranchiata*: *Eolis, Doris, Tritonia, Phyllidia,* &c.

Suborder 2.—*Tectibranchiata* : *Pleurobranchus, Aplysia, Bulla, Tornatella,* &c.

Subdivision II.—Lingual membrane strap- or ribbon-like, rhachis and pleura distinctly differentiated, dental processes recurved (*Anaclodonta*).

Order 1.—Heteroglossa (Gray).

Suborder 1.—*Polyplacophora*: *Chiton, Chitonellus.*

„ 2.—*Cyclobranchia*: *Patella, Patina.*

„ 3.—*Cervicobranchia* : *Tectura, Gadinia, Lepeta.*

„ 4.—*Cirrobranchia*: *Dentalium.*

Order 2.—Rhachidoglossa (Gray).

Suborder 5.—*Dicranobranchia* (Gray). Gills two, symmetrical on the back of the neck: *Doridobranchus, Scutus, Emarginula, Puncturella, Fissurella.*

„ 6.—*Schismatobranchia.* Gills in two plumes on the left side of the gill cavity: *Teinotis, Pudollus, Halictis, Scissurella.*

„ 7.—*Scutibranchia.* Gills in a spiral line on the left side : *Stomatella, Trochus, Turbo, Rotella, Nerita, Neritina, Navicella.*

„ 8.—*Pseudobranchia.* No distinct gills: *Helicina, Proserpina, Ceres.*

Division II.—DIŒCIA.

[The whole second subdivision of the author, the *Scutibranchia* and *Cyclobranchia* of other authors, *Rhipidoglossa* and *Docoglossa* of Troschel, are not monœcious but dicœcious, according to the observations of R. Wagner, Erdl. 1839, Milne-Edwards, 1840, Siebold, 1848, except *Dentalium* and its allies, which are also in other respects very far from the others.—Rec.]

J. W. Spengel (Z. wiss. Zool. xxxv. p. 373) proposes the following classification of the Gastropods according to his researches into the formation of the nervous commissures (*suprà*) :—

Class—Gastropoda.
1 Order—Streptoneura = *Prosobranchia* of Milne-Edwards.
Suborder 1.—*Zygobranchia* (many *Scutibranchia*).
„ 2.—*Azygobranchia* (*Pectinibranchia*).
2 Order—Orthoneura.
Tribe 1.—*Ichnopoda* = *Opisthobranchia* of Milne-Edwards,
„ 2.—*Pulmonata*.
„ 3.—*Pteropoda*.
Class—Amphineura (Von Ihering), including the *Chitonidæ*, *Neomenia*, and *Chætoderma*.

Records.

H. v. Ihering & W. Kobelt have given a record of the literature of the *Mollusca*, recent and fossil, for the year 1879, in Zool. JB. Neap. i. pp. 803–897.

W. Dall gives a record on the American work in the department of recent *Mollusca* during the year 1879, in Am. Nat. xiv. pp. 426–436.

CEPHALOPODA.

Some notes on the physiology of the chromatophores in the Cephalopods, by C. F. Krukenberg, Vergl. Physiol. Studien, i. pp. 1–37. They are expanded, and cause darkening also in isolated particles of the skin, if moderately irritated. Quinine causes in *Eledone moschata* a nearly white colour of the skin by permanent contraction of the chromatophores, but they are capable of again expanding by other irritations. Nicotine causes contraction, atropine and strychnine permanent expansion, all three also in very small isolated particles of the skin; chloroform and ether paralyze the chromatophores in the contracted state, camphor paralyzes them when expanded, and there is no other remedy but complete washing away of the poison by a large quantity of sea-water. In *Sepia*, the chromatophores of the head and visceral sac are much more sensible in this respect than those of the back. The change of colour in the skin is caused either by the action of the central ganglions on the peripheric ganglions, or by direct irritation of the latter.

The nuchal cartilage of the Cephalopods is described by H. v. Ihering; in *Sepia* it is thin and flat, its upper surface clothed with epithelium, only the edges and under surface beset with muscular fibres, in *Loligo*, *Ommastrephes*, *Onychoteuthis*, and *Enoploteuthis* it is provided with large wing-like appendages on both sides, serving for the insertion of the muscles, that of *Rossia macrosoma* is somewhat intermediate, and that of *Sepiola* is much reduced. Z. wiss. Zool. xxxv. pp. 18–22.

H. v. Ihering discusses several points of comparative morphology of the Cephalopods. The valve in the funnel according to him is analogous to the middle prominence between the two fins of the Pteropods, both forming the protopodium, but in other respects the Pteropods are very far from the Cephalopods; the renal and genital organs of the Cephalopods have more resemblance to those of the Bivalves, *Solenoconchæ* and

some other lower Gastropods, the genital glands being situated freely in the abdominal cavity and not continuous with the oviduct or vas deferens. The ventral pair of gills in *Nautilus* is homologous to the only pair of the *Dibranchiata*, no trace of a rudimentry second pair is to be found in the latter, and, therefore, the *Tetrabranchiata* are to be derived from the *Dibranchiata*, contrary to the common opinion. The author thinks that the distinction of *Œgopsidæ* and *Myopsidæ* is rather artificial, *Loligo* being in many points more nearly allied to *Ommastrephes* than to *Sepia*, and that the *Octopodidæ* are a rather primary form of Cephalopods. Z. wiss. Zool. xxxv. pp. 1–22 ; abstract in J. R. Micr. Soc. (2) i. p. 23.

J. Brock expatiates further on the phylogeny of the Cephalopods, comparing chiefly the structure of the genital and circulatory organs, absence or presence of the milt, the muscular system, and the cartilages of the mantle and the radula in the genera *Ommastrephes*, *Enoploteuthis*, *Chiroteuthis*, *Loligopsis*, *Owenia*, *Onychoteuthis*, *Sepioteuthis*, *Octopus*, *Eledone*, and *Argonauta*, for which he gives 4 comparative tables ; he comes to the same conclusions as those mentioned in Zool. Rec. xvi. *Moll.* p. 37, viz., that *Nautilus* is a very primitive form, rather near the common root of the *Tetrabranchiata* and *Dibranchiata* and that the latter are to be divided into three anatomically well defined "phyla":—*Œgopsides*, which are the oldest, *Myopsides*, and *Octopodidæ*, the last are the most differentiated, and must have branched off from the common stem at an early period, a long time before the tertiary epoch ; *Loligopsis* and *Veranya* are those *Œgopsides* which present a clear approach to the *Octopodidæ*. Within all three "phyla" there is a parallel development in the reduction of the shell, *Cirroteuthis* with internal shell being the most primitive form of the recent *Octopodidæ*, and *Ommastrephes* exhibiting the phragmocone of the Belemnites at the extremity of its internal shell ; in the same manner all three "phyla" have a tendency to lose the cartilaginous supporting apparel of the mantle and to acquire instead of it a muscular connection between neck and mantle, which is most perfectly attained in the *Octopodidæ*, but only imperfectly in the *Œgopsides* by *Loligopsis*. Morph. JB. vi. 112 pp. pls. xi. & xii. ; abstract in JR. Micr. Soc. iii. pp. 601–604.

DIBRANCHIATA.

Octopoda.

Octopus obesus and *lentus*, spp. nn., Verrill, Am. J. Sci. (3) xix. pp. 137 138, & 294, near Nova Scotia. *O. piscatorum* (Verrill), description copied in Ann. N. H. (5) v. p. 192.

Octopus maorum, sp. n., Hutton, Manual N. Zeal. Moll. p. 1, New Zealand.

Tremoctopus violaceus (Chiaje) and *catenulatus* (Fér.), radula: Brock, Morph. JB. vi. pl. xii. fig. 10, E. F.

Ocythoe tuberculata (Rafinesque) = *Tremoctopus catenulatus* (Verany) ; Steenstrup, Overs. Dan. Selsk. 1880, p. 104.

Stauroteuthis syrtensis (Verrill), Verrill, Am. J. Sci. (3) xix. p. 294, pl. xvi. figs. 1-5, Sable Island, Nova Scotia ; one specimen only known. See also Ann. N. H. (5) v. p. 191.

ŒGOPSIDÆ.

Histioteuthis collinsi (Verrill), Verrill, Tr. Conn. Ac. v. p. 234, pls. xxii. & xxvi. Am. J. Sci. (3) xix. p. 290, pl. xiv., Deep water off Nova Scotia.

Ommastrephes. J. Steenstrup (Overs. Dan. Selsk. 1880, pp. 73–79, pl.) proposes a distinct subfamily *Ommastrephini*, with the following characters :—internal shell stiletto- or arrow-shaped, with a small hollow cup at its end ; siphon placed in a more or less deep pit, with four muscular bridles; supporting apparel of the mantle T-shaped ; four waterbags round the eyes, but none at the root of the lateral arms; horny rings of the suckers regular. He distinguishes among them the following genera :—

1. *Ommastrephes* (Orb., 1835). Pit of the siphon deep, plaited in front ; tentacular arms with a row of alternating suckers and corresponding convex cushions, forming an adhesive apparel, at their extremity ; lateral arms, chiefly those of the third pair, with broad membranaceous wing-like appendages ; horny rings provided with four larger teeth. *O. gigas* (Orb.), *pteropus* (Steenstrup) *bartrami* (Lesueur), *oualaniensis* (Lesson), and *pelagicus* (Bosc.)

2. *Dosidicus* (Steenstrup, 1857). Differs from the preceding by the arms being attenuated in their outer half, and provided with very crowded long-stalked suckers. *D. eschrichti* (Steenstrup), South Sea.

3. *Todarodes*, g. n. Pit of the siphon moderately deep, plaited in front ; tentacular arms without the adhesive apparel, lateral arms not winged ; horny rings with alternating larger and smaller teeth throughout. *T. sagittatus* (Lam.) = *todarus* (Delle Chiaje, Verany), European Seas, and *pacificus* (Steenstrup), Japan.

4. *Illex*, g. n. Pit of the siphon not plaited, tentacular arms without adhesive apparel, lateral arms not winged ; horny rings of the larger suckers with blunt toothlets ; small suckers near the tip of the arms in eight rows. *I. illecebrosus* (Lesueur) = *piscatorum* (Lapylaie) = *sagittatus* (Orb., *nec* Lam.), Newfoundland, and *coindeti* (Verany), Mediterranean.

Ommastrephes pillæ (Verany) is a young *Illex coindeti*, *O. æquipodus* (Verany) a young *Todurodes*, *Omm. meneghinii* and *bianconii* (Verany) are probably young *Onychoteuthis*.

In all these *Ommastrephini* the fourth or ventral arm is hectocotylised in the male, and the spermatophores are attached within the mantle-cavity near the root of the gills. The male of *Ilex coindeti* has a shorter and thicker body than the female, and its suckers are of larger size (p. 93). The pit of the siphon in the above genera is figured on woodcut, p. 79, the adhesive apparel of the tentacular arms on woodcut, p. 11.

Ommastrephes illecebrosa (Lesueur, Verrill), N.E. Coast of America,

distinct from the Mediterranean *sagitta* (Lam.); Verrill, Am. J. Sci. (3) xix. pp. 289 & 290.

Ommastrephes todarus (Orb.), radula; Brock, Morph. JB. vi. pl. xii. fig. 10 *a*.

An account of the specimens of large *Cephalopoda* found in later times on the North-eastern Coast of America, is given by A. E. Verrill, Tr. Conn. Ac. v. pp. 177–258, with plates, containing 14 instances; 8 more are added by the same anthor in Am. J. Sci. (3) xix. pp. 284–287.

Architeuthis harveyi (Kent, as *Megaloteuthis*, 1874) = *monachus* (Verrill, 1875), and *princeps* (Verrill), N.E. Coast of America, comparatively described and figured by Verrill, Tr. Conn. Ac. v. pp. 210–217, & 223, pls. xvii.–xx. & pl. xxi. figs. i.–iii.; Am. J. Sci. (3) xix. pp. 287 & 288, pls. xii. & xiii.; also a note on the latter, body twenty feet long, in Nature, xx. p. 113.

Megateuthus, g. n. Near *Ommastrephes*, but the eight true arms longer than the mantle, the two tentacular arms very slender, the pen twice as broad, and the terminal fin very small. *M. martensi*, sp. n., Japan, length from the edge of the mantle to the hinder extremity 186 centimètres. A model of it was placed in the Exhibition of Fishery at Berlin; Hilgendorf, SB. nat. Fr. 1880, pp. 65–67.

Some notes on giant Cuttlefish in New Zealand, 10–11 feet from the root of the arms to the tip of the tail, one with eight, another with ten arms, by Kirk, Tr. N. Z. Inst. xii. pp. 310–313.

Sthenoteuthis, g. n., distinct from *Ommastrephes* by having, like *Architeuthis*, numerous small smooth-rimmed suckers alternating with tubercles on the proximal part of the club, for the mutual adhesion of the long tentacular arms; lateral arms provided with very broad, thin marginal membranes; caudal fin very broad. *Architeuthis megaptera* (Verrill), *Loligo bartrami* (Lesueur), and probably also *L. pteropus* (Steenstrup), belong to this genus. Verrill, Tr. Conn. Ac. v. p. 223 [Feb. 1880], pl. xxi. figs. 1–9: and Am. J. Sci. (3) xix. p. 288. [This is *Ommastrephes*, as defined by Steenstrup, *suprà*.—REC.]

Thysanoteuthis rhombus (Troschel) is intermediate in anatomical features between *Loligo* and *Ommastrephes*, agreeing chiefly with the latter in the disposition of the intestinal tract, the sexual and urinary organs, the vena cava, and nidamental glands, and by the duplicity of the oviducts, and with the former by the disposition of the heart and the arteria abdominalis and the transverse commissure of the ganglia stellata. Vigelius, MT. Zool. Stat. Neap. ii. pp. 150–161, with woodcuts; radula figured, p. 152; abstract in J. R. Micr. Soc. (2) i. p. 22.

Onychoteuthis lichtensteini (Fér.), radula; Brock, Morph. JB. vi. pl. xii. fig. 10 *c*.

Anisoctopus (Rafinesque) = *Leachia* (Lesueur), *A. punctatus* (Rafinesque), = *L. cyclura* (Lesueur) = *guttata* (Grant); Steenstrup, *l. c.* p. 104.

MYOPSIDÆ.

Sepiola leucoptera (Verrill), Verrill, Am. J. Sci. (3) xix. p. 291, pl. xv. figs. 4 & 5, off Cape Cod.

Rossia oweni (Ball), a specimen found at Llandudno, North Wales; E. A. Smith, Ann. N. H. (5) vi. p. 398.

Rossia hyatti and *sublevis* (Verrill); Verrill, Am. J. Sci. (3) xix. p. 291, pl. xv. figs. 1–3, off Cape Cod, Cape Sable, Nova Scotia, and Halifax.

Loligo pealii (Lesueur) is the common squid from Cape Hatteras to Cape Cod. As in all other squids, the length of the caudal fin, in proportion to that of the body, increases with age, even after maturity. *L. punctata* (De Kay) is the young of the same; *borealis*, var. n., North side of Cape Ann, Mass., and *L. pallida* (Verrill, 1873), Long Island Sound, described. Verrill, Am. J. Sci. (3) xix. pp. 292 & 293.

Pteroteuthis arabica (Ehrenb.) is a true *Loligo*, *Loligo laticeps* (Owen) = *Cranchia perlucida* (Rang) = *Onychia caribæa* (Lesueur), *Loligo eblanæ* (Ball) is a true *Ommastrephes*. Steenstrup, *l. c.* pp. 95–100.

Calliteuthis, g. n., Verrill, Am. J. Sci. (3) xx. p. 491, Outer banks of the Southern coast of New England.

Sepioteuthis mauritiana (Rüpp.), radula; Brock, Morph. JB. vi. pl. xii. fig. 10 *d*.

Sepiella (Gray, Steenstrup). Shell without apical spine; mantle supported by a prominent conical tubercle inserted into a deep excavation of the siphuncle; a large, distinctly pleated, subcutaneous sac on the back above the shell, with small openings on the ventral side near the root of the fins. Sexual differences the same as in *Sepia*, but more conspicuous, the shell of the female much broader than that of the male. *S. inermis* (Hasselt), Indian Sea, its female = *microchirus* (Gray) and *S. ornata* (Roux), Western Africa. Steenstrup, Vid. Medd. 1879–80, pp. 347–356, with 8 woodcuts.

Spirula australis. Male described by R. Owen; the arms of the fourth pair are very unequal in size, club-shaped, and without suckers. P. Z. S. 1880, pp. 352–354, pl. xxxii.; abstract in Arch. Z. expér. viii. p. lxii.

TETRABRANCHIATA.

Ammonitidæ.

W. Branco examines the first whorls, probably embryonal shells, of various Ammonites, and distinguishes, with regard to the shape of the first septum, three groups:—(1) *Asellati*, only found in Goniatites from Silurian and Devonian; (2) *Angustisellati*, in all Ammonites of the Jurassic and chalk periods, but also in some from the Trias; (3) *Latisellati*, typical for the Goniatites of the Carboniferous periods, but also for some Devonian, and probably also in the Permian Ammonites. The first whorl of the *Nautilidæ* is very different, as also is that of *Spirula*. Z. geol. Ges. 1880, pp. 596–611. [The Recorder mentions this palæontological paper because it is of general zoological importance.]

H. Douville describes a specimen of *Ammonites pseudoanceps* in which the earlike processes of the aperture are united from both sides, and leave only a single hole and two pairs of holes between them; he points out the analogy of these holes with the place of the funnel, the eyes, and

the weblike arms in *Argonauta*. J. de Conch. xxviii. pp. 355–362, with woodcut.

H. v. Ihering agrees with Barrande that the *Ammonitidæ* must have been *Dibranchiata*, not *Tetrabranchiata*, not only because their embryonal shell is more like that of *Spirula* and *Belemnites*, but also because the *Aptychus* corresponds to the nuchal cartilage of the *Dibranchiata*; Z. wiss. Zool. xxxv. p. 18.

PTEROPODA.

G. Pfeffer reviews, from a comparative morphological point of view the different forms of the shell in the *Hyalæidæ*. He states that, in *Diacria*, *Cleodora*, *Balantium*, *Triptera*, and *Creseis* (but not in *Hyalæa* proper), a limited embryonal part of the shell is to be distinguished, which is either preserved or lost in the adult. He also points out the differences between young and adult forms of the same species, the persistence of juvenile characters in some full grown varieties, and the mechanical loss of certain parts of the shell, namely, the lateral points and the upper lip, which occurs almost regularly in some species; and he mentions some interesting instances of external resemblance in colour and shape between distinct species collected at the same spot. Abh. Ver. Hamb. vii. pp. 70–77.

The same author arranges the *Hyalæidæ* in the following groups, but does not assign them to distinct genera, because an anatomical comparison of them has not yet been made:—

tridentata (Forsk.) = *affinis* and *cumingi* (Sow., Reeve), and *affinis* (Orb.) = *truncata* (Krauss) = *forskali* (Rang) = *tridentata* var. (Sow., Reeve), pp. 77–82, pl. vii. figs. 1 & 2.

uncinata (Rang) and *uncinatiformis*, new form, Atlantic, pp. 82 & 83, figs. 3 *a* & *b*.

globulosa (Rang), p. 83, fig. 4.

gibbosa (Rang) = *flava* (Orb.), and *gegenbauri*, new form, = *gibbosa* (Orb., *nec* Rang), pp. 84–87, figs. 5–7.

longirostris (Les.), p. 88, figs. 8 *a* & *b*.

labiata (Orb.), p. 89, fig. 10.

inflexa (Les.) and *imitans*, new form, from Zanzibar, pp. 89 & 90, figs. 9 *a* & *b*.

quadridentata (Les.) and *costata* (Pfeffer, 1879), pp. 90 & 91, figs. 11 & 12.

trispinosa (Les.) and *mucronata* (Q. & G.), p. 92, figs. 14 & 15.

lævigata (Orb.) and *longifilis* (Troschel), p. 93.

cuspidata (Q. & G.), p. 93.

pyramidata (Pér. & Les.), *martensi*, new form from the Atlantic and West Indies, *sulcata* (Pfeffer, 1879), and *australis* (Orb.), pp. 93–95, figs. 15–18.

balantium (Rang), p. 96, fig. 20.

falcatum, new group, near the preceding, but without sculpture, Atlantic, p. 96, fig. 19.

striata (Rang), p. 96.

virgula (Rang) and *flexa* (Pfeffer, 1879), pp. 96 & 97.
acicula (Rang), p. 97.
subulata (Q. & G.), p. 97.
columella (Rang) and *cancellata* (Pfeffer, 1879), p. 98, figs. 21 *a* & *b*.
Most of these "groups" and "forms" are fully described.

HETEROPODA.

Carinaria mediterranea. Regular pendulum-like movements of the foot observed by C. F. KRUKENBERG, 30–36 within a minute; they continue also if the foot with the ganglion pedale at its base is separated from the body, but cease if this ganglion is separated from the foot. Vergl. physiol. Studien, iii. pp. 177–180.

Sinusigera caledonica, sp. n., Crosse, J. de Conch. xxviii. p. 146, pl. iv. fig. 2. The author thinks that *Sinusigera* is an adult form and distinct from *Cheletropis*, which may be an embryonal shell. [Probably also *Sinusigera* is founded on very young shells.]

Sinusigera, pelagic, but not nocturnal, 21 species enumerated; *reticulata, perversa, minima, braziliensis, fusiformis, brœckiana, striata, dubia, nysti, tecturina, colbeauiana, rosea*, spp. nn. Craven, Ann. Soc. mal. Belg. xii.

GASTROPODA.

PECTINIBRANCHIA.

G. W. TRYON gives in the second volume of his Manual of Conchology, pp. 1–71, a general sketch of the external features, shell, anatomy, distribution in time and space, and history of classification of the *Prosobranchiata*, making free use of Kieferstein's comprehensive treatise on the subject in Bronn's "Klassen und Ordnungen des Thierreichs." He figures on pl. ii. sections of shells and microscopical views of them, pls. iii. & iv. the external appearance of some living animals and chiefly their trunks, pl. v. the radula of different families of *Rhachiglossa*, pl. vi. anatomical figures, pl. vii. different egg-cases, pl. viii. the development of *Buccinum* and *Purpura* and two larval shells.

MURICIDÆ.

Murex (including *Vitularia*). The known species enumerated, with short diagnosis, and figured by Tryon, Man. of Conch. ii. pp. 77–136, pls. i., ix.–xxx., xxxiv.–xli.

Murex recticornis, sp. n. (Martens), Kobelt. JB. mal. Ges. vii. p. 81, pl. iii. fig. 3, Eastern Australia, 76 fath.

Murex percoides (Löbbecke, 1879) and *lœbbeckii* (Kobelt, 1879) figured; JB. mal. Ges. vii. pl. iii. figs. 1 & 2.

Murex eximius, sp. n., Brazier, P. Linn. Soc. N. S. W. i. [1876], p. 170, Torres Straits.

Murex (*Pteronotus*) *bednalli*, sp. n. (Brazier, MS.), Angas, P. Z. S. 1880, p. 418, pl. xl. fig. 2, Port Darwin, Torres Straits.

Murex (*Ocenebra*) *confusa*, sp. n., Brazier, *l. c.* p. 172, Torres Straits.

Typhis. 5 species, none of them new, figured by Sowerby, Thes. Conch. iv. pl. ccccxxv. (or ccccxxiv.*). 14 species, none new, described by Tryon, Man. of Conch. ii. pp. 136–138, pl. xxx.

Trophon (Montf.). Monograph by Sowerby, Thes. Conch. iv. pp. 59–67, pls. cccciv. & ccccv.*, containing 41 species. The following are apparently new:—*interstriatus*, p. 60, pl. cccciv. fig. 6, locality unknown, *subserratus*, p. 63, pl. ccccv. figs. 32 & 33, and *stuarti* (E. A. Smith), fig. 37, Vancouver's Island, *innotabilis* (E. A. Smith), p. 66, pl. ccccv.*, fig. 39, locality unknown, *subangulatus*, p. 63, pl. ccccv.* fig. 48, locality unknown. *T. cepula* is a new name for *lamellosus* (Gray, *nec* Gmelin, *nec* Philippi), p. 61, pl. cccciv. fig. 14, & pl. ccccv. fig. 27. Also 40 species described and figured by Tryon, Man. of Conch. ii. pp. 138–151, pls. xxxi.-xxxiii.

Trophon stuarti, sp. n., E. A. Smith, P. Z. S. 1880, p. 481, pl. xlviii. fig. 6, Vancouver's Island.

Trophon squamosissima [*-mus*], sp. n., J. E. Tenison Woods, P. R. Soc. Tasm. 1878 [1879] p. 33, N. Tasmania.

Eupleura. 5 species described and 4 figured by Tryon, Man. of Conch. ii. pp. 157 & 158, pl. xxxix.

Urosalpinx. 16 known species, referred formerly to *Fusus*, *Adamsia*, &c., described and most of them figured by Tryon, *l. c.* pp. 151–156, pls. xxxi., xxxiii. & xxxix.

Purpuridæ.

Purpura. The known species shortly described, with a fuller account of *P. lapillus* (L.); Tryon, *l. c.* pp. 158–180, pls. xlii.–lv.

Purpura barcinonensis (Hidalgo), Hidalgo, Mol. mar. de España, pl. xxvii. *a*, figs. 7 & 8 [= *hæmastoma*, L., var.].

Purpura (*Cronia*) *anomala* (Angas) : see *Mangelia* (*Pleurotomidæ*).

Iopas, one species only, *francolinus* (Brug.) and *situla* being declared varieties of *sertum* (Brug.), discussed by Tryon, *l. c.* pp. 180 & 181, pl. lv. figs. 181 & 188–190.

Vexilla, including *Usilla* (H. Ad.): 4 species described, 3 figured; *id. l. c.* pp. 181 & 182, pl. lv. figs. 184–187.

Vitularia is included by Sowerby in his monograph of *Murex* (suprà).

Monoceros : 9 species described and figured by Tryon, *l. c.* pp. 193–195, pls. lx. & lxi.

Chorus, *Pinaxia*, and *Concholepas*, each with only one species, described and figured by Tryon, Man. of Conch. ii. pp. 197 & 198, pls. lxi. & lxii.

Ricinula: 29 species described and figured, many nominal species reduced to varieties; *id. l. c.* pp. 182–192, pls. lvi.–lix.

Cuma, 7 species, *Rapana* (including *Latiaxis*), 6 species, *Rhizochilus*, 1 species, *Coralliophila*, 17 species, *Pseudomurex*, 3 species, described and figured ; *id. l. c.* pp. 199–211, pls. lxii.–lxvi.

[*Coralliophila* ?] *Fusus brazieri*, locality unknown, and *imbricatus*, New Caledonia ; E. A. Smith, J. L. S. xii. [1876], pp. 539 & 540, pl. xxx. figs. 3 & 16.

Pseudoliva: 6 species described and 4 figured; Tryon, *l. c.* pp. 196 & 197, pl. lxi.

Purpura madreporarum (Sow.), referred to subg. *Galeropsis* (Hupé tertiary); *id. l. c.* pp. 211 & 212, pl. lxvii. figs. 387–391.

Melapium (Ad.), 1 species, and *Rapa* (Klein), 1 species, placed judiciously among the *Purpurinæ*, described and figured; *id. l. c.* pp. 213 & 214, pl. lxvii. figs. 392–396.

Separatista: 4 species described and 2 figured; *id. l. c.* p. 213, pl. lxviii. figs. 398 & 399.

Leptoconchus striatus (Rüpp.) and *cumingi* (Desh.). Notes and figures on the living animal and egg cases; C. Möbius, in Von Martens's Moll. Maur. p. 238, pl. xxi. figs. 1 & 2.

Magilus, 5 species, and *Magilina* (Vélain), 1 species, described and figured; Tryon, *l. c.* pp. 214–218, pls. lxviii. & lxix.

Buccinidæ.

[*Pollia*] *Fusus angulatus*, sp. n., Sowerby, Thes. Conch. iv. p. 86, pl. ccccxvi. fig. 94, Australia.

Pisania nævosa and *amphodon*, spp. nn., E. v. Martens, Moll. Maur. p. 240, pl. xx. figs. 8 & 9, Mauritius.

Pisania solomonensis, sp. n., E. A. Smith, J. L. S. xii. [1876], p. 541, pl. xxx. fig. 14, Solomon Islands.

Neptunea. Kobelt finishes the monograph of this genus, figuring *N. tabulata* (Baird), *rosea*, *virens*, *callirrhina*, and *attenuata* (Dall.), in Küster's Conch. Cab. pt. 291, pp. 138–140, pl. xlv. figs. 1, 3, 5, 6, 8. This genus is also included in Sowerby's monograph of *Fusus* (see *Fasciolariidæ*, infrà).

[*Neptunea*] *Fusus tæniatus*, sp. n., Sowerby, Thes. Conch. iv. p. 90, pl. ccccxv. fig. 119, Japan.

Sipho. The known species figured by Sowerby in his monograph of *Fusus*, Thes. Conch. iv. pls. ccccxii. & ccccxiii. *F. obesus*, p. 93, pl. ccccxii. fig. 92, and *solidulus*, p. 93, pl. ccccxiii. fig. 97, both from the Northern Seas, are apparently new.

Sipho angustus, sp. n., E. A. Smith, Ann. N. H. (5) vi. p. 287, Vancouver Island.

Euthria (Gray), monograph by Kobelt, in Küster's Conch. Cab. pt. 296, pp. 219–233. 20 species described, 14 figured.

Pyrula, including *Melongena* and *Busycon*, monograph by Sowerby, Thes. Conch. iv. pp. 99–107, pls. ccccxviii.–ccccxxii., containing 33 species. *P. tabulata* (Baird), p. 103, pl. ccccxix. fig. 17, Vancouver's Island, is apparently new.

[*Buccinum*] *Tritonium* (Müller, 1776), = *Buccinum* (L., Lam.); Bayle, J. de Conch. xxviii. p. 241. [As O. F. Müller himself says that he unites the 3 Linnæan genera, *Murex*, *Strombus*, and *Buccinum*, because the animals of those northern species which he examined showed no essential differences to his eye, his genus is quite indefinite, and we may acquiesce in the first rational definition of *Buccinum* and *Tritonium* given by Cuvier and Lamarck.—Rec.]

Buccinum. J. G. Jeffreys admits only 8 northern species, viz., *glaciale* (L)., *undatum* (L.), *grœnlandicum* (Chemn.), *hydrophanum* (Hanc.),

humphreysianum (Benn.), *totteni* (Stimps.), *tenue* (Gray), and *ciliatum* (Fabr.), with numerous varieties and 48 synonyms; even that number of species may be reduced when more intermediate forms are known. Ann. N. H. (5) vi. pp. 423–425.

Buccinum undatum (L.). W. Dall confirms that the males are generally of smaller size, and attributes the larger size of the female to the necessity of producing a large number of eggs and egg-cases. Bull. Soc. Washingt. iii. p. 75.

Buccinum (*Cominella*) *nodicinctum* (Martens, 1878), E. v. Martens, Conchol. Mitth. p. 42, pl. ix. fig. 4, Auckland Island.

Buccinum campbelli and *veneris*, spp. nn., Filhol, C. R. xci. p. 1094, Campbell Island.

Cominella albo-lirata, sp. n., J. E. Tenison Woods, P. R. Soc. Tasm. 1878 [1879], p. 33, Flinder's Island.

Buccinum (*Chlanidota*) *vestitum* (Martens, 1878), E. v. Martens, Conchol. Mitth. p. 43, pl. ix. fig. 3, Kerguelen Island.

Josepha, g. n., near *Cominella*, with a conspicuous plait on the columella. *J. tasmanica*, sp. n., J. E. Tenison Woods, *l. c.* p. 32, Tasmania.

Phos textus (Gmelin), var. n. *rhodostoma*, Martens, Moll. Maur. p. 241, pl. xx fig. 7, Seychelle Islands.

Eburna australis (Sow.), Kobelt, JB. mal. Ges. vii. p. 335, pl. vii. figs. 5–8, Sydney.

Nassidæ.

Nassa. The variability of the shells in this genus is discussed by F. P. Marrat in a separate pamphlet, "Varieties of Shells of *Nassa*," Liverpool : 1880, with 3 pls. 95 pp. After a general introduction to the subject, he describes the animal of the genus, and gives a list of references to the animals of various species in different works [The author is mistaken in quoting Olivi's Zoologia Adriatica, where no description of the living animal is given, and he omits to name the very first figure and description of a living animal of the genus given by Fabius Columna, De Purpura, Rome, 1616, cap. 4, regarding *N. mutabilis*]. He also notes 38 species in which the operculum is serrated, 16 in which it is crenated, and 12 in which it is plain. He then gives a list of 1321 numbers species or varieties (the latter diagnosed in a few words), describes 21 new species (see *infrà*), and gives some examples of natural series of intimately connected species, passing one into another according to him; he describes, finally, several species and varieties of *Nassa*, dredged on the same spot off Malta by Captain Horsfall, mentions some deformities, and hints at the probability that this genus may be constituted "by one shell in an endless varieties of forms." [*Cf.* also Zool. Rec. xvi. *Moll.* p. 42.] Some earlier papers on the same subject by the author are appended to this publication.

Nassa nodosa, Malacca, *lyræformis* [*lyrif-*], China, *bucculenta*, Philippines, *polita*, Mauritius, *grata*, Canton, *pusilla*, Singapore, *lauta*, Malacca, *crassicostata*, Bombay, *sculpta*, Natal, *prompta*, *picturata*, *acuminata*, *ferruginea*, *quercina*, *granulosa*, *lactea*, *cærulea*, *tabescens*, *quinque-costata*, *hanleyana*, and *parva*, spp. nn., no localities given, Marrat, *l. c.* pp. 77–83.

Nassa sesarma and *argentea*, Whydah, W. Africa, *pulcherrima*, Borneo ? or Australia, *lirata*, *cribraria*, *fraudulenta*, Philippines, *sparta*, West Coast of South America, *sculpta*, New Zealand, *lævigata*, *rissoides*, and *scalarina*, locality unknown (all described as new by Marrat in a pamphlet dated 1877) ; descriptions copied and coloured figures given. Marrat, *l. c.*

Nassa crispata and *keeni*, Philippines, *sinensis*, China, *bullata* = *coronata* var. of Quoy & Gaimard, New Guinea, *abyssinica*, Abyssinia, *paucicostata*, "Nassau," *multilineata*, South America, *pura*, West Indies, *æthiopica* and *minor*, Kabenda, North of the Congo, *oblonga*, *rugosa*, *flava*, *crassicostata*, *rotundicostata*, *harpularia*, *acutangula*, *undata*, *nivosa*, *præcallosa*, *vincta*, *laticostata*, spp. nn., *concentrica* (= *concinna*, Reeve, *nec* Powis), locality unknown, and *fenestrata* (= *isabellii*, Reeve, *nec* Orb.), Philippines, Mozambique, and Moreton Bay, also published by Marrat in a pamphlet dated 1877, reprinted in the publication of 1880, not figured.

Nassa. Varieties of *N. suturalis* (Lam.), *mucronata* (A. Adams), *graphitera* (Beck), *velata* (Gould), *festiva* (Powis), *plicosa* (Krauss), *canaliculata* (Lam.), *cooperi* (Forbes), *webbii* (Petit), *turrita* (A. Ad.), *plebecula* (Gould), *capensis* (Krauss), *onerata* (Desh.) = *obliqua* (Pease), and *angulifera* (A. Ad.), figured by Marrat, *l. c.*, pl. i.

Nassa thersites var. n. *irus*, Martens, Moll. Maur. p. 243, pl. xx. fig. 10, Mauritius. Variability of *N. olivacea* (Brug.) including *approximata* (Pease), and of *N. arcularia* (L.) including *rumphi* (Desh.) and *pullus* (Lam.) ; *id. l. c.* p. 242.

Nassa bicallosa, West Australia, *marrati*, *trinodosa*, *interlirata*, Solomon Islands, spp. nn., E. A. Smith, J. L. S. xii. 1876, pp. 543–545, pl. xxx. figs. 1, 2, 4, & 5.

Nassa (*Cæsia*) *simplex*, sp. n., *id.* Ann. N. H. (5) vi. p. 319, off the mouth of the Rio de la Plata.

Olividæ.

Olivella australis, sp. n., J. E. Tenison Woods, Tr. R. Soc. Vict. xiv. 1878, p. 56, Clark's Island, Australia.

Ancillaria. 46 known species enumerated by H. C. Weinkauff, JB. mal. Ges. vii. pp. 101–106.

Fasciolariidæ.

Fusus (Lamarck, emend.), Monograph by Kobelt, in Küster's Conch. Cab. pts. 291, 292, & 296, pp. 141–212, pls. xlvi.–lxvi. 77 species described and figured, including as new or not before figured :—*læbbeckii*, sp. n., p. 154, pl. xlviii. fig. 1, locality unknown ; *spadiceus*, sp. n., p. 179, pl. lv. figs. 5 & 6, locality unknown ; *hemifusus*, p. 186, pl. l. figs. 4 & 5, locality unknown. The following changes of names are proposed :—*F. adamsi*, new name for *ventricosus* (H. Adams, 1870, *nec* Beck, *nec* Gray), p. 152 ; *F. hartigi* (Shuttl., 1855) = *pæteli* (Dkr.), p. 191, pl. lxi. figs. 3 & 4, West Indies ; *F. perplexus* (Adams, 1864) = *inconstans* (Lischke), p. 195, pl. lxiii. figs. 2 & 3.

Fusus (including *Sipho* and *Neptunea*). Monograph by Sowerby, Thes.

Conch. iv. pp. 69–97, pls. ccccvi.–ccccxvii. bis, containing 140 species. The following are apparently new :—*sandvichensis*, p. 72, pl. ccccviii. fig. 17, Sandwich Islands ; *subquadratus*, p. 75, pl. ccccviii. fig. 28, locality unknown ; *acuticostatus*, p. 76, pl. ccccviii. fig. 30, locality unknown ; *graciliformis*, p. 80, pl. ccccxi. fig. 62, Japan ; *articulatus* [nec Lam.], p. 76, pl. ccccxi. fig. 66, locality unknown ; *vulpicolor*, p. 78, pl. ccccxi. fig. 73, Falkland Islands or New Zealand ; *percyanus*, p. 70, pl. ccccxii. fig. 77, locality unknown ; *depictus*, sinistral, p. 84, pl. ccccxii. fig. 86, locality unknown ; *lævigatus*, p. 75, pl. ccccxvii. fig. 157, Australia ; *rudicostatus*, p. 75, pl. ccccxvii. bis, fig. 164, Australia ? ; *tessellatus*, p. 94, pl. ccccxvii. bis, fig. 165, *lætus*, p. 94, pl. ccccxvii. bis, fig. 166, *excavatus*, p. 94, pl. ccccxvii. bis, fig. 168, and *fusco-nodosus*, p. 94, pl. ccccxvii. bis, fig. 169, localities unknown ; *crenulatus*, p. 85, pl. ccccxvii. bis, fig. 170, and *robustior*, p. 82, pl. ccccxi. fig. 63, Cape of Good Hope. *Fusus* ? *rectiplicatus*, p. 91, pl. ccccxiii. fig. 101, Northern seas [very near *krœyeri*, Mörch] ; *manchuricus* (E. A. Smith), p. 90, pl. ccccxv. fig. 125, Japan ; *tenuistriatus*, p. 85, pl. ccccxvi. fig. 140, locality unknown ; *innotabilis* (E. A. Smith), pl. ccccxvi. fig. 141, locality unknown.

Plicatella (*Peristernia*) *bonasia*, sp. n., Martens, Moll. Maur. p. 246, pl. xx. fig. 6, Seychelle Islands. *Pl. fragaria* (Wood, as *Voluta*) = *carolinæ* (Kien., as *Turbinella*) = *bella* (Reeve, as *Ricinula*) ; id. *l. c.* p. 246, Mauritius.

Latirus nagasakiensis, sp. n., E. A. Smith, P. Z. S. 1880, p. 482, pl. xlviii. fig. 7, Japan.

Mitridæ.

The typical *Mitra*, the subgenera *Scabricula*, *Cancilla*, *Zeba*, *Turricula*, *Costellaria*, *Callithea*, *Cylindra*, and *Imbricaria* are sand or burrowing species, *Nebularia*, *Chrysame*, *Thala*, *Volutomitra* [?], *Strigatella*. *Pusia*, *Dibaphus*, and *Mitroidea* reef-shells, *Zierlina*, littoral ; Garrett, J. of Conch. iii. p. 73.

Mitra aurora (Dohrn), differences from *coronata*, living animal and variation in the sutural nodules of the latter, p. 14 ; *M. eburnostoma*, *eburnea*, and *humeralis*, spp. nn., pp. 15 & 18, Paumotu Islands ; *M. interlirata* (Reeve) compared with *flammea* (Q. & G.), p. 20 ; *M. lugubris* (Swains.) probably = *lacunosa* (Reeve), p. 20 ; *M. propinqua*, sp. n., p. 22, Society Islands, near *punctata* (Swains.) ; *M. peregra* (Reeve) = *spadicea* (Dunker), p. 23 ; *M. retusa* (Lam.) = *paupercula* (Schrœter), belongs to the subgenus *Nebularia*, and is quite distinct from *paupercula* (L.), and *virgata* (Reeve), p. 25 ; *M. subtexturata*, p. 26, Raiatea, *spirapuncta*, p. 27, Viti Islands, and *tahitensis*, p. 30, Society Islands, spp. nn. Garrett, J. of Conch. iii.

Mitra polita (Reeve) from Mauritius ; Martens, Moll. Maur. p. 252, pl. xx. fig. 15.

Mitroidea multiplicata (Pease), Paumotu and Samoa, described by Garrett, J. of Conch. iii. p. 68.

Dibaphus philippii (Crosse) [*edentulus* (Sow.)] inhabits all the Polynesian groups south of the equator, except the Tonga and the Marquesas,

colour and sculpture described, resemblance to *Mitroidea* pointed out by Garrett, J. of Conch. iii. pp. 69 & 70. E. v. Martens states that in the upper whorls *D. edentulus* more resembles *Mitra abbatis* (Chemn.) than *Conus mitratus* (Hwass), to which it is likened by Weinkauff; Moll. Maur. p. 253.

Turricula bicolor, Samoa and Paumotu Islands, *castanea*, Samoa and Viti, *flexicostata* and *pulchra*, Paumotu and Viti, *festiva*, *fusco-nigra*, *hoyti*, *instricta*, *peasii*, *propinqua*, and *unilineata*, Viti, *flexicostata* and *modicella*, Paumotu, spp. nn., with descriptions or critical remarks concerning *aurantia* (Swains.) = *pyramidalis* (Reeve), *angulosa* (Martini ?, Reeve), *cumingi* (Reeve), *cadaverosa* (Reeve), *diachroa* (Adams & Reeve) = *græffi* (Crosse), *discoloria* (Reeve), *exasperata* (Chemn.), *microzonias* (Lam.), *mille-costata* (Swains.), *michaui* (Crosse & Fischer) = *rigida* (Reeve, *nec* Swains.) = *dunkeri* (Schmeltz), *vittata* (Swains.), and *zebuensis* (Reeve ?); Garrett, J. of Conch. iii. pp. 36–63.

Turricula (*Thala*) *simulans*, sp. n., Martens, Moll. Maur. p. 255, pl. xx. fig. 16, Mauritius.

Mitra (*Turricula*) *rufo-filosa*, sp. n., E. A. Smith, J. L. S. xii. p. 548, pl. xxx. fig. 10, Solomon Islands.

Strigatella zebra, sp. n., Garrett, *l. c.* p. 35, Viti and Samoa Islands; with critical notes concerning *auriculoides*, *maculosa*, and *virgata* (Reeve), and description of the living animal of *acuminata* (Swains.), *brunnea* (Pease), and *columbelliformis* (Kien.), pp. 32–35. *Cf.* suprà, *Mitra retusa*.

Cylindra nucea (Gronov.), colours of the living animal, and *fenestrata* (Lam.), description corrected; *id. l. c.* pp. 65 & 66.

Imbricaria oliviformis (Swains.), colour of living animal; *id. l. c.* p. 66.

Volutidæ.

Voluta rueckeri var. n. *ceraunia*, Crosse, J. de Conch. xxviii. p. 148, pl. iv. fig. 1, New Britain.

Voluta ellioti (Sow.). The dark lines, nearly straight in the greater part of the shell, become in one specimen suddenly zig-zag near the mouth; this change is due to a former fracture of the shell afterwards healed over. Martens, SB. nat. Fr. 1880, pp. 67–69.

Voluta (*Aulica*) *bednalli*, sp. n. (Brazier, MS.), Angas, P. Z. S. 1880, p. 418, pl. xl. fig. 1, Port Darwin, Torres Straits.

Columbellidæ.

Columbella spiratella and *cincinnata*, spp. nn., *alabastrum*, and *cumingi* (Reeve), all from Mauritius, Martens, Moll. Maur. pp. 247 & 248, pl. xx. figs. 11–14.

Columbella carolinæ, sp. n., E. A. Smith, J. L. S. xii. [1876], p. 541, pl. xxx. fig. 9, Strong Island, Carolines.

Columbella dictya, sp. n., J. E. Tenison Woods, P. R. Soc. Tasm. 1878 [1879], p. 34, N. Tasmania.

Columbella (*Nitidella* ?) *dalli*, sp. n., E. A. Smith, Ann. N. H. (5) vi. p. 287, Vancouver Island.

Columbella (*Anachis*) *clathrata*, sp. n., Brazier, P. Linn. Soc. N. S. W. i. [1876] p. 227, New Guinea.

Columbella (*Amycla*) *mariæ*, *inscripta*, *merita*, *pudica*, and *abyssicola*, spp. nn., New Guinea, Torres Straits, and N.E. Australia, *id. l. c.* pp. 230-232.

Columbella (*Astyris*) *læta*, sp. n., *id. l. c.* p. 232, Torres Straits.

Marginellidæ.

Marginella. List of the known species, 219, by H. C. Weinkauff, JB. mal. Ges. vii. pp. 40–64, systematically arranged as follows :—

I. With basal notch.
  Sect. 1. True *Marginella*.
    Group *a*. *Marginella* (H. & A. Adams). Example, *M. glabella* (L.).
    „ *b*. *Glabella* (H. & A. Adams). Ex., *faba* (L.).
    „ *c*. *Eratoidea*, n., = *Egouena*, pt., and *Serrata* (Jouss.). Ex., *hæmatita* (Kien.), *australis* (Hinds), &c.
  Sect. 2. *Persicula* (Gray).
    Group *a*. *Bullata* (Jouss.), pt. Ex., *cornea* (Lam.), *clandestina* (Brocchi).
    „ *b*. *Persicula* (H. & A. Adams). Ex. *persicula* (L.).
    „ *c*. *Gibberula* and *Granula* (Jouss.). Ex., *monilis* (L.).
  Sect. 3. Without name.
    Group *a*. *Closia* (Gray). Ex., *largillierti* (Kien.).
    „ *b*. *Cryptospira* (H. & A. Ad.). Ex., *quinqueplicata* (Lam.).
    „ *c*. *Volutella* (Swains., Ad.). Ex., *bullata* (Born).

II. Aperture closed below.
  Sect. 1. *Prunum* (Adams) = *Egouena* (Jouss.).
    Group *a*. *labiatæ*. Ex., *curta* (Sow.).
    „ *b*. *guttatæ*. Ex., *oliviformis* (Kien.).
    „ *c*. *marginatæ*. Ex., *marginata* (Born.).
  Sect. 2. *Volvaria*, s. str. (H. & A. Adams). Ex., *pallida* (L.).
  „ 3. *Canalispira* (Jouss.). Ex., *olivelliformis* (Jouss.).
  „ 5. *Volvarina* (H. & A. Ad.) and *Balanetta* (Jouss.). Ex., *zonata* (Kien.).

Marginella glabella (L.). Living animal found in depths of 25–30 mètres by H. v. Maltzan, described by J. Carrière, Zool. Anz. iii. pp. 637 & 638.

Marginella majuscula, sp. n., Martens, Moll. Maur. p. 257, pl. xxii. fig. 2, Cargados Islands, N.E. of Mauritius.

Marginella cyprœoides, sp. n., J. E. Tenison Woods, P. R. Soc. Tasm. 1877 [1878], p. 122, Tasmania.

Marginella (*Prunum*) *lævigata*, sp. n., Brazier, P. Linn. Soc. N. S. W. i. [1876] p. 225, Torres Straits and New Guinea.

Pseudomarginella, g. n. Shell like that of *Marginella*, but animal provided with an unguiculate operculum, like that of *Fusus*; the animal lives on littoral rocks, not on sandy ground like the true *Marginellæ*. *P.*

adansoni, the only species, is quite similar to *M. glabella*, Goree : Maltzan, Nachr. mal. Ges. 1880, pp. 106–109. J. Carrière has examined Maltzan's specimens, and found in two of them the radula like that of *Buccinum* or *Neptunea*, in a third like that of *Purpura*, and other differences in the foot and operculum, and he distinguishes therefore *Ps. platypus* and *leptopus*, spp. nn., both from Goree, Zool. Anz. iii. 1880, pp. 637–641. [Such differences in similar shells are very strange, and require further confirmation.—REC.]

CONIDÆ.

Conus consanguineus, locality unknown, *neptunoides*, Australia, *taylorianus*, Australia ?, and *albo-spira*, locality unknown, spp. nn., E. A. Smith, P. Z. S. 1880, pp. 478–480, pl. xlviii. figs. 1–4.

Conus mediterraneus (Hwass). On its occurrence in the Mediterranean, the older specimens at somewhat greater depths; Weinkauff, JB. mal. Ges. vii. pp. 194 & 195.

PLEUROTOMIDÆ.

Pleurotoma clara, sp. n., Eastern Coast of Patagonia, 60 fath., (*Drillia*) *patagonica* (Orb.), Patagonia, *studeriana* (Martens, 1878), Kerguelen, 120 fath., *lanceolata* (Rv.) and *declivis*, sp. n., Hakodade, *oxyclathrus*, sp. n., New Guinea, 24 fath.; E. v. Martens, Conch. Mitth. pp. 35–42, pl. viii. figs. 1–4, & pl. ix. figs. 1 & 2.

Pleurotoma vancouverensis, sp. n., E. A. Smith, Ann. N. H. (5) vi. p. 286, Vancouver Island.

Pleurotoma solomonensis, sp. n., *id.*, J. L. S. xii. [1876] p. 537, pl. xxx. fig. 6, Solomon Islands.

Drillia tæniata, Flinders' Island, and *agnewi*, Table Cape, J. E Tenison Woods, P. R. Soc. Tasm. 1878 [1879], p. 36 [Tasmania].

Clathurella rufinodis, sp. n., Martens, Moll. Maur. p. 227, pl. xx. fig. 2, Mauritius.

Clathurella crassina, sp. n., Angas, P. Z. S. 1880, p. 416, pl. xl. fig. 6, Aldinga Bay, St. Vincent's Gulf, S. Australia.

Clathurella immaculata, sp. n., E. A. Smith, J. L. S. xii. [1876], p. 539, pl. xxx. fig. 7, Gilbert Islands.

Clathurella granulosissima and *sculptilis*, spp. nn., J. E. Tenison Woods, P. R. Soc. Tasm. 1878 [1879], pp. 37 & 38 [Tasmania].

Glyphostoma paucimaculata[*-tum*], sp. n., Angas, P. Z. S. 1880, p. 416, pl. xl. fig. 7, South Australia.

Mangelia havisoni and *trachys*, spp. nn., J. E. Tenison Woods, Tr. R. Soc. Vict. xiv. [1878] pp. 56 & 57, Clark's Island and Brighton, Victoria.

Mangelia delicatula, Hobarton, and *attenuata*, Circular Head, spp. nn., *id.*, P. R. Soc. Tasm. 1878 [1879], pp. 37 & 39 [Tasmania].

Mangelia anomala (Angas, as *Purpura*, 1877), South Australia, well preserved adult species; Tate, P. Linn. Soc. N. S. W. v. pp. 131 & 132.

Cythara unilineata and *interstriata*, E. A. Smith, J. L. S. xii. [1876] p. 538, pl. xxx. figs. 11 & 13, Solomon Islands.

Daphnella trivaricosa, sp. n., and *D. nitida* (Kiener, as *Pleurotoma*) =

Columbella marquesa (Gaskoin, Reeve); Martens, Moll. Maur. p. 228, pl. xx. figs. 1, 3, & 4, Mauritius.

Terebridæ.

Terebra cærulescens (Lam.) var. n. *flammulata*, Martens, *l. c.* p. 230, pl. xx. fig. 5, Seychelle Islands.

Terebra mariesi, sp. n., E. A. Smith, P. Z. S. 1880, p. 480, pl. xlviii. fig. 5, Japan.

Myurella guayaquilensis, new name for *belcheri* (E. A. Smith), pre-occupied; E. A. Smith, P. Z. S. 1880, p. 481.

Cerithiopsidæ.

Cerithiopsis balteata, sp. n., Fiji, and *fayalensis*, sp. n., Azores, 450–500 fath., Watson, J. L. S. xv. pp. 124 & 125.

Cerithiopsis angasi, new name for *clathrata* (Angas), pre-occupied; Brazier, P. Linn. Soc. N. S. W. iv. [1879] p. 388.

[See also *Cerithiidæ*.]

Cassididæ.

[*Tritonium*] *Buccinum* (Tournefort, 1742) = *Triton* (Lam.), Bayle, J. de Conch. xxviii. p. 241. [Ante-Linnean, therefore no change needed.—Rec.]

Tritonium (*Epidromus*) *angasi*, sp. n., Brazier, P. Linn. Soc. N. S. W. i. [1876], p. 174, Torres Straits.

Ficula (Swains.). Monograph by Sowerby, Thes. Conch. iv. pp. 109 & 110, pl. ccccxxiii. 4 species, all known.

Oniscia ponderosa (Hanley, 1858) found on the North coast of New Caledonia; Brazier, P. Linn. Soc. N. S. W. iv. [1879], p. 431.

Cypræidæ.

Cypræa. Weinkauff continues his monograph in Küster's Conch. Cab. pts. 287, 289, & 295, pp. 17–80, pls. xvii.–xxiv., describing and figuring 65 species, most of them well known. *C. subteres*, new name for *teres* (Sow., Reeve, *nec* Gmelin), p. 27, pl. viii. fig. 4, & pl. xiii. figs. 1 & 4; *teres* (Gmelin) = *tabescens* (Dillw.), p. 28, pl. viii. figs. 1–3; *gemmula*, sp. n., p. 54, pl. xvi. figs. 1, 2, 8, & 9, Red Sea, near *arabicula*.

Cypræa decipiens, sp. n., E. A. Smith, P. Z. S. 1880, p. 482, pl. xlviii. fig. 8, North Australia. Very near *thersites* (Brod.).

Erato. 18 known species enumerated by H. C. Weinkauff, JB. mal. Ges. vii. pp. 107 & 108.

Erato pellucida, sp. n., J. E. Tenison Woods, P. R. Soc. Tasm. 1878 [1879], p. 35, Table Cape, Tasmania.

Ovulidæ.

Birostra m'coyi, sp. n., J. E. Tenison Woods, Tr. R. Soc. Vict. xiv. [1878], p. 56, N.E. Tasmania.

Naticidæ.

Natica intricatula (sp. n. ?), Hidalgo, Moll. Mar. de España, pl. xx. *c*, figs. 10 & 11, without description.

Amauropsis globulus, sp. n., Angas, P. Z. S. 1880, p. 416, pl. xl. fig. 5, Holdfast Bay, South Australia.

Marseniidæ.

Lamellaria (*Chelynotus*) *nigra* (Blv.), figure of living animal by Möbius, in Martens's Moll. Maur. pl. xxi. fig. 9.

Xenophoridæ.

Xenophora (Fischer). Monograph by P. Fischer, in the continuation of Kiener's "Spécies Général," *Trochus*, pp. 424–450, containing 16 known species, distributed into 3 subgenera :—

Haliphœbus, subg. n. of *Xenophora*, for *X. solaris* (L.), p. 450.

Tugurium, subg. n. of *Xenophora* ; border of the shell very developed, porcellaneous on its under face ; only a few and small foreign bodies agglutinated, and generally only on the first whorls. *X. caribbæa* (Petit), *exuta* (Reeve), *helvacea* (Philippi), *indica* (Gmel.), and *lamberti* (Souverbie), p. 450.

Cerithiidæ.

Cerithium vulgatum (Brug.), spawn in form of threads ; Schnitzlein, MT. z. Stat. Neap. ii. p. 173.

Cerithium sinon, new name for *C. clathratum* (Sow., 1855, *nec* Desh., 1834, foss.) ; *crumena*, for *coronatum*, Sow. (*nec* Bellardi, 1850) ; *custos*, for *coronatum*, Sow. (*nec* Brugnière, 1792), *rigens*, for *costatum*, Sow. (*nec* Defrance, 1817) ; *eurus*, for *curtum*, Sow. (*nec* Lea) ; *eludens*, for *dubium*, Sow. (Thes. 1855, *nec* Sow., Min. Conch. 1816) ; *macrescens*, for *elongatum*, Sow. (*nec* Anton, 1839) ; *proditum*, for *fusiforme*, Sow. (*nec* Leymerie, 1844) ; *amabile*, for *gracile*, Sow. (*nec* Lamarck) ; *desolatum*, for *lævigatum*, Philippi (*nec* Marcel de Serres) ; *homologum*, for *multigranum*, Sow. (*nec* Desh., 1834) ; *gentile*, for *nitidum*, Sow. (*nec* Zekeli, 1852) ; *repletulum*, for *obesum*, Sow. (*nec* Desh., 1834) ; *opportunum*, for *polygonum*, Sow. (*nec* Leymerie, 1844) ; *proditum*, for *pyramidatum*, Hombr. & Jacq. (*nec* Desh., 1834) ; *patiens*, for *rugosum*, Sow. [Wood ?], (*nec* Lam.) ; *cordigerum*, for the recent *semigranosum*, Lam. (not the fossil from Grignon, which has priority) ; *icarus*, for *tenue*, Sow. (*nec* Desh., 1834) ; *omissum*, for *tuberosum*, Sow. (*nec* Grateloup, 1846) ; *rivale*, for *undulatum*, Sow. (*nec* Rœmer) ; *fortiusculum*, for *varicosum*, Sow. (*nec* Defrance, 1817) ; and *uranus*, for *vittatum*, Sow. (*nec* Lam.) ; Bayle, J. de Conch. xxviii. pp. 243–251. *C. proditum* also pre-occupied, and changed into *audouini* ; id. *l. c.* p. 354.

Cerithium matukense and *phoxum*, spp. nn., Watson, J. L. S. xv. pp. 105 & 106, Fiji Islands, the first 310–315 faths.

Cerithium (*Bittium*) *lissum*, Fiji, *amblyterum*, Fayal, Azores, 500 faths., *mamillatum* and *enode*, off Pernambuco, 675 faths., *amboynense*, Amboyna, *pigrum*, *luscinia*, and *philomelæ*, Nightingale Island, Tristan d'Acunha, 150 faths., *gemmatum*, Atlantic, near Setubal, 470 faths., *Globigerina*-ooze, *pupiforme*, Cape York, *oosimense*, Japan, spp. nn.; Watson, J. L. S. xv. pp. 107-117.

Cerithium [*Bittium*, or perhaps *Cerithiopsis*?] *cylindricum*, Port Jackson, *abruptum*, Azores, 450–500 faths., *delicatum* and *aedonium*, Nightingale Island, Tristan d'Acunha, 100–150 faths., spp. nn., *id. l. c.* pp. 118–121.

Cerithium (*Triforis*) *levukense*, Fiji, *digemma* and *inflatum*, St. Thomas West Indies, 390 faths., *hebes*, Tristan d'Acunha, 100–150 faths., spp. nn., *id. l. c.* pp. 100–104.

Bittium minimum, J. E. Tenison Woods, P. R. Soc. Tasm. 1877 [1878], p. 123; *B. minimum* [again !], *id. op. cit.* 1878 [1879], p. 35; *B. turbinel*[*l*]*oides*, id. ibid.; *B. sublævis*[*ve*], id. Tr. R. Soc. Vict. xiv. [1878], p. 58: spp. nn., all from Tasmania.

Triforis crassula, sp. n., Martens, Moll. Maur. p. 282, pl. xxii. fig. 1, Mauritius.

Triforis fasciata, sp. n., J. E. Tenison Woods, P. R. Soc. Tasm. 1878 [1879], p. 34, Tasmania.

Lampania angulifera (Sow., Reeve) is from Port Jackson, Brazier; P. Linn. Soc. N. S. W. iv. p. 388.

Planaxidæ.

Planaxis sulcata (Born), common on rocks in N.E. Australia, eaten by the settlers; J. E. T. Woods, P. Linn. Soc. N. S. W. v. pp. 108 & 109.

Melaniidæ.

Melania amarula (Lam.), Mauritius and Bourbon, and *diadema* (Lea, Brot) = *amarula*, of Rumph, from Amboina, compared; Martens, Moll. Maur. p. 211.

Melania subplicata and *snellemanni*, spp. nn., Sumatra, and *sumatrensis* (Brot), Schepman, Middel-Sumatra iv. pt. 3, pp. 13-15, pl. i. figs. 3-6; radula pl. iii. figs. 8 & 9; radula of *M. scabra* and *tuberculata* (Müll.), *l. c.* pp. 15 & 16, figs. 10 & 11.

Melania brazieri, sp. n., Ancey, Le Nat. No. 42, Solomon Islands.

Melania (*Sermyla*) *admirabilis*, *M. tanganyicensis* and *horii*, spp. nn., Lake Tanganyika, E. A. Smith, Ann. N. H. (5) vi. p. 426.

Tiphobia, g. n. Shell subturbinate, spire depressed, whorls flattened above, angulated, and spinose; axis and aperture prolonged into a channelled beak; epidermis none [?]. Operculum ?. *T. horii*, sp. n., Lake Tanganyika. E. A. Smith, P. Z. S. 1880, p. 348, pl. xxxi. fig. 6.

Syrnolopsis, g. n. "Testa subulata, lævis, imperforata; apertura ad basin

late sinuata; labrum breviter incrassatum, in medio late sinuatum, inferne aliquanto productum, longe intus liris 1–2 prominulis munitum; columella incrassata, plica valida superne instructa, labri extremitati callo tereti juncta." *S. lacustris*, sp. n. (11½ millim.), Lake Tanganyika. E. A. Smith, Ann. N. H. (5) vi. p. 426.

Melanopsis. The very variable Moroccan forms of this genus are distinguished by Morelet as follows: *prærosa* (L.), *hammonensis* (Gassies) = *maroccana* (Chemnitz, pt., Morelet, 1853, Bourg., Mouss.), *cariosa* (L.), *costata* (Olivier), *tingitana* (Morelet), and *maresi* (Bourg); he admits the occurrence of specimens which are intermediate between these species, but thinks that they may be hybrids. J. de Conch. xxviii. pp. 68–78; *prærosa* and *tingitana*, pl. iii. figs. 6 & 8.

Limnotrochus, g. n. Trochiform, umbilicate, spirally striated, without epidermis, last whorl carinated in the middle; aperture broadly sinuated below; operculum horny, paucispiral. *L. thomsoni* and *kirki*, spp. nn., Lake Tanganyika. E. A. Smith, Ann. N. H. (5) vi. pp. 425 & 426.

Paludomus (Swains.) s. stricto; operculum in the centre spiral, peripherically concentrical, nearly as in *Lioplax* and *Cleopatra* among the *Paludinidæ*. 28 species described and figured by Brot, in Küster's Conch. Cab. pt. 293, pp. 24–48, pls. vi.–viii. *P. constrictus* and *phasianinus* (Reeve), *zeylanica* (Lea), *fulguratus*, *piriformis* (Dohrn), and *parvus* (Layard) are all varieties of *chilinoides* (Reeve), p. 28; *rapiformis*, sp. n., p. 30, pl. v. fig. 10, locality unknown; *isseli*, sp. n., p. 31, pl. vii. figs. 7 & 8, Sarawak; *andersonianus*, var. n. *peguensis*, p. 36, pl. vii. figs. 2 & 3, = *regulatus*, var., Hanley & Theob., Conch. Ind. p. 108, fig. 6; *acutus*, *spiralis* (Reeve), *modicella* (Reeve), *lutosa* (Souleyet), *nasutus* (Dohrn), and *spurcus* (H. & A. Ad.), are all varieties of *tanjoriensis* (Blanf.) = *tanschaurica* (Gmel.), p. 41, pl. viii. figs. 18 & 20–23; *inflatus*, sp. n., p. 44, pl. viii. figs. 25 & 26; *baccula* (Reeve) = *ajanensis* (Morelet); *madagascariensis*, sp. n., p. 48, pl. viii. fig. 7, Madagascar.

Paludomus travancorica (Beddome, MS.), sp. n., Blanford, J. A. S. B. xlix. pt. 2, p. 219, pl. ii. fig. 22, Trevandrum, S. India.

Tanalia: operculum concentrical, 7 species described and figured, all from Ceylon, *undata*, *layardi*, *erinaceus*, *ærea*, *funiculata*, *picta* (all of Reeve), *nodulosa*, *skinneri*, *distinguenda*, *torrenticola* (all of Dohrn), *reevii* and *similis* (Layard), are varieties of *loricata* (Rv.); *gardneri*, *tennanti*, *dilatata* (Reeve), *cumingiana*, *dromedarius* (Dohrn), and *melanostoma* (Thorpe), are varieties of *neritoides* (Reeve). Brot, in Küster's Conch. Cab. pt. 293, pp. 1–14, pls. i.–iv.

Philopotamus (Layard): chiefly distinct by the spiral structure of the operculum, which is, however, more or less conspicuous in different species. 9 known species described and figured, by Brot, in Küster's Conch. Cab. pt. 293, pp. 15–23, pls. ii. v. & vi., Southern India and Ceylon.

Stomatodon (Benson), g. n. "Testa globosa-turrita, spira parvula, brevi, in adultis erosa, columella lata, callosa, basi intus subito truncata et conspicue dentata. Operculum lamellosum, nucleo marginali dextrorso, ad mediam altitudinis partem posito." *S. bensoni*, = *Tanalia*? *stomatodon* (Benson, 1862), already suspected by Benson to be a new genus. Brot, in Küster's Conch. Cab. pt. 293, p. 12, pl. v. fig. 2, Southern India.

Turritellidæ.

Turritella runcinata, *accisa*, *carlottæ*, and *cordismi*, all Bass's Strait, 38-40 faths., *philippensis*, Port Philip, S. Australia, 38 faths., *austrina*, Prince Edward and Kerguelen Islands, 100 & 28 faths., *deliciosa*, Cape York, 155 faths., Watson, J. L. S. xv. pp. 217–221. *T.* (*Torcula*) *admirabilis*, sp. n., Admiralty Islands, N.E. of Papua, 16–25 faths., and *lamellosa*, sp. n., Bass's Strait, 38–40 faths.; *id. l. c.* pp. 227-230.

Turritella concava, sp. n., Martens, Moll. Maur. p. 283, pl. xx. fig. 19, Mauritius.

Litorinidæ.

Tectarius (Valenciennes) = *Pagodus* (Gray). Monograph by P. Fischer, in the continuation of Kiener's "Spécies Général," *Trochus*, pp. 451–459. 6 known species.

Echinella ? *tectiformis*, sp. n., Watson, J. L. S. xv. p. 94, Japan, 34° N. lat., 565 faths.

Cremnoconchus. Critical note concerning some names of species, by Blanford, J. A. S. B. xlix. pt. 2, p. 221.

Litorina. Descriptions of several known species, as yet without figures, by Weinkauff, in Küster's Conch. Cab. pt. 298, pp. 25–40.

Littorina melanacme, sp. n., E. A. Smith, J. L. S. xii. [1876], p. 352, pl. xxx. fig. 21, Solomon Islands. *L. cærulescens* (Lam.) [?], also found on the coasts of Australia, more rare in the tropical parts, and *pyramidata* (Quoy) most developed at Port Jackson, rarer, and of smaller size, in more northern and more southern parts of the coast; *L. scabra* (L.), in the mangrove swamps, widely distributed. J. E. T. Woods, P. Linn. Soc. N. S. W. v. pp. 109 & 121.

Fossarus cereus, sp. n., Watson, J. L. S. xv. p. 97, East of Cape York, Australia, 1400 faths.

Lacuna picta, sp. n., *id. l. c.* p. 96, Atlantic, 9° S. lat., 34° W. long., 350 faths.

Lacuna (*Hela*) *margaritifera*, sp. n., *id. l. c.* p. 97, Mid Pacific, E. of Japan, 36° N. lat., 178° E. long., 2050 faths.

Risella (Gray). Historical note on the genus, and description of two known species, by P. Fischer, in the continuation of Kiener's "Spécies Général," pp. 460–463.

Rissoidæ.

Rissoina. Weinkauff continues his monograph in Küster's Conch. Cab. pt. 299, pp. 17-40, describing and figuring 35 species, all figured already by Schwartz von Mohrenstern. He unites *denticulata* of the latter with *plicata* (A. Adams), and gives to his *coniformis* the new name *montagui*, thinking that Montagu's *Turbo denticulatus* and *coniformis* [*coniferus*] belong to *Columbella*, not to *Rissoina*, pp. 23 & 28. [This is a mistake; Weinkauff has only compared Chenu's translation, not the

original work of Montagu, in which pl. xv. fig. 2, *Turbo coniferus*, has no resemblance to a *Columbella*.]

Rissoina elegantula and *lirata*, spp. nn., Angas, P. Z. S. 1880, p. 417, pl. xl. figs. 10 & 11, St. Vincent's Gulf, S. Australia.

Rissoina terebroides, sp. n., E. A. Smith, J. L. S. xii. p. 554, pl. xxx. fig. 19, Solomon Islands.

Rissoina kershawi and *supra-sculpta*, J. E. Tenison Woods, Tr. R. Soc. Vict. xiv. [1878], p. 57; *R. minutissima* and *unilirata*, id. P. R. Soc. Tasm. 1877 [1878], pp. 122 & 123: spp. nn., all from Tasmania.

Rissoa (*Alvania*) *mauritiana*, sp. n., Martens, Moll. Maur. p. 285, pl. xx. fig. 17, Mauritius.

Rissoa (*Ceratia*) *punctato-striata*, sp. n., J. E. Tenison Woods, P. R. Soc. Tasm 1878 [1879], p. 35, Table Cape, Tasmania.

Barleeia? *microthyra*, sp. n., Martens, Moll. Maur. p. 285, pl. xx. fig. 17, Mauritius.

S. Clessin discusses the known genera of the freshwater *Rissoidæ*, and arranges them as follows:—

Subfam. 1—*Bythiniinæ*: *Bythinia*, *Nematura*, *Euchilus*, the last only fossil.

Subfam. 2—*Benedictiinæ*: *Benedictia* (Dybowski).

Subfam. 3—*Hydrobiinæ*: *Hydrobia* (Hartm., Frauenfeld), with subg. *Thermydrobia* (Paulucci); *Vitrella* (Cless.), *Belgrandia* (Bourg.), *Tryonia* (Stimps.), *Frauenfeldia* (Clessin), and *Bythinella* (Moq. Tand.).

Subfam. 4—*Fluminicolinæ*: *Lithoglyphus* (Ziegler), including *Fluminicola* (Stimps.); *Gillia* (Stimps.), *Cochliopa* (Stimps.), *Somatogyrus* (Gill), *Amnicola* (Gray).

Subfam. 5—*Emmericiinæ*: *Emmericia* (Brusina), *Nematurella* (Sandberger, only fossil), *Stalion* (Brusina), *Nystia* (Turn.), *Fossarulus* (Neum.), *Prososthenia* (Neum.).

Subfam. 6—*Pomatiopsinæ*: *Pomatiopsis* (Tryon).

He thinks that *Pyrgula*, *Baicalia*, and *Gerstfeldtia* will be better placed among the *Melaniidæ*. Mal. Bl. (2) ii. pp. 169–196.

Stenothyra woodmasoniana, Port Canning, *hungerfordiana*, Andaman Islands, *blanfordiana*, Chilka Lake, also Port Canning and Madras, spp. nn., Nevill, J. A. S. B. xlix. pt. 2, pp. 159 & 160.

Hydrobia stagnalis (L.), var., 6½ millim. long, at the mouth of the Elbe; Borcherding, Nachr. mal. Ges. 1880, p. 23.

Hydrobia vitrea, var. *quenstedti*, found alive at the entrance of the cave of Falkenstein; Fries, Württ. nat. J. H. 1880, p. 113.

Belgrandia thermalis (L.), var. n. *minuta*, Mme. Paulucci, Catalogo della sezione Italiana dell' Esposizione internazionale di Pesca in Berlino, p. 192 (German edn., p. 71), Calenzano, Tuscany, in a streamlet.

Hydrobia (*Belgrandia*) *miliacea*, sp. n., Nevill, J. A. S. B. xlix. pt. 2, p. 161, Port Canning, near Calcutta.

Bythinia victoriæ, sp. n., J. E. Tenison Woods, Tr. R. Soc. Vict. xxiv. [1878], p. 65, Geelong, Australia. Is a *Bythinella*; id. P. R. Soc. Tasm. 1878 [1879], p. 71.

Bythinella nitida, sp. n., R. M. Johnston, P. R. Soc. Tasm. 1878 [1879], p. 25, Barren Island.

Bythinella. *Bythinia unicarinata* (Woods) = *Paludestrina legrandiana* (Brazier), *Bythinia tasmanica* (Woods) = *Paludestrina wisemaniana* (Brazier), and *Bythinia ponkillensis* (Woods) = *Amnicola simoniana* (Brazier), all belong to *Bythinella*; J. E. Tenison Woods, P. R. Soc. Tasm. 1878 [1879], p. 69.

Frauenfeldia lacheineri (Charp.) var. n. *exilis*, Mme. Paulucci, Catalogo, &c., p. 192 (German edn., p. 71), Castelgoffredo, Prov. Brescia.

Lithoglyphus clessinianus, sp. n., Paulucci, *ibid.*, Milan, Verona, and Monfalcone.

Lithoglyphus neritinoides and *rufo-filosus*, spp. nn., E. A. Smith, Ann. N. H. (5) vi. p. 426, Lake Tanganyika.

Spekia, g. n., for *Lithoglyphus zonatus* (Woodw., 1850); Bourguignat, Descr. div. Esp. 1879.

Amnicola paulucciæ, sp. n. (Clessin, MS.), Mme. Paulucci, Catalogo, &c., p. 191 (German edn., p. 71), Tronto river, Central Italy.

Amnicola pesmii, sp. n., Morelet, J. de Conch. xxviii. p. 355, Subfossil at Tamerna-Djedida, in the Saharan region of Algeria.

Amnicola ? *launcestonensis*, sp. n., R. M. Johnston, P. R. Soc. Tasm. 1878 [1879] p. 24, Tasmania.

Gerstfeldia, g. n., comprising *Godlewskia* (Fisch. & Crosse, 1879) and *Trachybaicalia* (Martens, 1876), containing the following species:—*godlewskii*, *pulchella*, *turriformis*, *carino-costulata*, *wrzesniowskii*, and *carinata* (Dybowski), all from Lake Baikal. Clessin, Mal. Bl. (2) ii. pp. 187 & 196.

Paladilhia. 6 known species enumerated, and *servaini*, sp. n., Alluvial deposits of the Ebro, described by Bourguignat, Description de *Cœlestele* et *Paladilhia*, pp. 20–22.

Lartetia cornucopia, sp. n., Stefani, Bull. Soc. mal. Ital. vi. p. 83, Alluvial deposits of the Arbia, near Siena, Tuscany.

Rissoellidæ.

Jeffreysia edwardiensis, sp. n., Watson, J. L. S. xv. p. 99, Prince Edward Island, 46° S. lat., 50–150 fath.

Paludinidæ.

S. Clessin discusses the known genera; Mal. Bl. (2) ii. pp. 161, 165, & 193.

Vivipara. List of European species by J. R. Bourguignat [not seen by the Recorder].

Paludina spekii, sp. n., E. A. Smith, P. Z. S. 1880, p. 485, pl. xlviii. fig. 11, East coast of Africa, 6°–7° S. lat.

Paludina colbeaui, sp. n., Craven, P. Z. S. 1880, p. 216, pl. xxii. fig. 5, Nossi-bé, Madagascar.

Neothauma, g. n. Shell like that of *Vivipara*, but having the aperture effuse and slightly channelled at the base, and the outer lip rather deeply

yet widely sinuated in the middle. Animal and operculum unknown. *N. tanganyicense*, sp. n., Lake Tanganyika, E. A. Smith, P. Z. S. 1880, p. 349, pl. xxxi. fig. 7 [allied to *Paludina umbilicata*, Reeve].

Cleopatra letourneuxi, *lynganica*, *cameroni*, *raymondi*, *laurenti*, *mareotica*, and *lhotellerii*, spp. nn., the two latter from Egypt, Bourguignat, Descr. div. Esp. 1879.

Bythinia everardi, sp. n., Blanford, J. A. S. B. xlix. pt. 2, p. 220, Lannoli, between Bombay and Poona.

Bythinia victoriæ, sp. n., Woods; see *Bythinella* (*Rissoidæ*).

Tatea, g. n. Shell elongate, pyramidal; operculum calcareous, with vertical submarginal claw. Tentacles long; foot truncate. Type, *Bythinia huonensis*. J. E. Tenison Woods, P. R. Soc. Tasm. 1878 [1879] p. 72.

Ampullariidæ.

Ampullaria ampullacea (L.), Sumatra, radula; Schepman, in Veth's Middel-Sumatra, iv. 3, p. 12, pl. ii. fig. 7.

Lanistes farleri, sp. n., Craven, P. Z. S. 1880, p. 219, pl. xxii. fig. 7, Magila, Usambara country, E. Africa.

Meladomus letourneuxi, sp. n., Bourguignat, Descr. div. Esp. [1879].

Vermetidæ.

Vermetus gigas (Bivona). P. de Rougemont has observed at Naples that the living animal emits from its mouth a thin veil-like plaited substance, which entangles small natatory animals and is withdrawn afterwards within the mouth. Bull. Soc. Neuch. xii. pp. 94–97.

Scalariidæ.

Scalaria wellingtonensis, sp. n., Kirk, Tr. N. Z. Inst. xii. p. 307, and Ann. N. H. (5) vi. p. 15, Wellington, New Zealand.

Crossea cancellata, sp. n., J. E. Tenison Woods, P. R. Soc. Tasm. 1877 [1878], p. 122, Blackman's Bay, Tasmania.

Ianthinidæ.

Recluzia ? globosa, sp. n., E. A. Smith, J. L. S. xii. [1876] p. 551, pl. xxx. fig. 8, Gilbert Islands.

Eulimidæ.

Eulima candida, sp. n. (20 lin. long), Marrat, Varieties of *Nassa*, last page and plate, locality unknown.

Eulima marginata and *apheles*, spp. nn., J. E. Tenison Woods, P. R. Soc. Tasm. 1878 [1879], p. 40, Circular Head, Tasmania.

Pyramidellidæ.

Doliella, subg. n. of *Odostomia*. Peristome entire, shell tun-shaped,

top immersed; for *O. nitens* (Jeffr.). Monterosato, Bull. Soc. mal. Ital. vi. p. 73.

Anisocycla, subg. n. of *Odostomia*. Characterized by the rounded whorls: = *Aciculina* (Desh., 1864, *nec* H. & A. Ad., 1853). *O. ventricosa* (Forbes). Monterosato, *l. c.* p. 72.

Odostomia clara, *compta*, *polita*, and *parvula*, all from Darnley Island, Torres Straits, and *affinis*, Cape York, spp. nn., Brazier, P. Linn. Soc. N. S. W. i. [1876] pp. 259 & 260.

Syrnola pulchra, sp. n., *id. l. c.* p. 261, Darnley Island and Cape York.

Chemnitzia chrysozona, sp. n., Martens, Moll. Maur. p. 301, pl. xx. fig. 21, Mauritius.

Chemnitzia lordi, sp. n., E. A. Smith, Ann. N. H. (5) vi. p. 288, Vancouver Island.

Turbonilla darnleyensis and *confusa*, Darnley Island, Torres Straits, *eximia*, N.E. Australia, and *aplini*, New Guinea, spp. nn., Brazier, P. Linn. Soc. N. S. W. i. [1876] p. 258.

RHIPIDOGLOSSA.

Neritidæ.

Neritina fluviatilis, var. *thermalis* (Boubée), Rion river, Mingrelia, Böttger, JB. mal. Ges. vii. p. 160, pl. v. fig. 7.

Neritina hidalgoi, sp. n., Crosse, J. de Conch. xxviii. p. 320, pl. xi. fig. 2, River S. Julian, near Jativa, Eastern Spain. Very near *N. valentina* (Graells).

Neritina suavis, sp. n., Gassies, Faune conch. N. Caled. iii., New Caledonia.

Nerita costata, *polita*, and *albicilla* (L.), common on rocks, *lineata* and *atro-purpurea*, in the mangrove swamps of North-East Australia, J. E. T. Woods, P. Linn. Soc. N. S. W. v. pp. 114, 115, & 120.

Trochidæ.

Turbo cepoides, sp. n., E. A. Smith, Ann. N. H. (5) vi. p. 397, locality unknown.

Turbo cucullata [*-tus*], sp. n., J. E. Tenison Woods, P. R. Soc. Tasm. 1877 [1878] p. 121, Bass's Straits.

[*Turbo*] *Senectus squamosus* (Gray, 1847) = *laminiferus* (Reeve, 1848) = *foliaceus* (Hombr. & Jacq.), found at Port Jackson; Brazier, P. Linn. Soc. N. S. W. iv. p. 429.

Turbo (*Pomaulax*) *taylorianus*, sp. n., E. A. Smith, P. Z. S. 1880, p. 483, locality unknown.

Calcar (Montf.). P. Fischer adopts this genus in a somewhat larger sense, including in it all Trochiform shells with calcareous operculum, and subdividing it into the following subgenera :—*Bolma* (Risso), *Cookia* (Less.), *Canthorbis* (Swains.), *Guildfordia* (Gray), *Sol* (Klein), *Pachypoma* (Gray), *Lithopoma* (Gray), *Stella* (Klein), *Uvanilla* (Gray), and *Pomaulax* (Gray). He describes 42 species, of which the following may

be mentioned:—*C. semi-costatum* (Kien.) = *Trochus stellatus* (Philippi, Reeve), Bombay, and *cucullatum* (Kien.), Australia. Continuation of Kiener's "Species général," *Trochus*, pp. 3–56, pp. 35 & 40, pl. xxxii. fig. 3, & pl. xxxviii. fig. 1.

Collonia? *roseo-punctata*, sp. n., Angas, P. Z. S. 1880, p. 417, pl. xl. fig. 8, St. Vincent's Gulf, S. Australia.

Leptothyra roseo-cincta, sp. n., and *purpurata* (Desh., as *Turbo*) var. n. *tri-cingulata*, Martens, Moll. Maur. p. 294, the former pl. xx. figs. 22–25.

Liotia crassibasis, sp. n., E. A. Smith, P. Z. S. 1880, p. 484, pl. xlviii. fig. 10, locality unknown.

Liotia minima, J. E. Tenison Woods, Tr. R. Soc. Vict. xiv. [1878] p. 58, locality unknown; *L. annulata*, id. P. R. Soc. Tasm. 1877 [1878] p. 121, Blackman's Bay, Tasmania: spp. nn.

Norrisia, new name for *Trochiscus* (Sow., 1838), pre-occupied in *Arachnida* by Heyden, 1826, and in *Gastropoda* by Held, 1837; Bayle, J. de Conch. xxviii. p. 241.

Trochus. P. Fischer has completed the monograph of this genus in Kiener's "Species général." He describes 253 species, and divides them into 43 groups (pp. 414–423), most of them already named by Gray, H. & A. Adams, &c., and adds 70 coloured plates (Nos. xliv., xlvii.–xlix., liii., liv., lvii.–cxx.) to those published without descriptions about thirty years ago. Only the new species or those not before figured will be mentioned *infrà*, but the attention of conchologists may be called to the many rectifications in synonymy contained in this valuable monograph.

Trochus (*Tectus*) *fabrii* (Montrouz.); Fischer, *l. c.* p. 384, pl. cxvi. fig. 1, Loyalty Islands.

Trochus (*Polyodonta*) *creniferus* (Kien.); *id. l. c.* p. 109, pl. xxxiv. fig. 3, Ceylon and New Caledonia.

Belangeria, new group of *Trochus*, for *T. scabrosus* (Philippi), from the Indian Sea; *id. l. c.* p. 415, pl. civ. fig. 2, not characterized.

Trochus (*Omphalius*) *ligulatus* (Menke); *id. l. c.* p. 382, pl. cxv. fig. 5, Mazatlan.

Trochus (*Chlorostoma*) *montereyi* (Kien.), *striatulatus* (Kien.), *funebralis* (A. Adams), and *rugosus* (A. Adams); Fischer, *l. c.* pp. 104, 106, 173, & 231, pl. xxxiii. figs. 1 & 3, pl. lvii. fig. 3, & pl. lxxv. fig. 3, all from the North-west coast of America.

Cœlotrochus, subg. n., for *Trochus tiaratus* (Quoy & Gaim.), New Zealand; Fischer, *l. c.* p. 417, pl. xxii. fig. 2.

Eurytrochus, subg. n. of *Trochus*, for *T. coxi* (A. Ad.), *danieli* (Crosse), *lehmanni* (Menke, as *Turbo*), and *reevii* (Montrouz.), Australia and New Caledonia, not characterized; *id. l. c.* p. 417, pl. cii. figs. 1 & 2, pl. cv. fig. 3, & pl. cxi. fig. 3.

Trochus (*Monilea*) *lentiginosus* (A. Adams), Australia, and *lifuanus* (Fischer, 1878), Loyalty Islands; *id. l. c.* pp. 317 & 388, pl. c. fig. 4, & pl. cxvi. fig. 4.

Solanderia, subg. n. of *Trochus*, for *T. nucleus* (Philippi), New Caledonia, not characterized; *id. l. c.* p. 417, pl. lxxxvi. fig. 2. [Name pre-occupied in the *Cœlenterata* (*Alcyonaria*).]

Trochus (*Gibbula*) *spratti* (Forbes), Ægean Sea, *picturatus* (A. Adams),

New South Wales, *strangii* (A. Ad.), Port Jackson, *smaltatus* (Fischer, 1878), South Australia, and *scamnatus* (Fischer, 1878), Oceania; *id. l. c.* pp. 148, 273, 329, 381, & 394, pl. xlix. fig. 3, pl. xc. fig. 2, pl. cii. fig. 3, pl. cxv. fig. 4, & pl. cxvii. fig. 4.

Trochus (*Gibbula*) *leaensis*, sp. n., Watson, J. L. S. xv. p. 90, Lea Point, Cape Town.

Trochus (*Gibbula*) *supra-granosus*, sp. n., E. A. Smith, J. L. S. xii. [1876] p. 558, pl. xxx. fig. 15, Solomon Islands.

Trochus (*Forskalea*) *fanuloides* (Fischer), 1874, locality unknown; Fischer, *l. c.* p. 333, pl. ciii. fig. 3.

Trochus (*Osilinus*) *citrinus* (Gmelin) = *colubrinus* (Gould) = *sagittiferus* (Hidalgo, *nec* Lam.), Cape Verde Islands, Madeira, Morocco, Spain; *id. l. c.* p. 262, pl. lxxxviii. fig. 1.

Calliotrochus, subg. n. of *Trochus*, for *T. phasianellus* (Desh.), Indian Seas; *id. l. c.* p. 418.

Trochus (*Zizyphinus*) *sosia*, new name for *pyramis* (Reeve, *nec* Gmelin), supposed to be Australian, afterwards recognized to be identical with *exasperatus* (Gmelin), from the Mediterranean; *id. l. c.* p. 403, pl. cxix. fig. 3.

Trochus (*Zizyphinus*) *coppingeri*, sp. n., E. A. Smith, Ann. N. H. (5) vi. p. 320, off the mouth of the Rio de la Plata.

Trochus (*Zizyphinus*) *arruensis*, sp. n., Watson, J. L. S. xv. p. 91, Aru Islands.

Lischkeia [*-kai*], subg, n. for *Trochus moniliferus* (Lam.) = *alvinæ* (Lischke), Japan; Fischer, *l. c.* p. 419, pl. xvi. fig. 2.

Odontotrochus, subg. n. for *Trochus chlorostomus* (Menke), Australia; *id. l. c.* p. 419, pl. xcii. fig. 2.

Trochus (*Thalotia*) *serpentinus* (Quoy, Kiener), Guam Island, *id. l. c.* p. 131, pl. xlv. fig. 3; *flindersi*, *freycineti*, and *baudini* (Fischer, 1878), South Australia, *id. l. c.* pp. 354–356, pl. cx. figs. 3–5.

Thalotia mariæ, Hobson's Bay, *tesselata* [*-ellata*], locality unknown, and *dubia*, Clark's Island, J. E. Tenison Woods, Tr. R. Soc. Vict. xiv. [1878] pp. 58 & 59.

Trochus (*Elenchus*) *nitens* (Kien.) = *lepidus* (Koch), Kangaroo Island, South Australia; Fischer, *l. c.* p. 132, pl. xlv. fig. 4.

Trochus (*Cantharidus*) *fournieri* (Crosse) and *gilberti* (Mont.), New Caledonia, Fischer, *l. c.* pp. 400 & 401, pl. cix. figs. 1 & 2; *erogatus*, new name for *indistinctus* (Kien., Philippi, *nec* Wood), Australia ?, and *lesueuri*, new name for *elegans* (Kien., *nec* Gmelin) = *lehmanni* (Menke, Philippi, *nec* Kien.), Australia, *id. l. c.* pp. 128 & 129, pl. xlv. figs. 1 & 2.

Trochus (*Cantharidus*) *huttoni*, sp. n., E. A. Smith, J. L. S. xii. [1876], p. 548, pl. xxx. fig. 20, New Zealand.

Priotrochus, subg. n. for *T. goudoti* (Fischer, 1878), Madagascar, and *obscurus* (Wood), Eastern Africa, not characterized, Fischer, *l. c.* p. 420, pl. cxiii. fig. 3, & pl. lxix. fig. 2 [pillar lip finely denticulated].

Aphanotrochus, subg. n., like *Gibbula*, but pillar lip denticulated. *T.* (*A.*) *obscurus* (Wood) and *chrysolæmus*, sp. n., Martens, Moll. Maur. p. 296, the latter pl. xx. fig. 20, Mauritius [= *Priotrochus*, Fischer, of the same year].

Trochus (*Trochocochlea*) *multicarinatus* (Chenu) = *constrictus* (Q. & G., Philippi, *nec* Lam.), South Australia, and *extenuatus*, new name for *porcatus* (A. Adams, *nec* Philippi), Port Jackson, Fischer, *l. c.* pp. 184 & 330, pl. lx. fig. 3, & pl. ciii. fig. 1.

Trochus (*Labio*) *vermiculatus* (Fischer, 1874), Socotra, and *zeus* (Fischer, 1874), Australia ?, Fischer, *l. c.* pp. 228 & 334, pl. lxxiv. fig. 3, & pl. civ. fig. 1.

Trochus (*Euchelus*) *scaber* (Chemnitz, ? Philippi), and *stellio* (Fischer, 1878), locality of both unknown, Fischer, *l. c.* pp. 288 & 290, pl. xciii. figs. 2 & 3 ; *scabriusculus* (A. Adams), New South Wales, *id. l. c.* p. 374, pl. cxiv. fig. 2.

Trochus (*Euchelus*) *alveolatus* (A. Ad., as *Monodonta*), E. A. Smith, J. L. S. xii. [1876], p. 559, Solomon and Philippine Islands.

Trochus (*Clanculus*) *stigmatarius* (A. Ad.), Philippine and Marianne Islands, *clangulus* and *clanguloides* (Wood), New South Wales, *homalomphalus* and *gibbosus* (A. Adams), Australia, *gemmatus* (Gould), Sandwich Islands, *flosculus*, sp. n., Seychelle Islands, *unedo* (A. Ad.), New Caledonia, Fischer, *l. c.* pp. 217, 232, 235, 237, 241, 300, 323, & 369, pl. lxxi. fig. 4, pl. lxxxi. figs. 1–3, pl. lxxxii. fig. 3, pl. xcvi. fig. 1, pl. ci. fig. 2, & pl. cxiii. fig. 2.

Clanculus bicarinatus, sp. n., Angas, P. Z. S. 1880, p. 419, pl. xl. fig. 4, Port Darwin, Torres Straits.

Trochus (*Clanculus*) *bathyrhaphe*, sp. n., E. A. Smith, J. L. S. xii. [1876], p. 557, pl. xxx. fig. 17, Solomon Islands.

Liotrochus, subg. n. for *Trochus callosus* (Koch), Lifu Island, not characterized, Fischer, *l. c.* pp. 381 & 423, pl. cxv. fig. 3 ; *Rotella montrouzieri* (Souverbie) is a variety of it, p. 380.

Trochus (*Solariella*) *philippensis*, Port Philip, South Australia, 38 faths., *lamprus*, Fiji, 12 faths., and *albugo*, Port Jackson, 2–10 faths., Watson, J. L. S. xv. pp. 92–94, spp. nn.

Trochus (*Minolia*) *pudibundus* (Fischer, 1878), New Caledonia, *prodictus*, new name for *angulatus* (A. Ad., *nec* Sow., foss.), and *dianthus*, new name for *bellulus* (A. Ad., *nec* Dunker), New South Wales, Fischer, *l. c.* pp. 376, 395 & 396, pl. cxiv. fig. 3, pl. cxviii. figs. 1 & 2.

Minolia rectiliginea [*vitiliginea*] (Menke), var. ?, J. E. Tenison Woods, Tr. R. Soc. Vict. xiv. [1878], p. 59, Hobson's Bay, Australia.

Trochus (*Margarita*) *vancouverensis*, sp. n., E. A. Smith, Ann. N. H. (5) vi. p. 288, Vancouver Island.

Adeorbis tenuilirata[*-us*], sp. n., *id.* J. L. S. xii. [1876], p. 557, pl. xxx. fig. 19, Solomon Islands.

Adeorbis vincentiana[*-us*], sp. n., Angas, P. Z. S. 1880, p. 417, pl. xl. fig. 9, St. Vincent's Gulf, S. Australia.

Haliotididæ.

Pleurotomaria. The slit in the aperture serves probably for the rejection of the fæcal products ; Dall, Bull. Soc. Washingt. iii. p. 76.

Pleurotomaria adansoniana (Crosse & Fisch.). A fresh specimen, in-

habited by a hermit crab, found at Guadeloupe, in a depth of 150 brasses; Crosse, J. de Conch. xxviii. p. 284.

Pleurotomaria beyrichi (Hilgendorf), Martens, Conch. Mitth. p. 53, pl. vii., Japan.

Pleurotomaria rumphi (Schepman, 1879), abstract of its description, by Crosse, J. de Conch. xxviii. p. 204.

Schismope morleti, sp. n., Crosse, J. de Conch. xxviii. p. 144, pl. iv. fig. 3, New Caledonia.

Haliotis huttoni, sp. n., Filhol, C. R. xci. p. 1094, Campbell Island.

CYCLOBRANCHIA.

Acmæidæ.

Acmæa corticata, sp. n., Hutton, Man. N. Zeal. Moll. p. 89, New Zealand.

Acmæa marmorata (Woods), most developed in North-east Australia, much smaller in South Australia and Tasmania, and *septiformis* (Quoy & G.), very constant in size and colour from North-eastern Australia to Tasmania; J. E. T. Woods, P. Linn. Soc. N. S. W. v. pp. 110 & 111.

Patellidæ.

Patella campbelli, sp. n., Filhol, C. R. xci. p. 1095, Campbell Island.

Patella tigrina (Gmelin)?, from Trinity Bay, N.E. Australia, J. E. T. Woods, P. Linn. Soc. N. S. W. v. p. 112.

Scutellina cinnamomea (Gould, as *Patella*) = *ferruginea* (A. Adams); Brazier, P. Linn. Soc. N. S. W. iv. p. 389.

Chitonidæ.

Some critical remarks upon the modern genera of this family by J. G. Jeffreys, Ann. N. H. (5) vi. pp. 34 & 35.

Chiton scabridus, sp. n., *id.* Ann. N. H. (5) vi. p. 33, Torbay and Jersey (near *C. cancellatus*).

Lepidopleurus campbelli, sp. n., Filhol, C. R. xci. p. 1095, Campbell Island.

Tonicia gryei, sp. n., *id. ibid.*, Campbell Island.

Plaxifora [*-phora*] *campbelli*, sp. n., allied to *biramosa* (Q. & G.), *id. ibid.*, Campbell Island.

TECTIBRANCHIA.

Tornatellidæ.

Ringicula maricі, Nossi-bé, Madagascar, *salleana* and *passieri*, Fosse du Cap Breton, *caledonica* and *noumeensis*, New Caledonia, *œhlertiæ*, China and Japan, 30–34 fath., *pulchella* (Jeffreys), W. of Ireland, 1215 fath., and between Falmouth and Gibraltar, 795 fath., *terquemi*, Smyrna,

20 metres, spp. nn., and new localities for several known species; Morlet, J. de Conch. xviii. pp. 151–160, most of them figured, pl. v. figs. 1 & 3–7.

Bullidæ.

An historical note on the knowledge of this family and comparative anatomical description of several genera (*infrà*) by A. Vayssière, Ann. Sci. Nat. (6) ix. Art. 1, 123 pp. 12 pls. Abstract of the anatomical description in J. R. Micr. Soc. iii. pp. 766–770.

Cylichna zealandica, sp. n., Kirk, Tr. N. Z. Inst. xii. p. 307, and Ann. N. H. (5) vi. p. 15, Waikanao, New Zealand.

Bulla (*Haminea*) *hydatis* (L.). Comparative anatomical description by Vayssière, *l. c.* pp. 77–113, pls. xi. & xii. figs. 102–119. Eyes well developed.

Scaphander lignarius (L.). Comparative anatomical description ; *id. l. c.* pp. 76–113, pls. x. & xi. figs. 85–102. Eyes atrophied.

Philine aperta (L.). Comparative anatomical description: *id. l. c.* pp. 75–113, pls. viii.–x. figs. 70–84. Eyes atrophied.

Gasteropteron meckelii (Kosse). Full anatomical description ; it has a very small internal shell, 4-5 tenths of a millimetre, nautilus-shaped, of 1½ whorls (pl. i. fig. 3), containing a part of the liver, and continued into a membranaceous plate which is situated in a cavity within the mantle ; eyes imbedded within the skin ; some anatomical particulars of more general interest are mentioned in the general part. *Id. l. c.* pp. 14–72, pl. i. fig. 6.

Doridium meckelii (Delle Chiaje). Comparative anatomical description; *id. l. c.* pp. 73–113, pl. vii. figs. 56–69; internal shell forming scarcely one circumvolution and continued into a membranaceous plate, fig. 58 ; eyes imbedded within the skin, p. 111.

Doridium cyaneum (Martens, 1879) var. n. *vittatum*, and *D. guttatum*, sp. n., Martens, Moll. Maur. pp. 305 & 306, Mauritius, where, as in the Mediterranean, a striped and a spotted species (?) occur in the same locality.

Chelidonura hirundinina (Q. & G.). Figures of living animal and variety by Möbius, in Martens's Moll. Maur. p. 305, pl. xxi. figs. 5 & 6, Mauritius.

Aplysiidæ.

Aplysia dactylomela (Rang). Specimen from Bermuda described, and radula and armature of the stomach figured; Dobson, J. L. S. xv. pp. 159 & 160, woodcuts.

Aplysia nigro-cincta, sp. n., and *tigrina* (Rang), both from Mauritius, described, Martens, Moll. Maur. p. 307, the first pl. xxi. fig. 3.

Aplysia tryoni, sp. n., F. H. Meinertzhagen, Tr. N. Z. Inst. xii. pp. 270 & 271, Waimarama, Hawke's Bay, New Zealand.

Notarchus indicus (Schweigger). Description and figures from living specimen; Möbius, in Martens's Moll. Maur. p. 307, pl. xxi. fig. 4.

Aclesia cirrifera and *striata* (Q. & G.), from Mauritius ; *id. l. c.* p. 308.

Pleurobranchidæ.

Pleurobranchus monterosati, sp. n., *aurantiacus* (Risso) = *elongatus* (Cantraine), *plumula* (Montagu) = *stellatus* (Risso) = *ocellatus* (Delle Chiaje), *testudinarius* (Cantr.), and *membranaceus* (Montagu) = *dehaani* (Cantr.), all observed at Marseilles, their shells described and figured, that of the largest species (*testudinarius*) is the smallest of all; Vayssière, J. de Conch. xxviii. pp. 205–216, pl. vii. figs. 1–5.

Pleurobranchus scutatus, sp. n., Mauritius, and *peroni* (Cuvier) described; Martens, Moll. Maur. p. 309, the first pl. xxi. fig. 8. It is remarkable that the species of smaller size contain comparatively larger shells in this genus.

NUDIBRANCHIA.

Some general observations on the *Nudibranchia* and their representations by glass models, by R. Blaschke, SB. Ges. Isis, 1880, pp. 23–26.

Pleurophyllidiidæ.

Pleurophyllidia comta, sp. n., Bergh, Verh. z.-b. Wien, xxx. pp. 173–176, pl. ii. fig. 12, pl. iii. figs. 7–12, pl. iv. figs. 1–3. Anatomically described.

Linguella fallax, sp. n., *id. l. c.* pp. 177–180, pl. ii. figs. 13–15, pl. iii. fig. 13, pl. iv. figs. 4–7, Enosima, Japan.

Doridiæ.

Glossodoris 2 spp., *Actinocyclus* 3, *Doris* (s. str.) 22, *Doriprismatica* 13, *Ægires* 1, *Polycera* 1, *Pelagella* 1, *Idalia* 5, known from the Mediterranean, enumerated with synonymy and precise localities, but without descriptions, by N. Tiberi, Bull. Soc. mal. Ital. vi. pp. 195–217. [The author is not aware of the important papers published by R. Bergh, and wrongly places *Doriopsis limbata* in *Actinocyclus*, &c.]

Archidoris montereyensis (Coop.). Anatomical figures by Bergh, P. Ac. Philad. 1880, pl. xvi. figs. 10 & 11.

Peltodoris, g. n. "Corpus subdepressum, circumferentia ovali, subrigidum, suprà minutissime granulatum; tentacula digitiformia; apertura branchialis rotundata; branchia paucifoliata, foliis tripinnatis; armatura labialis nulla; lingua rhachide nuda, pleuris multidentatis, dentibus hamatis; prostata magna; penis et vagina inermis." *P. atro-maculata*, sp. n., Naples; *Doris crucis* (Örsted) belongs also to this genus; Bergh, MT. zool. Stat. Neap. ii. pp. 222–232, pl. xi., abstract in J. R. Micr. Soc. (2) i. p. 28.

Diaulula sandiegensis (Coop., as *Doris*), anatomical description by R. Bergh, P. Ac. Philad. 1880, pp. 40–46.

Cadlina claræ, sp. n., = ? *Doris pellucida* (Risso), Gulf of Naples, externally and anatomically described by H. v. Ihering, Mal. Bl. (2) ii. pp. 108–110, pl. i. fig. 1, & pl. iii. figs. 20–22.

Jorunna johnstoni (Ald. & Hanc., as *Doris*) = ? *tomentosa* (Cuv.), anatomically described; Bergh, *l. c.* pp. 46–52, pl. ix. figs. 1–11.

Aciodoris lutescens (Bergh, 1879), Nazam Bay, N. Pacific, anatomically described; *id. l. c.* pp. 52–58.

Lamellidoris. 20 species enumerated, *bilamellata* (L.) var. n. *pacifica*, Behring Sea, *L. varians* (Bgh.) with var. n. *hystricina*, Kyska Island, N. Pacific, and *muricata* (Müll.), N. Atlantic, anatomically described; *id. l. c.* pp. 58–75, pl. ix. fig. 18, pl. xi. figs. 3–14, & pl. xiii. fig. 1.

Adalaria (Bgh., 1879). 5 species enumerated, *proxima* (Ald. & Hanc.), N. Atlantic, *pacifica* and *virescens*, spp. nn., both from Unalaska, *albopapillosa* (Dall, 1872, as *Alderia*), Sitkha, and *loveni* (Ald. & Hanc., as *Doris*) = *D. muricata*, Abilgaard, Lovèn, & Sars, N. Atlantic, anatomically described; *id. l. c.* pp. 75–88, pl. ix. figs. 12–15, pl. x. figs. 1–11, & pl. xi. fig. 15.

Acanthodoris. 8 species enumerated, *pilosa* (O. F. Müll.) with varr. nn. *albescens* and *purpurea* from the Aleutian Islands, and *A. cærulescens*, sp. n., Behring Sea, anatomically described; *id. l. c.* pp. 88–105, pl. x. figs. 12–15, pl. xi. figs. 1 & 2, pl. xii. figs. 1–16, pl. xiii. figs. 2–7, pl. xiv. fig. 16.

Chromodoris. The Mediterranean species are examined, *C. tricolor* (Cantr., 1841) = *cærulea* (Risso, 1826), *gracilis* (Rapp, Chiaje), *C. messinensis*, sp. n., *C. villafranca* (Risso, 1818) = *tenera* (Costa, 1840) = *pulcherrima* (Cantr., 1841) = *scacchii* (Chiaje) = *passinii* (Verany), *C. elegans* (Cantr., 1835) = *picta* (Schultz, Philippi) = *schultziana* (Chiaje), *C. albescens* (Schultz), *luteo-rosea* (Rapp) = *iheringi* (Bergh), *elegantula* (Philippi), and *krohni* (Verany), described by H. v. Ihering, Mal. Bl. (2) ii. pp. 61–94, pl. i. figs. 2–7 living animals, pl. ii. figs. 1–14 parts of the radula. *C. dalli* and *californiensis* (Bergh), anatomical figures by Bergh, *l. c.* pl. xiii. figs. 8–14, pl. xiv. figs. 1–15.

Aphelodoris antillensis (Bergh, 1879). Anatomical figures by Bergh, *l. c.* pl. xvi. figs. 12–18.

Goniodoris (Forbes) = *Pelagella* (Gray): generic description, list of 8 species, *G. nodosa* (Mont.), *castanea* (Ald. & Hanc.) = *paretii* (Verany), Atlantic and Mediterranean, externally and anatomically described; Bergh, Mal. Bl. (2) ii. pp. 113–135, anatomical figures pl. iv.

Halgerda, g. n. "Corpus subdepressum, subrigidum, suprà læve; apertura branchialis ovata, foliis tripinnatis paucis; tentacula nulla; podarium sat angustum; armatura labialis nulla; lingua rhachide nulla, pleuris multidentatis, dentibus hamatis serrulatis; prostata magna; penis inermis." *H. formosa*, sp. n., perhaps = *Doris venosa* (Q. & G.), Reunion Island, Bergh, Verh. z.-b. Wien, xxx. pp. 190–195, pl. iv. figs. 15–20, pl. v. figs. 10–12.

Doriopsididæ.

Doriopsis limbata (Cuv.), and *grandiflora* (Rapp) = *guttata* (Risso), distinct from it. Both anatomically described by H. v. Ihering, Mal. Bl. (2) ii. pp. 94–107, anatomical figures of both, pl. iii. figs. 15–19; also by Bergh, JB. mal. Ges. vii. pp. 297–316, pl. x. figs. 1–8, & pl. i. figs. 1 & 2.

Doris setigera (Rapp) is probably a *grandiflora* bearing bristles of *Annelides* (?), implanted into its skin ; *id. l. c.* p. 298, footnote.

Doriopsis nigra (Stimps.) var. n. *cærulea*, Bergh, Verh. z.-b. Wien, xxx. pp. 181–184, anatomical description, Japan.

Doriopsilla, g. n. Distinct from *Doriopsis* by its somewhat rigid and granulated mantle. *D. areolata*, sp. n., Bergh, JB. mal. Ges. vii. pp. 316–326, pl. ii. figs. 3–11, anatomical description, Civita Vecchia.

Polyceridæ.

Polycera. 11 species enumerated, *P. pallida*, sp. n., Northern Pacific, anatomically described by Bergh, P. Ac. Philad. 1880, pp. 105–111, pl. xv. fig. 14, pl. xvi. figs. 1-9, 19, & 21.

Euplocamus croceus (Phil.), genital organs figured ; *id.* Verh. z.-b. Wien, xxx. pl. x. figs. 1 & 2.

Euplocamus japonicus, sp. n., *id. op. cit.* xxix.[1879] pp. 636–639, pl. xiii. fig. 17, pl. xiv. figs. 3–10, Japan.

Plocamophorus tilesii (Bergh), Japan. Genital organs figured ; Bergh, Verh. z.-b. Wien, xxx. pl. x. figs. 3–5.

Ancula cristata (Ald.), *id. l. c.* xxx. p. 629, pl. x. figs. 6–9, pl. xi. figs. 3–12, full anatomical description : specimens from the Baltic Sea, even from the western shore of the island Föhr, have no spicula in the skin. *Ancula sulphurea* (Stimps.) from North America is probably only a local variety.

Drepania (Lafont, 1874) *græffii*, sp. n., *id. l. c.* p. 636, pl. x. figs. 10–15, Trieste.

Triopa (Johnst.). Generic characters discussed, 5 known species enumerated, and *T. clavigera* (Müll.) anatomically described; *id. l. c.* pp. 640–645, pl. xiii. figs. 9–11, pl. xiv. figs. 1–3; anatomical figures by the same also in P. Ac. Philad. 1880, pl. xiii. figs. 15–20, pl. xiv. figs. 21 & 22, pl. xv. figs. 12 & 13.

Triopha, g. n. Distinguished from *Triopa* by nodose or shortly ramose dorsal appendages and ear-shaped lower tentacles; 5 tripinnate branchial plumes ; mouth with two strong horny plates; 3–4 lateral and 10–11 external (uncinal) plates on each side in the radula. *T. modesta*, sp. n., N. Pacific. Bergh, P. Ac. Philad. 1880, pp. 112–117, anatomical figures, pl. xiv. figs. 17–20, & pl. xv. figs. 1–11.

Issa, g. n. Frontal and dorsal appendages less developed than in *Triopa*, mouth with triangular jaw, lingual armature consisting of a median (rhachidian) row of plates, two strong lateral and seven external (marginal) plates. *I. lacera* (Müll., as *Doris*), North Sea. Bergh, Verh. z.-b. Wien, xxx. pp. 545–649, pl. xiii. figs. 12–15, pl. xiv. figs. 11 & 12. *Colga*, g. n., *id.* Nudibr. N. Pacif. Oc. ii. (1880) p. 261, is the same genus but the name is pre-occupied.

Ægires punctilucens (Orb.), Bergh, Verh. z.-b. Wien, xxx. pp. 651–655, pl. x. figs. 16–19, pl. xi. figs. 14–19, pl. xii. figs. 1–4, pl. xiii. fig. 1, North, Sea, and *Æ. leuckarti* (Verany), *id. l. c.* pp. 655–658, pl. xii. fig. 15, pl. xiii. figs. 2–8, Mediterranean, both anatomically described.

Nembrotha kubariana (Bergh), Pelew Islands, Pacific, *id. l. c.* pp. 659-663, pl. xiv. figs. 13–16, pl. xv. figs. 1–10, anatomical description.

Trevelyana, Kelaart. The generic characters reviewed, 10 known species enumerated, and *inornata*, sp. n., Nagasaki, anatomically described; *id. l. c.* pp. 185–190, pl. iii. figs. 14–17, pl. iv. figs. 8–14, pl. v. figs. 1–9.

Tritoniidæ.

Scyllæa (L.) New external and anatomical description, enumeration of 7 known species and *S. bicolor*, sp. n., from Enosima, Japan, anatomically described; Bergh, *l. c.* pp. 166–172, pl. i. figs. 12–17, pl. iii. figs. 3–6.

Tethys fimbriata [*fimbria*, Linn.]. Notes on living specimens; R. Hartmann, SB. nat. Fr. 1880, p. 9.

Melibe (Rang, 1829) = *Chiorœa* (Gould). Head large, hood-like, front edge cirrated; jaw strong, toothed; no radula: stomach provided with strong lamellæ; foot narrow; somewhat similar to *Tethys*. 7 known species enumerated, and *M. vexillifera*, sp. n., from Enosima, Japan, anatomically described; Bergh, *l. c.* pp. 160–165, pl. ii. figs. 1–11, pl. iii. figs. 1 & 2.

Dendronotidæ.

Dendronotus robustus (Verrill) = *velifer* (Sars); Verrill, P. U. S. Nat. Mus., Nov. 1879.

Æolidiæ.

Rizzolia, g. n. Near *Cratena* and *Facelina* by the dorsal appendages being united on low pedicels, and by the simple, non-perfoliated upper tentacula; armature of the mouth as in *Facelina*, radula uniserial, each plate crescent-shaped, with 6–10 cuspids on either side; penis unarmed. Type, *R. peregrina* (Gmelin, as *Doris*), Naples. Trinchese, Rend. Acc. Bologn. 1877, pp. 1–6; full anatomical description by the same, Mem. Acc. Bologn. (4) i. p. 767, with 3 pls., living animal magnified and anatomical particulars. Some additional notes by Bergh, Verh. z.-b. Wien, xx. p. 156.

Rizzolia modesta, sp. n., Bergh, Verh. z.-b. Wien, xxx. pp. 156–160, pl. i. figs. 1–11, anatomical description, Enosima, Japan.

TELOBRANCHIA.

Neomenia gorgonophilus [*? gorgoniophila*], sp. n. Note on its habits and anatomy, by Kowalewsky, Zool. Anz. iii. pp. 190 & 191. The animal creeps somewhat like *Nemertes*, it leaves the water and advances on a dry surface, until it dies by exsiccation; when stopped by an obstacle, it creeps backwards. Abstract in J. R. Micr. Soc. iii. p. 932.

Proneomenia, g. n. Body cylindric (curved when alcoholized); calcareous spicula of the epidermis enveloped by a very thick cuticle. A small radula, and distinct salivary glands. A gland near the vent, at the hinder

end of the animal, is considered to be the organ of Bojanus. The lateral glands described by Tullberg are probably oviducts. The glands on both sides of the vent seem to be analogous to a byssal gland. *P. sluiteri*, sp. n., 105 & 148 millim. long, Sea of Barents, Novaja Zemlya, Hubrecht, Zool. Anz. iii. pp. 589 & 590. [Abstract in Arch. Z. expér. ix. 1881, p. 15, and J. R. Micr. Soc. (2) i. p. 28.]

PULMONATA.

Very valuable special observations upon the anatomy of many European and foreign species, and materials for a natural or anatomical classification of them, with some historical and critical notes on the work done by A. Schmidt and Binney, are given by C. SEMPER, in Reis. Philippin. Landmollusken Heft 5, pp. 225–250.

AGNATHA.

Testacella stabilii, sp. n., Pini, Atti Soc. Ital. xxi. 1879, p. 614, Udine, Friuli.

Testacella williamsiana, sp. n, Nevill, P. Z. S. 1881, p. 101, pl. xiii. fig. 1, Caves of Mentone, diluvial deposits.

Daudebardia heydeni (Böttg.), *hassiaca* (Clessin), and *sardoa* (Issel), figured by Kobelt, Iconogr. vii. pp. 28 & 29, pl. cxci. figs. 1937–1939.

Daudebardia isseliana, sp. n., Nevill, *l. c.* p. 102, pl. xiii. fig. 2, Caves of Mentone, diluvial deposits.

Daudebardia sieversi and *pawlenkoi*, spp. nn., Böttger, JB. mal. Ges. vii. pp. 112 & 113, pl. iv. figs. 1 & 3, Suram and Abastuman, Transcaucasia.

Glandina decussata (Desh.), variety from Texas; Wetherby, J. Cincinn. Soc. iii. p. 38.

Glandina pethionis and *denticulata*, spp. nn., Weinland, JB. mal. Ges. vii. pp. 355 & 356, Hayti.

Streptaxis craveni, between Mombassa and river Dana, *gigas* and *mozambicensis*, both between Lake Nyassa and East coast, spp. nn., E. A. Smith, Ann. N. H. (5) vi. p. 429.

[*Streptaxis*] *Helix usambarica*, sp. n., Craven, P. Z. S. 1880, p. 216, pl. xxii. fig. 6, Usambara Hills, E. Africa.

Streptaxis compressus, sp. n., Sivagiri Mountains, S. India, *personatus*, Cumbum, *concinnus*, Balarangam Mountains, near Mysore, and *pronus*, Tinnevelly, spp. nn., all in Southern India; Blanford, J. A. S. B. xlix. pt. 2, pp. 201–204, pl. ii. figs. 10–13.

Ennea intermedia (Morelet), var. ?, Kobelt, JB. mal. Ges. vii. p. 333 pl. viii. figs. 4–7, Madagascar.

[*Ennea*] *Pupa cafœicola*, sp. n., Craven, *l. c.* p. 215, pl. xxii. fig. 10, Nossi-bé, Madagascar.

[*Ennea*] *Pupa usambarica*, sp. n., *id. l. c.* p. 218, pl. xxii. fig. 2, Usambara country.

Ennea lata and *ujijiensis*, spp. nn., E. A. Smith, P. Z. S. 1880, p. 347,

pl. xxxi. figs. 4 & 5, Ujiji, Central Africa. [The former belongs to the section *Edentulina*, the latter to *Enneastrum*.]

Ennea crassilabris and *infans*, p. 616, pl. lvii. figs. 5 & 6, Leydenburg, Transvaal, *natalensis*, p. 619, pl. lvii. fig. 7, Durham Harbour, Port Natal, Craven, P. Z. S. 1880, spp. nn.

Ennea macrodon, Nilgiri Mountains, *subcostulata*, Shevrai Mountains, *exilis*, Balarangam Mountains, *stenostoma* (Beddome, MS.), Karnul, *beddomii*, Sivagiri Mountains, and *canarica* (Beddome, MS.), South Canara, spp. nn., all in Southern India; Blanford, J. A. S. B. xlix. pt. 2, pp. 205–210, the 4 former pl. ii. figs. 14–17.

Ennea bicolor (Hutt.), radula and genital organs described, living animal figured, by Semper, Reis. Philippin. Landmoll. p. 250, pl. viii. fig. 14.

Gibbulina (Beck), including *Gibbus* (Montf.), *Gonidomus* and *Gonospira* (Swains). 36 Mascarene species enumerated, with note on their natural arrangement; Martens, Moll. Maur. pp. 200–204.

Nevillia, subg. n. of *Gibbulina*: whorls narrow, with strong perpendicular ribs; for *G. clavulata* (Lam.), *modesta* (H. Ad.), and *uvula* (Desh.); *id. l. c.* pp. 204 & 205.

[*Rhytida*] *Patula gradata* (Gould), *radicalis* (Mouss.), and *vicaria* (Mouss.), from the Society Islands, also belong, from their jaws and radula, to the *Testacellidæ* or *Agnatha*; Semper, Reis. Philippin. Landmoll. v. p. 249.

Oxygnatha.

Spinning of *Limax* observed, by Bergh, CB. Ver. Riga, xxiii. p. 172.

Limax maximus (L.), albino variety, P. Fischer, J. de Conch. xxviii. p. 299; *L. agrestis* (L), var. n. *xanthosoma*, Dép. Puy de Dôme, *id. l. c.* p. 294.

Limax agrestis (L.), injurious to agriculture in Dorpat; Mühlen, SB. Ges. Dorp. v. [1879–80], p. 119.

Limax subalpinus, sp. n., and *callichrous* (Bourg.), *corsicus* (Moq. Tand.), varr. nn. *gestr*[*o*]*i* and *isseli*, *L. dacampi* (Menegh.), numerous varieties of colour, *L. cinereus* (Müll.) and *cinereo-niger* (Wolf), *L. ater* (Razoumowsky) = *engadinensis* (Heynem.), = *cinereo-niger*, var. *albipes* (Stabile), *L. agrestis* (L.) and *brunneus* (Drap.), all observed in Piedmont, described and figured from living specimens, with additional figures of the internal shell, the jaw and genital organs, by M. Lessona, Atti Acc. Rom. (3) vii. Mem. Sci. fis. pp. 330–337, pls. i.–iii.

Limax brandti, sp. n., Martens, Mél. Biol. x. p. 380, Borschom, Transcaucasia. *L.* (*Krynickillus*) *dymczeviczii* (Kaleniczenko), *id. l. c.* p. 381, Russian Armenia; *L. keyserlingi*, sp. n., *id. l. c.* p. 396, Astrabad.

Limax (*Krynickillus*) *mentonicus*, sp. n., and *nicensis* (Bourg.), Mentone and Grimaldi, Alpes Maritimes, Nevill, P. Z. S. 1880, p. 103.

Parmacella valenciennesi (Gervais): the living animal described and figured, by H. Crosse, J. de Conch. xxviii. pp. 329–334, pl. ix. figs. 1 & 2, egg fig. 3. List of the known species of this genus, and their geographical distribution; *id. l. c.* pp. 335–344 [its occurrence in Turkistan is not mentioned].

Parmacella velitaris, sp. n., Martens, Mél. Biol. x. p. 396, Astrabad.

Vitrina pellucida : its sole exactly similar to that of *Limax cinereoniger*; Simroth, Zool. Anz. iii. 1880, p. 93.

Vitrina major (Fer.), var. n. *stabilii*, Lessona, Atti Soc. Rom. (3) vii. Mem. Sci. fis. p. 356, pl. iv. figs. 5–7, Piedmont.

Vitrina globosa, sp. n., Böttger, JB. mal. Ges. vii. p. 115, pl. iv. fig. 4, Thatani, Southern Caucasus, perhaps young specimens.

Vitrina diaphana (Dr.), found also in Northern Germany, at Bremen, and Hamburg ; Borcherding, Nachr. mal. Ges. 1880, p. 83.

Vitrina subconica (Böttg.), *komarowi* (Böttg.), *bonellii* (Targ. Tozz.), and *lusatica* (Jordan), Kobelt, Iconogr. vii. pp. 29 & 30, pl. cxci. figs. 1940–1943.

Vitrina (*Phenacolimax*) *reitteri*, sp. n., Böttger, Ber. Offenb. Ver. xix.–xxi. p. 102, Western Montenegro.

Vitrina (*Trochovitrina*) *subcarinata*, sp. n., Böttger, JB. mal. Ges. vii. p. 379, Talysch, Southern shore of Caspian Sea.

Vitrina transvaalensis and *vandenbrœcki*, spp. nn., Craven, P. Z. S. 1880, p. 615, pl. lvii. figs. 3 & 4, Leydenberg, Transvaal.

Vitrina milligani (Pfr.), from New Zealand ; Kirk, Tr. N. Z. Inst. xii. p. 307.

Gallandia, g. n. Shell thin, transparent, glossy as in *Vitrina*, but spire conical, last whorl more or less angular, perforated. Animal wholly retractile within the shell. *G. conoidœa* [*conoidea*] (Martens, as *Vitrina* ?), Turkistan, and Mount Olympus, in Asia Minor, *subconica* (Böttger, as *Vitrina*), Caucasus, and *lederi* (Böttger, as *Vitrina*), Caucasus. Bourguignat, Descript. du genre *Gallandia*, pp. 4–8.

Helicarion. The Indian species referred to this genus enumerated, and several of them placed in *Girasia* and *Austenia* ; H. H. Godwin-Austen, P. Z. S. 1880, pp. 298 & 294.

Helicarion sumatrensis, sp. n., Schepman, in Veth's Middel-Sumatra, iv. 3, p. 6, p. i, fig. 1 ; radula, pl. ii. fig. 2, Sumatra.

Girasia (Gray, 1855) = *Hoplites* (Theobald, 1864), description emended and completed ; *G. hookeri* (Gray) = *Helicarion theobaldi* (Godw.-Aust.), and *shillongensis* (Godw.-Aust.), anatomically described : H. H. Godwin-Austen, P. Z. S. 1880, pp. 291–294, pl. xxvii. fig. 1. *G. shillongensis* var. *brunnea* figured from life, figs. 2 & 3, & pl. xxiv. figs. 1 & 2 ; *G. hookeri* and *magnifica* figured from specimens in spirits, pl. xxvii. fig. 4, mantle-lobes, figs. 5–8, genital organs and spermatophore.

Austenia gigas (Bens., as *Vitrina*). Anatomical description, chiefly of the genital organs, spermatophore, &c. ; *id. l. c.* pp. 294–297, pl. xxiv. figs. 3–9, & pls. xxv. & xxvi. ; radula, pl. xxvii. fig. 10.

Nanina. Critical note on the name and genus ; Blanford, J. A. S. B. xlix. pt. 2, pp. 184 & 185.

Nanina obliquata (Rv.) and *virens* (Martens), both from Sumatra ; Martens, Conchol. Mitth. pp. 1–3, pl. i. figs. 1–6.

Xestina albata, sp. n., Blanford, *l. c.* p. 189, pl. iii. fig. 3, Papanassam, Tinnevelly, S. India.

Ariophanta immerita (Blanf.), South Canara ; *id. l. c.* p. 185, pl. iii. fig. 4.

Oxytes sylvicola, sp. n., Blanford, *l. c.* p. 185, Burrail range, 3000–4000 feet, North Cachar.

Hemiplecta tinostoma, Tinnevelly Ghats, and *enisa*, Aghastyamullay Hills, both in Travancore, spp. nn., *id. l. c.* pp. 187 & 188, pl. iii. figs. 1 & 2.

[*Hemiplecta*] *Nanina doriæ*, sp. n., Tapparone-Canefri, Ann. Mus. Genov. xvi. p. 61, New Guinea.

[*Rhyssota*] *Nanina sowerbiana* (Pfr.), from the Carolines: variability; Martens, SB. nat. Fr. 1880, p. 144.

Macrochlamys ? *platychlamys*, sp. n., Bombay, *tenuicula* (H. Ad.) = *effulgens* (Theob.), Bombay and Western Ghats, and ? *wynnii*, sp. n. Mari, Western Himalaya; Blanford, *l. c.* p. 197, pl. ii. figs. 6 & 9, & pl. iii. fig. 5.

Durgella. Note on its anatomy; *D. blanfordi*, sp. n., Assam, Godwin-Austen, P. Z. S., Dec. 1880.

Euplecta (Semper); type, *Helix subopaca* (Pfr.), Ceylon. Blanford places 8 species from Continental India in this genus, including *Helix climacterica* (Bens.) and *vidua* (Blanf.); the latter is figured from Papanassam, S. India, with a smaller variety. J. A. S. B. xlix. pt. 2, pp. 190–193, pl. ii. figs. 2 & 5.

Trochomorpha planorbis (Lesson), from Sumatra: radula described by Schepman, in Veth's Middel-Sumatra, iv. 3, p. 7, pl. ii. fig. 3.

Trochomorpha kuesteri (Pfr.) var. n., and *nigritella* (Pfr.), variable in size and colour, *marmorosa* (Hombr. & Jacq.) = *approximata* (Guillou, pt. Reeve), all from the Carolines; Martens, SB. nat. Fr. 1880, pp. 145 & 146.

Helix (*Thalassia*) *kreffti* (Cox), from Thursday Island, Torres Straits; Brazier, P. Linn. Soc. N. S. W. iv. p. 392.

Sesara ? *ingrami* (Blanf.), Yoma Mountains, Pegu; Blanford, *l. c.* p. 193.

Pachystyla (Mörch, 1852) = *Rotula* (Semper, 1870). Radula and genital organs nearly as in *Nanina*; no horn-like prominence at the caudal pore, mantle-lobes not prolonged; pillar lip of the aperture ordinarily thickened. Peculiar to the Mascarene Islands; 22 species distributed in 3 groups:—*Pachystyla* proper; type, *Helix inversicolor* (Fér.). *Erepta* (Albers, 1850), with columellar tooth; type, *Helix stylodon* (Pfr.). *Cœlatura*, see infrà, and *Caldwellia* (H. Adams, 1873), small, fragile, trochiform; type, *H. philyrina* (Morelet). Martens, Moll. Maur. pp. 191–195. Young specimen of *P. inversicolor*, with tooth-like knob at the pillar lip, pl. xix. fig. 6; anatomical description of this species by Schacko, *tom. cit.* pp. 341 & 342.

Cœlatura, subg. n. of *Pachystyla*. Distinct by spiral sculpture; for *Helix cœlatura* (Fér.), *duponti* (Morel.), *scalpta* (Mart.), *semicerina* (Morel.). Martens, Moll. Maur. pp. 192 & 195.

Hyalina (*Retinella*) *olivetorum* (Herm.), var. or sp. n. ?, *macrobiotus* and subvar. n. *sub-incerta*, *H.* (*R.*) *likes*, sp. n., Nevill, P. Z. S. 1880, pp. 104 & 105, Caves of Mentone, diluvial deposits.

Hyalinia (*Mesomphix*) *duboisi* (Charp.), var. from Transcaucasia; Böttger, JB. mal. Ges. vii. p. 121.

Hyalina draparnaldi (Beck) on the ramparts of Osnabrück; Borcherding, Nachr. mal. Ges. 1880, pp. 91 & 92.

Hyalina depressa, sp. n., Sterki, Nachr. mal. Ges. 1880, pp. 104 & 105, S.W. Germany and N.W. Switzerland.

Hyalina mentonica, sp. n., and *H. eugyrus* (Stabile) = *villæ* (Mortillet), sub-alpine region of Alpes Maritimes, *blauneri* (Shuttl.) = *lucida* var. *compressa* (Dumont), sub-maritime zone of the same. Nevill, *l. c.* pp. 106 & 107, the first pl. xiii. fig. 3.

Hyalina maceana (Bourg.), var. or sp. n. ? *planorbioides*, *H. fodereana* (Bourg., MS.) and (*Vitrea*) *tenebraria* (Bourg., MS.); *id. l. c.* pp. 106 & 107, Caves of Mentone, diluvial deposits.

Hyalina podolica, sp. n., Clessin, Mal. Bl. (2) ii. p. 201, alluvial deposits of the River Bug.

Hyalinia (*Polita*) *lederi* and *pygmæa*, spp. nn., Böttger, JB. mal. Ges. vii. p. 117, pl. iv. fig. 2, Thatani, Southern Caucasus, and Martkopi, near Tiflis.

Hyalinia (*Polita*) *caspia*, spp. nn., Böttger, JB. mal. Ges. vii. p. 379, Talysch.

Hyalina subeffusa (Böttg.), *latebricola*, *subdædalea*, *deila*, and *subterranea* (all of Bourg.); Kobelt, Iconogr. vii. pp. 31 & 32, pl. cxci. figs. 1944–1949.

Hyalina aruensis, sp. n., Tapparone-Canefri, Ann. Mus. Genov. xvi. p. 59, Vokan, Aru Islands.

Hyalina effusa var. n. *major*, Weinland, JB. mal. Ges. vii. p. 364, Hayti.

Hyalina, section *Vitrea*. 28 European species enumerated and distributed into 3 groups:—

1. *Crystallus* (Lowe); type, *crystallina* (Müll.).
2. *Diaphanella* (n.); type, *diaphana* (Stud.) = *hyalina* (Fér.).
3. *Mediterranea* (n.); type, *hydatina* (Rossm.).

Clessin, Mal. Bl. (2) ii. pp. 204–207.

Hyalinia (*Vitrea*) *andreæ*, sp. n., Böttger, JB. mal. Ges. vii. p. 37, footnote, Delemont, Swiss Jura.

Hyalinia (*Vitrea*) *erjaveci* (Brusina) and *kutschigi* (Parr.). Notes on specimens from Croatia; Böttger, JB. mal. Ges. vii. p. 226.

Hyalinia (*Vitrea*) *reitteri*, sp. n., *id.* Ber. Offenb. Ver. xix.–xxi. p. 103, Lesina, Dalmatia.

Hyalinia (*Vitrea*) *angystropha*, sp. n., *id.* JB. mal. Ges. vii. p. 380, Suram, Transcaucasia.

[?] *Zonites upsoni*, sp. n., Calkins, Valley Naturalist, ii. p. 53, woodcut, Winnebago county, Illinois. Resembles *Helix harpa* in outline, but texture of the shell like that of *Conulus fulvus*.

Zonites savesi, sp. n., Gassies, Faune Conch. N. Caled. iii., New Caledonia.

Sagda blandi, sp. n., Weinland, JB. mal. Ges. vii. p. 367, Hayti.

Sagda (*Odontosagda*) *hilli* (Gundl.); *id. l. c.* p. 365, Cuba.

Aulacognatha.

Letourneuxia (Bourg.) = *Geomalacus*; Morelet, J. de Conch. xxviii. p. 16.

Ariolimax columbianus var. n. *hecoxi*, Wetherby, J. Cincinn. Soc. iii. p. 38, Santa Cruz, California.

Patula lederi, sp. n., Böttger, *l. c.* p. 380, Talysch.

Helix. Palæarctic species :—

Helix edentula (Drap.) occurs in various parts of Styria, on the slopes of the mountains, much concealed, and is constant in form; *H. unidentata* (Drap.), very variable, size of its shell independent of the height in which it lives; and var. n. *anodonta*, without tooth in the aperture, Prebichel Pass, Styria. Tschapeck, JB. mal. Ges. vii. pp. 183–191, pl. vi. figs. 1–4.

Helix hispida (L.), numerous varieties, Piedmont, *H. globus*, alluvial deposits of the Po, and *segusina*, Susa, spp. nn., Lessona, Atti Acc. Tor. xv. [1879] pp. 291–297, figs. 1-24, 25–27, & 30–33.

Helix umbrosa (Partsch). Jaw partly goniognath; Semper, Reis. Philippin. Landmoll. 5, p. 248.

Bradybæna ciliata (Venetz, *Helix*). Jaw smooth; Lessona, Atti Acc. Rom. (3) vii. Mem. sci. fis. p. 349.

Helix (*Fruticicola*) *cemenelea* (Risso) = *galloprovincialis* (Dupuy), distinct from *cantiana* (Montagu), sub-alpine region of Alpes Maritimes, *anconæ* (Issel), with subvar. n. *minor*, same country, littoral, *ciliata* (Stud.), older diluvial deposits in the caves of Mentone, *moutoni* (Mittre) var. n. *subfossilis*, same deposits, *diæga* (Bourg., 1877), sub-alpine region, *telonensis* (Mittre) var. n. *crassilabris*, same region; Nevill, P. Z. S. 1880, pp. 117–119.

Helix carthusiana (Müll.) var. n. *arvensis*, Pini, Atti Soc. Ital. xxi. 1879, p. 621, Belgiojoso, Prov. of Pavia.

Helix ousterea, *monerebia*, and *gaudefroyi*, spp. nn., near *cemenelea* (Risso), *delæouri*, *ischnia*, *abelbaia*, and *euclastolena*, spp. nn., near *perlevis* (Shuttl.), and *astenia*, sp. n., near *telonensis*, all from Corsica, Mabille, Guide Nat. 1880, No. 3.

Helix martorelli (Bourg.) figured; J. Martorell y Peña, Apuntos Arqueologicos (Barcelona: 1879).

Helix (*Trichia*) *granulata* (Alder) var. *epirotica* (Mouss.), from Croatia; Böttger, JB. mal. Ges. vii. p. 227.

Helix (*Trichia*) *globula* (Kryn.) probably = *pisiformis* (Pfr.), Transcaucasia; *id. l. c.* p. 123.

Helix (*Monacha*) *schuberti* (Roth), with varr. *colchica* (Mouss.) and *circassica* (Charp.), Transcaucasia; *id. l. c.* pp. 124–126.

Helix fruticum (Müll.) is placed by C. Semper in the genus *Chloræa*, on account of its lobulate female appendicular gland; the number of its sagittal glands varies from 3 to 1. Reis. Philippin. Landmoll. 5, pp. 229–231.

Helix (*Fruticicola*) *arpatschaiana* (Mousson) var. *sewanica*, Martens, Mél. Biol. x. p. 381, Sewanga Island, in Lake Goktscha, Armenia; and

H. (*F.*) *talischana*, sp. n., *id. l. c.* p. 396, Lenkoran, Prov. Talisch, both figured in Conchol. Mitth. pp. 7 & 9, pl. iii. figs. 4–7, 11–14.

Helix schrenckı (Middend.), Siberia, *talischana*, sp. n., South coast of Caspian Sea, *circassica* (Charp.), Imeritia, *arpatschaiana* (Mouss.) var. n. *sewanica*, near Goktscha lake, *aristata* (Kryn.) and *globula* (Kryn.), Transcaucasia, *rubens* (Martens) with varr. *concolor*, *finschiana*, *zeiliana*, and *regeliana*, Turkistan and Kulja, *helvola* (Friv.), Siberia, *semenowi* (Martens), Tianschan and Alatau, *rufispira* (Martens) var. n. *albidorsalis* (Mouss., MS.), and *nordenskiœldi* (Westerlund), Siberia, all figured, and comparative table of their differences and those of some allied species given, by E. v. Martens, Conchol. Mitth. pp. 6–18, pl. iii. figs. 1–20, & pl. iv. figs. 1–20.

[*Gonostoma*] *Helix camerani*, sp. n., Lessona, Atti Acc. Rom. (3) vii. Mem. sci. fis. p. 356, pl. iv. figs. 8–10, Mologna piccola, 2000 metres above the sea, Piedmont. Allied to *H. gougeti* (Terr.).

[*Gonostoma*] *Helix maroccana* (Morelet, 1876) and *calpeana* (Morel., 1854) figured; Morelet, J. de Conch. xxviii. pp. 50 & 51, pl. ii. fig. 3, & pl. iii. fig. 5,

Xerophila. Anatomical notes on several species; C. Semper, Reis. Philippin. Landmoll. 5, pp. 239 & 240.

Helix virgata, *caperata*, *ericetorum*, and *Bulimus acutus*. C. Ashford discusses their variations, considering the continuous dark bands as primitive, and their breaking up into blotches or spots or disappearing as secondary; J. of Conch. iii. pp. 89–95.

Xerophila candidula (Stud.) var. *thymorum* (Alten). Presence of 2 sagittæ amatoriæ found in a few specimens; Dietz, JB. Ver. Augsb. xxv. p. 94.

Helix (*Xerophila*) *cespitum* (Drap.) var. n. *dismasthia*, littoral region, and var. n. *alticola*, 2000–4000 feet above the sea, both near Mentone, *subcespitum*, sp. n., *terveri* (Mich.) with var. n. *subarenarum*, *sclera*, sp. n., diluvial deposits of the caves at Mentone, *conspurcata* var. n. *illuvinosa*, or sp. ?, Mentone, recent. Nevill, P. Z. S. 1880, pp. 120, 121, & 123.

Helix (*Xerophila*) *obvia* (Ziegl.) var. *candicans* (Ziegl.), from Croatia; JB. mal. Ges. vii. p. 228.

[*Xerophila*] *Helix vukotinovici*, sp. n., Hirc, Verh. z.-b. Wien, xxx. p. 524, Buccariza, Western part of Croatia. Near *vestalis* (Parr.).

Helix thiessece, sp. n. (Mousson, MS.), near *pyramidata* (Drap.) and *chalcidica* (Blanc), nearer to *cretica* (Fór.), both from Eubœa; Kobelt, JB. mal. Ges. vii. pp. 236–238, pl. vi. figs. 10–12, 12–15.

Helix cucullus (Martens), Martens, Conch. Mitth. p. 19, pl. v. figs. 1–3, Malta.

Helix amanda (Rossm.), var. n. *insularis*, Galita Island, near Tunis; Issel, Ann. Mus. Genov. xv. p. 270.

Helix (*Xerophila*) *derbentina* (Androzejewsky), specimens from Derbend, described by Martens, Mél. Biol. x. p. 397; var. *supra-zonata* (Mouss.), Böttger, JB. mal. Ges. vii. p. 131, Transcaucasia.

Helix (*Xerophila*) *acutistria*, sp. n., Böttger, JB. mal. Ges. vii. p. 152, pl. v. figs. 2–4, Tiflis. Near *profuga* (A. Schm.).

[*Xerophila*] *Helix finitima* (Morelet, 1876), and *cottii* (Morelet, 1874),

Morocco, Morelet, J. de Conch. xxviii. pp. 39 & 40, pl. ii. fig. 2, & pl. iii. fig. 4; the first also by Kobelt, Iconogr. vii. p. 39, pl. cxcvii. fig. 1978. *H. colomesiana* (Bourg.), *jaylii* (Paladilhe), *rusticula* (Pal.), a variety of the former, *submeridionalis* (Bourg.), *duplicata* (Mouss.), and *subapicina* (Mouss.), the last a variety of *apicina* (Lam.) and *irus* (Lowe); critical notes by Morelet, *l. c.* pp. 41–48, all from Morocco.

[*Xerophila*] *Helix dumivaga*, sp. n., *id. l. c.* p. 47, Chyst, Morocco, not figured.

Helix hesperidum, sp. n., Tezaroualt, province of Sus, Southern Morocco, and *conopsis* (Morelet, 1876), Cape Cantin, Morocco, Morelet, *l. c.* pp. 38 & 37, pl. iii. figs. 2 & 1; Kobelt, Iconogr. vii. p. 40, pl. xcvii. figs. 1981 & 1980.

[*Cochlicella*] *Bulimus acutus* (Müll), variations in colour; Ashford, J. of Conch. iii. p. 95. Variations observed in Morocco, *Helix terveriana* (Mouss., *nec* Webb & Berth.) is one of them; Morelet, *l. c.* pp. 53 & 54.

C. Semper points out the anatomical likeness of *Euparypha* and *Arionta*, Reis. Philippin. Landmoll. 5, p. 245.

[*Euparypha*] *Helix pisana* (Müll.), Moroccan varieties, *dehnii* (Rossm.), *planata* (Chemn.), with var. *erythrostoma* (Phil.), and *H. subdentata* (Fér.), Moroccan, not Persian; Morelet, *l. c.* pp. 27–31, pl. i. figs. 1 & 2, pl. ii. fig. 1, & pl. iii. fig. 7.

[*Euparypha*] *Helix subdentata* (Fér.), Mogador, Kobelt, Iconogr. vii. p. 39, pl. cxcvii. fig. 1979.

[*Leucochroa*] *Helix turcica* (Chemn.), with var. *mogadorensis* (Mouss.), and *mograbina* (Morelet), with var. *degenerans* (Mouss.): on their differences, Morelet, *l. c.* pp. 32–35.

[*Campylæa*] *Helix cingulata* (Stud.) found alive on the Staffelberg, in Northern Bavaria, probably introduced by man; Clessin, Mal. Bl. (2) ii. p. 203.

Helix preslii (Schmidt), var. allied to *anauniensis*, Vallarsa, S. Tirol; Gredler, Nachr. mal. Ges. 1880, p. 87.

[*Campylæa*] *Helix strobeli*, sp. n., Lessona, Atti Acc. Rom. (3) vii. Mem. Sci. fis. p. 361, pl. iv. figs. 1–4, Val del Cervo, Piedmont, 1900 metres above the sea.

Helix (*Campylæa*) *maureliana* (Bourg. 1868), redescribed by Nevill, P. Z. S. 1880, p. 1 14, with var. n. *robusta*, Caves of Mentone.

Helix raspaili (Payr.), var. n. *pilosa*, Corsica, Kobelt, Iconogr. vii. p. 41, pl. cxcvii. fig. 1982.

Helix acropachia and *lenelaia*, allied to *raspaili* (Fér.), Mabille, Guide Nat. 1880, No. 3, Corsica.

Helix setosa, var. n. *buccarina*, Hirc, Verh. z.-b. Wien, xxx. p. 525, Mount Turcina, near Buccari, Western Croatia.

Helix nicolai, sp. n., Klecak, Nachr. mal. Ges. 1880, p. 106, Velebit Mountains, N. Dalmatia.

Helix cyclolabris, var. *eubœa* (Parr.), Kobelt, JB. mal. Ges. vii. p. 236, pl. vi. figs. 7–9.

Helix (*Fruticocampylæa*) *eichwaldi* (Pfr.), with var. *daghestana* (Parr.), and its resemblance with *armeniaca* (Pfr.), Böttger, JB. mal. Ges. vii. pp. 130 & 131. *H. transcaucasia* (Mouss.), with var. n. *pygmæa*, *H.*

narzanensis (Kryn.), with several varieties, and *H. pratensis* (Pfr.), placed in the subgenus *Eulota*; id. *l. c.* pp. 126 & 130, all from Transcaucasia.

[*Arionta*] *Helix arbustorum*, var. n. *corneoliformis*, Lessona, Atti Acc. Rom. (3) vii. Mem. Sci. fis. p. 363, pl. iv. fig. 11, Valley of the Po, near Monte Viso.

Helix xatartii and *canigonica* distinct from *arbustorum*; Fagot [separate paper, Toulouse: without date, 16 pp.].

[*Tachea*] *Helix sylvatica*, var. *eximia* (Dupuy), and var. n. *rhenana*, Valley of the Rhine, Carlsruhe (Baden), and *nemoralis*, var. n. *erjaveci*, Görz; Kobelt, Iconogr. vii. pp. 36 & 37, pl. xcv. figs. 1964–1966.

Helix (*Tachea*) *atro-labiata* (Kryn.), large specimens from Transcaucasia, Böttger, JB. mal. Ges. vii. pp. 132 & 133.

Helix coquandi (Morelet), variations of colour and bands; Morelet, J. de Conch. xxviii. p. 26, pl. i. fig. 1, & Kobelt, Iconogr. vii. p. 35, pl. xcv. figs. 1961–1963, Morocco.

Helix graellsiana (Pfr.), jaw oxygnath, genital organs as in *Fruticicola*; Semper, Reis. Philipp. Landmoll. 5, p. 241.

Helix codringtoni (Gray), var., Kalamata, Kobelt, JB. mal. Ges. vii. p. 235, pl. vi. figs. 5 & 6.

Helix vermiculata (Müll.), var. n. *grimaldensis*, Nevill, P. Z. S. 1880, p. 113, Alpes Maritimes; var. n. *depressa*, Carthage and Cape Bon, and var. n. *conoidea*, Sahel; Issel, Ann. Mus. Genov. xv. p. 263.

Helix vermiculosa (Morelet), Morelet, J. de Conch. xxviii. p. 18, pl. ii. fig. 5, Morocco.

Helix (*Tachea?*) *mentonica* = *vermicularis* (Issel, 1867, *nec* Bonelli), *ædesima*, *bennetiana*, and *williamsiana*, spp. nn., with several varieties; Nevill, P. Z. S. 1880, pp. 109–111, diluvial deposits in the Caves of Mentone, the second contemporaneous with man, the rest older.

Helix lactea (Müll.), variations in the colour of the peristome, *lucasi* (Desh.) differs from the former, *rerayana* (Mouss.) a new variety, *maresi* (Crosse) = *tigri* (Gervais), *beaumieri* (Mouss.), variations in size, *atlasica* (Mouss.), very near *marmorata*, all from Morocco; Morelet, J. de Conch. xxviii. pp. 19–25.

Helix niciensis (Fér.), subvarr. nn. *colorata* and *primitiva*, and var. n. *speluncarum*; Nevill, P. Z. S. 1880, p. 116, Caves of Mentone, diluvial deposits of different ages.

Helix globularis, *platychela*, and *sicana*, and also *globularis* and *scabriuscula*, connected by a continuous row of transitory forms, each characteristic of certain localities, according to Kobelt, Ber. Senck. Ges. 1879–80, pp. 235–240, pl. v. figs. 1–15.

Helix gyrostoma (Fér.), Martens, Conch. Mitth. p. 24, pl. v. figs. 8–10, Tripoli.

Helix circum-ornata (Fér.), Martens, Conch. Mitth. p. 19, pl. v. figs. 4–7, Itri near Gaeta.

Helix (*Iberus*) *strigata* (Fér.), Umbria and Terni, var. n. *apula*, Taranto, *signata* (Fér.) Monte Cassino, *carseolana* (Fér.) = *marrucina* (Tib.), Matese and Abruzzi, and *mariannæ* (Kob.), with var. *peucetana*, Apulia, discussed and figured; Kobelt, JB. mal. Ges. vii. pp. 69–77, pl. i.

figs. 1–15. Férussac's original figures of *strigata*, *carseolana*, and *circumornata* copied, figs. 16–18.

[*Iberus*] *Helix sultana*, new name for *subscabriuscula* (Bourg.), Tetuan, Morocco, Morelet, J. de Conch. xviii. p. 36, pl. ii. fig. 4, & Kobelt, Iconogr. vii. p. 38, pl. cxcvii. fig. 1976.

[*Iberus*] *Helix leachii* (Fér.), from Tripoli, Martens, Conch. Mitth. p. 25, pl. v. figs. 11–13, & Kobelt, Iconogr. vii. p. 38, pl. cxcvii. fig. 1977.

[*Pomatia*] *Helix aggerivaga*, sp. n., between *aperta* and *aspersa*, Mabille, Guide Nat. 1880, No. 3, Corsica.

Helix pomatia (L.), several varieties, Kobelt, Iconogr. vii. pp. 37 & 38, pl. cxcvi. figs. 1968–1975.

Helix. African species :—

[*Pella*] *Helix zanguebarica*, sp. n., Craven, P. Z. S. 1880, p. 217, pl. xxii. fig. 4, Zanzibar and Magila.

Helix symmetrica, sp. n., *id. l. c.* p. 614, pl. lvii. fig. 2, Leydenburg, Transvaal.

Helix (*Pella*) *cyclaria* (Morelet), Martens, in Möbius's Beitr. Meeresf. Maur. p. 195, pl. xix. figs. 3–5, Mauritius (extinct).

Rhytida [?] *caffra* (Fér.), living animal described, Gibbons, J. of Conch. iii. pp. 95 & 96.

Helix (*Ampelita*) *percyana*, sp. n., E. A. Smith, P. Z. S. 1880, p. 485, pl. xlviii. fig. 12, Madagascar. *H. stumpffi*, sp. n., Kobelt, Nachr. mal. Ges. 1880, p. 31, and JB. mal. Ges. vii. p. 332, pl. vii. figs. 3 & 4, Nossi-bé Madagascar.

Helicophanta magnifica (Fér.). Edge of the mantle thick, jaw quite smooth, lateral teeth of the radula elongated, unicuspidate, genital organs very simple, without accessory glands, no sagitta. Much allied to the Australian subgenus *Panda*. Semper, Nachr. mal. Ges. 1880, pp. 60 & 61.

[*Stylodonta*] *Helix unidentata* (Chemn.) and *studeriana* (Fér.). Dufo's notes on their separate sexes and ovo-viviparity reproduced by J. Steenstrup, Vid. Medd. 1879–80, pp. 302–306, and by C. Viguier, Arch. Z. expér. viii. pp. 529–536. The latter describes and figures the male and the female genital organs of the latter species, taken from two distinct specimens, pl. xl. G. Schacko describes the very simple genital organs of a male of the first species, without glandular appendages, and the pavimental radula, and points out the anatomical differences from the Mauritian *Pachystyla*, in Martens's Moll. Maur. pp. 342 & 343.

Helix. Indian species :—

Helix (*Plectopylis*) *brachydiscus*, Tenasserim, *oglii* and *brahma*, Assam, spp. nn., Godwin-Austen, J. A. S. B. xlviii. [1879], pt. 2, pp. 1–4, pl. i.

Helix calpis (Bens.) is probably the young state of *Raphaulus blanfordi* (Pfr.), Blanford, *op. cit.* xlix. pt. 2, p. 211.

Helix. Austro-Malayan species :—

Many species of *Helix* from the Malayan Archipelago and the Papuan Islands, all known, very well figured by Dohrn in Küster's Conch. Cab. pt. 299, pls. clxviii.–clxxii., including some remarkable colour varieties,

shape and size of *Helix fringilla* (Pfr.), *trailli* (Pfr.), *palawanica* (Pfr.), and *hemiopta* (Bens.), pp. 575–578, pl. clxix. figs. 13–18, pl. clxx. figs. 1–7, & pl. clxxi. figs. 1–3.

Helix (*Patula*) *spaldingi*, var. n. *carinata*, Brazier, P. Linn. Soc. N.S.W. iv. p. 393, Thursday Island, Torres Straits.

Helix macgregori (Cox) and *alfredi* (Cox), var. n. *trichroa*, Martens, Conch. Mitth. p. 4, pl. ii. figs. 4–7 & 8–10, both from New Ireland.

Helix (*Trochomorphoides*) *bertiniana*, sp. n., Tapparone-Canefri, Ann. Mus. Genov. vi. p. 60, Ramoi, New Guinea.

Helix (*Trachia*) *delessertiana* (Guillou) = *torresiana* (Hombr. & Jacq.), from Thursday Island, Torres Straits, Brazier, *l. c.* p. 393.

Helix (*Planispira*) *buxtoni*, sp. n., *id. l. c.* p. 396, Thursday Island.

[*Obba*] *Helix linnæana* (Pfr.), figured by Löbbecke & Kobelt, JB. mal. Ges. vii. p. 329, pl. viii. fig. 1; it is evidently next allied to *quoyi* (Desh.), from Celebes, figured, figs. 2 & 3.

Helix (*Papuina*) *pelechystoma* [*-cystema*], spp. nn., Tapparone-Canefri, Ann. Mus. Genov. xvi. p. 60, Pulo Faor, New Guinea.

Chloritis spinosissima, sp. n., Mindanao, anatomically distinct from *Chlorœa* by the well-developed flagellum, and the very long simple acinose female appendicular gland; Semper, Reis. Philippin. Landmoll. 5, p. 235, pl. ix. fig. 10, & pl. xiv. fig. 2.

Chlorœa (Albers) regarded by Semper as a separate genus, distinct from *Cochlostyla* by the multiple acinose form of the female appendicular gland, and subdivided into two groups of it:—

1.—Arboreal, shell smooth, brightly coloured: *Chl. benguetensis*, sp. n., Benguet, Island Luzon, pl. viii. figs. 11 & 12, *antonii*, sp. n., Luzon, pl. x. fig. 10, *huegeli* (Pfr.), *sirena* (Brod.), and 8 other known species from the Philippines. The anatomy of *sirena*, *huegeli*, and *benguetensis* has been examined by him, pl. xiv. figs. 5–8.

2.—Living on the ground, shell unicolorous, brownish, striated or ribbed; placed by former authors in the subgenus *Dorcasia*. *Chl. fodiens* (Pfr.), *mighelsiana* (Pfr.), with a variety, pl. x. fig. 3, from Northern Luzon, *carinifera*, sp. n., pl. x. fig. 1, Luzon, 4000 feet, *dissimilis*, sp. n., pl. x. fig. 8, prov. Cagayan, Luzon. Also *H. tourannensis* (Soub.), from Cochin China, *taranaki* (Gray), from Australia, the nearly cosmopolitan *similaris* (Fér.), and even the European *fruticum* (Müll.), are placed by Semper, from anatomical examination, in this genus; Reis. Philippin. Landmoll. 5, pp. 226–234.

Helix. Australian species:—

Helix (*Rhagada*) *bordaensis*, sp. n., Angas, P. Z. S. 1880, p. 419, pl. xl. fig. 3, Cape Borda, Kangaroo Island, S. Australia.

Helix (*Planispira*) *buxtoni*, sp. n., Brazier, P. Linn. Soc. N. S. W. iv. p. 393.

Helix falconari (Reeve), East Coast of Australia, 27–32° N. lat., Brazier, J. de Conch. xxviii. p. 315.

Helix oriunda and *subtersa*, spp. nn., Gassies, Faune Conch. N. Caled.

iii. pp. 20 & 37, & J. de Conch. xxviii. p. 325 & 326, pl. x. fig. 2, New Caledonia. *H. occlusa* and *astur* (Souverbie), are varieties of *turneri* (Pfr.), *kanakina* (Gassies) the young state of *inæqualis* (Pfr.), *deplanchesi* (Gassies) = *luteolina* (Gassies), *coguiensis* (Crosse) = *testudinaria* (Gassies), *id.* ibid. *H. yahouensis*, sp. n., Gassies, J. de Conch. xxviii. p. 326, pl. x. fig. 4, New Caledonia.

Helix dictyodes (Pfr.), varieties, Brazier, J. de Conch. xxviii. p. 312.

Helix (*Paryphanta*) *gilliesi*, sp. n., E. A. Smith, Ann. N. H. (5) vi p. 159, Whakamarama range, New Zealand.

Helix. North American species :—

Helix pauper (Gould), note by Cooper; P. Am. Phil. Soc. 1879, p. 282.

Helix (*Patula*) *cumberlandiana* (Lea), note on its occurrence; Wetherby, J. Cincinn. Soc. iii. p. 36.

Helix (*Polygyra*) *espiloca* (Ravenel), from Texas and Louisiana, *id. l. c.* p. 38.

Adelodonta, subg. n., for *Helix polygyrella* (Bland); Ancey, Le Nat. No. 42, p. 334. [= *Polygyrella* (Bland).]

Helix (*Stenotrema*) *hirsuta* (Say), two distinct varieties, sometimes found at the same spot, *edwardsi* (Bland), *stenotrema* (Say), *edgariana* (Lea), and *labrosa* (Bland), notes on their affinities and occurrence; Wetherby, *l. c.* pp. 33–36.

Helix (*Triodopsis*) *copii* (Wetherby). Specific distinctness confirmed, but many of the so-called species in this subgenus may be subspecies or "varieties"; *id. l. c.* p. 37.

Helix (*Triodopsis*) *harfordi* (Binn.). Note by Cooper, P. Am. Phil. Soc. xviii. p. 286.

Micrarionta, subg. n. for *Helix farcta* (Newc.) and var. n. *oleata*, Ancey, Le Nat. No. 42, p. 334.

Helix flavescens (Wiegm.). Note on its colouration by the Recorder, JB. mal. Ges. vii. p. 96, footnote.

Helix californiensis (Lea) running gradually into *nemorivaga* (Val.) = *nickliniana* of most authors, *ramentosa* (Gould), and *vincta* (Val.). Cooper, P. Am. Phil. Soc. xviii. p. 283.

Helix redimita (W. G. Binney) distinct species; *id. l. c.* p. 284.

Helix tryoni (Newc.) belongs also to *Arionta*, but *H. dupetit-thouarsi* (Desh.), *fidelis* (Gray), and *mormonum* (Pfr.) rather to *Campylæa*, and *H. townsendi* (Lea) to *Mesodon* [?]; id. *l. c.* pp. 284 & 286. *H. fidelis*, tree-climbing; Wetherby, J. Cincinn. Soc. iii. p. 39.

Helix. Species from Tropical America :—

Helix inaguensis, sp. n., Weinland, JB. mal. Ges. vii. p. 369, pl. xii. fig. 22, Bahamas. Belongs probably to *Patula*.

Helix constantior, Turk's Island, and *calacala*, New Providence, spp. nn., and *gallopavonis* (Val.) varr. nn. *major* and *elatior*, Turk's Island, Bahamas; *id. l. c.* pp. 371–374, the two former pl. xii. figs. 19 & 21. Belong to *Polymita*.

Helix (*Coryda*) *vigiensis*, sp. n., *id. l. c.* p. 374, pl. xii. fig. 20, Hayti.

[*Plagioptycha*] *Helix indistincta* (Fér.), varieties, *id. l. c.* p. 370, Hayti. *H. salvatoris* (Pfr.), Bahama Islands; Martens, Conchol. Mitth. p. 4, pl. ii. figs. 1–3.

Caracolus marginella (Gm.). Genital organs very simple, without appendicular glands, jaw smooth, teeth of jaw with broad convex edges, similar to those of *Achatina* or *Amphidromus*; Semper, Nachr. mal. Ges. 1880, pp. 37 & 38.

Helix sigmoides (Morelet) is not the young state of *H. ghiesbreghti* (Pfr.); Crosse, J. de Conch. xxviii. p. 194.

Cochlostyla, subg. *Pfeifferia* (Gray), *micans* (Gray), genital organs and radula quite agreeing with those of other Philippine *Cochlostylæ*, described by Semper, Reis. Philippin. Landmoll. 5, p. 225.

Borus garcia-moreni, sp. n., Miller (1878), Ecuador, = *popelairianus* (Nyst.); Dohrn, JB. mal. Ges. vii. p. 87.

Bulimus dædalus (Desh.) with varr. *minor* and *multidentatus*, *B. brakebuschi*, *weyenberghi*, *chancaninus*, and *kobeltianus* (Döring); Kobelt, JB. mal. Ges. vii. pp. 286–292, pl. ix. figs. 1–16, Argentine States.

Achatina pulchella (Martens). Note on its radula by Schacko, in Möbius's Beitr. Mauritius, p. 341.

Achatina zanzibarica and *lhotellerii*, spp. nn., and *panthera* var. n. *nasimoyensis*, Bourguignat, Descr. div. esp. 1879, all from Zanzibar.

Achatina thomsoni and *kirki*, spp. nn., E. A. Smith, Ann. N. H. (5) vi. p. 428, Eastern Africa, between the coast and the lakes.

Achatina smithi, sp. n., Craven, P. Z. S. 1880, p. 617, pl. lvii. fig. 1, Leydenburg, Transvaal.

Achatina [?] *kirki*, sp. n., *id. l. c.* p. 218, pl. xxii. fig. 9, Magila, Usambara country, E. Africa.

Achatina (*Limicoloria*) *martensiana* and *rectistrigata*, spp. nn., E. A. Smith, P. Z. S. 1880, pp. 345 & 346, pl. xxxi. figs. 1 & 2, Ujiji.

[*Limicolaria* ?] *Bulimus notabilis*, sp. n., *id.* Ann. N. H. (5) vi. p. 427, between Lake Nyassa and East coast.

Perideris auripigmentum (Rv.). Radula distinct from that of *Achatina*; Schacko, *l. c.* p. 341.

Buliminus fragosus (Fér.), *candidus* (Lam.) = *forskali* (Beck), *lycicus* (Pfr.), *carneus* (Pfr.) with var. *glabratus* (Mouss.), *spratti* (Pfr.), *nogelii* (Roth), *rufistrigatus* (Bens.) = *oxianus* (Martens) [?], *komarowi* (Böttg.), *tricollis* (Mouss.), *kindermanni* (Parr.), *ehrenbergi* (Pfr.), *blanfordianus* (Nevill), *frivaldszkii* (Pfr.), *raynevalianus* (Raym.), *sagax* (Friv.), *tuberifer* (Böttg.), *caucasicus* (Pfr.), *cretensis* (Pfr.), *thiesseanus* (Mouss.), *euboicus* (Reeve), *dirphicus* (Blanc), *blandus* (Friv.), *scapus* (Friv.), *denticulatus* (Pfr.), *botterianus* (Phil.), *tricuspidatus* (Pfr.) = *levaillantianus* (Bourg.), *truquii* (Mouss.), *sieversi* (Mouss.), *phasianus* (Dubois), *bourguignati* (Letourn.), *milevianus* (Raym.), *cirtanus* (Morel.), *todillus* (Morel.), *euryomphalus* (Letourn.), *olivaceus* (Pfr.), *rothi* (Pfr.), *benjamiticus* (Mouss.), *cespitum* (Morelet), and *humberti* (Bourg.); Kobelt, Iconogr. vii. pp. 41–65, pls. cxcviii.–cci. figs. 1983–2044, with some others which are copied from published works.

Buliminus thiesseanus (Mouss.), Kobelt, JB. mal. Ges. vii. p. 238, pl. vi. figs. 16 & 17, Eubœa, Attica, and Bœotia; *B.* (*Chondrus*) *godetianus*, sp. n., Samos, and *hippolyti*, sp. n., Eubœa, *id. l. c.* p. 240, and Iconogr. pp. 62 & 63, pl. cci. figs. 2037 & 2038.

Buliminus astrabadensis, sp. n., *id.* Iconogr. vii. p. 63, pl. cci. fig. 2039, Astrabad.

Buliminus raddii, sp. n., *id. l. c.* p. 50, pl. cxcix. figs. 2008 & 2009, Caucasus.

Buliminus labiellus, sp. n., Tarbagatai Mounts, Central Asia, *oxianus* (Martens), East coast of Caspian Sea, *sogdianus* (Martens), Turkistan, *secalinus*, sp. n. (Mousson, MS.), Kulja, *intumescens* (Martens), Turkistan, *asiaticus*, sp. n. (Mousson, MS.), Kulja, and *retrodens* (Martens), Kulja, with a comparative table of the differences of these and some allied Central Asiatic species; Martens, Conchol. Mitth. pp. 24–32, pl. vi. figs. 1–18.

Buliminus jugurtha, sp. n., Kobelt, Iconogr. vii. p. 61, pl. cci. fig. 2034, Algeria. Remarkable by its distinct pillar fold.

Buliminus (*Napœus*) *reitteri*, sp. n. (Martens), Böttger, Ber. Offenb. Ver. xix.–xxi. p. 106, Montenegro.

Buliminus (*Napœus*) *talyschanus*, sp. n., Böttger, JB. mal. Ges. vii. p. 381, Talysch, southern shore of the Caspian Sea.

Buliminus (*Zebrina*) *hohenackeri* (Kryn.). Difference from *detritus* (Müll.), Böttger, *l. c.* pp. 133 & 134; varieties, Martens, Mél. Biol. x. pp. 385 & 386.

Bulimus (*Chondrula*) *quinquedentatus* (Born) [Mühlfeldt], var. n. *uniparietalis*, Böttger, *l. c.* p. 135, Tiflis.

Buliminus tridens, var. n. *podolica*, Clessin, Mal. Bl. (2) ii. p. 202, alluvial deposits of River Bug.

Buliminus quadridens, var. n. *prolixus*, Pini, Atti Soc. Ital. xxi. 1879, p. 624, Castelarquato, province of Piacenza.

Buliminus (*Chondrula*) *didymodus*, sp. n., Leder, JB. mal. Ges. vii. p. 386, Talysch.

Buliminus (*Chondrula*) *komarowi*, sp. n., and *tricollis* (Mouss.), var. n. *minor*, both from Kars, Böttger, JB. mal. Ges. vii. pp. 154 & 156, pl. v. figs. 5 & 6; *B.* (*Ch.*) *phasianus* (Dubois) = *lamelliferus* (Rossm.), var., *id. l. c.* p. 157.

Buliminus (*Petraeus*) *abyssinicus* (Rüpp.) and *syriacus* (Pfr.). Note on their radula by Schacko, *l. c.* pp. 340 & 341.

[*Pachnodus*] *Buliminus velutinus* (Pfr.), Seychelles. Description of living animal by Möbius, Beitr. z. Meeresf. Maur. p. 198; of the jaw, radula, and genital organs, by Schacko, *tom. cit.* pp. 337–341, pl. xix. figs. 13–23; jaw perpendicularly striate, median and lateral teeth of the radula like those of European species, marginal teeth somewhat resembling those of *Otostomus*.

[*Pachnodus*] *Buliminus tumefactus* (Reeve). Radula quite different from that of the preceding, near that of *Bulimulus*; Schacko, *l. c.* p. 341.

Bulimus (*Rhachis*) *punctatus* (Ant.). Note on its radula; Schacko, *l. c.* p. 341.

Bulimus cameroni and *spekii*, spp. nn., Bourguignat, Descr. Div. Esp. 1879, Zanzibar.

Bulimus (*Buliminus*) *ptychaxis*, sp. n., E. A. Smith, P. Z. S. 1880, p. 346, pl. xxxi. fig. 3, Ujiji.

Bulimus myoporinæ, new name for *sinistrorsus* (Tate), preoccupied, Tate, Tr. R. Soc. Adelaide, iii. p. 104.

Bulimus beddomii (Brazier, 1876) from the islands of Torres Straits and N.E. Australia, Brazier, P. Linn. Soc. N. S. W. iv. p. 395.

Hapalus travancoricus (Theobald) probably = *Cataulus*, sp. juv.; Blanford, J. A. S. B. xlix. pt. 2, p. 215 [*cf.* Zool. Rec. xiv. *Moll.* p. 66].

Partula mooreana, sp. n., W. D. Hartman, P. Ac. Philad. 1880, p. 229, Moorea Island, Society Islands.

Ferussacia gronoviana (Risso). A well-developed mucus-pore at the extremity of the foot, Nevill, P. Z. S. 1880, p. 153; anatomical description of its buccal and genital organs by Godwin-Austen, *tom. cit.* pp. 662–664, pl. lxiv. The genus *Ferussacia* is placed in the *Stenogyridæ*, and its subgenera are enumerated by Nevill, *l. c.* pp. 664 & 665.

Ferussacia gronoviana, varr. nn. *subamblya*, *subfolliculus*, and *subforbesi* [!], Nevill, *l. c.* pp. 153 & 154, Mentone.

Ferussacia dactylophila, sp. n., Issel, Ann. Mus. Genov. xvi. p. 274, woodcut, Galita Island, near Tunis.

Ferussacia forbesi (Bourg), Morocco, Morelet, J. de Conch. xxviii. p. 58, pl. iii. fig. 9.

Pseudostreptostyla, subg. n. of *Ferussacia*, for *F. abnormis*, sp. n. Pillar lip resembling that of *Spiraxis*; Nevill, P. Z. S. 1880, p. 665, Mentone.

Tornatellina gigas, sp. n. (44 millim. in length), Martens, SB. nat. Fr. 1880, p. 146, Ruck Island, Carolines.

Cæcilianella. Note on some doubtful species from Mentone by Nevill, P. Z. S. 1880, p. 135.

Geostilbia mariei, sp. n., Nossi-bé, Madagascar, and *blandiana*, sp. n., Prov. of Para, Brazil, Crosse, J. de Conch. xxviii. pp. 149 & 150.

Stenogyra gracilis (Hutton), Sumatra. Radula; Schepman, in Veth's Middel-Sumatra, iv. 3, p. 9, pl. ii. fig. 4.

Stenogyra carolina, sp. n., Martens, SB. nat. Fr. 1880, p. 147, Ruck Island, Carolines.

[*Stenogyra* ?] *Bulimus magilensis*, sp. n., Craven, P. Z. S. 1880, p. 217, pl. xxii. fig. 3, Magila, Usambara Country, E. Africa.

Subulina lhotellerii, sp. n., = *variabilis*, var. b. (Jickeli), Bourguignat, Descr. Div. Esp. 1879, Abyssinia.

Subulina solidiuscula and *lauta*, spp. nn., E. A. Smith, Ann. N. H. (5) vi. p. 428, near Lake Tanganyika.

[*Subulina*] *Achatina mamillata*, sp. n., Craven, P. Z. S. 1880, p. 215, pl. xxii. fig. 8, Nossi-bé, Madagascar.

Bulimus (*Subulina*) *pronyensis*, sp. n., Gassies, Faune Conch. N. Caled. iii., New Caledonia.

Clausilia plicata (Drap.) found in Morocco, Morelet, J. de Conch. xxviii. p. 61.

Clausilia paulucciana, sp. n., diluvial deposits of the caves of Mentone,

and note on some varieties of *C. solida* (Drap.), Nevill, P. Z. S. 1880, p. 132, pl. xiv. fig. 1, & p. 131.

Clausilia mamillata and *aurigerana*, spp. nn., Fagot, Bull. Soc. Agric. Pyr. Or. 1880, figured, Aulus, Dép. Ariège, Pyrenees.

Clausilia calderinii, sp. n., Alagna in Val Sesia, *genei*, sp. n., Pesco, *pollonerœ*, sp. n., Pollonera, *diodon* (Stud.), typical form from Gondo at the Simplon Mount, with var. n. *rossmœssleri*, Col d'Ollon, and *C. mellæ* (Stabile), all from Piedmont, Lessona, Atti Acc. Rom. (3) vii. Mem. Sci. fis. pp. 345–349; varieties of *C. thomasiana* (Stabile), *id. l. c.* p. 347.

Clausilia tenuistriata, sp. n., Mount Amiata, Tuscany, *furvana*, sp. n., Valle Furva, Prov. of Sondrio, *plicatula* (Dr.), var. n. *plicatulina*, Val Trompia, *rugosa* (Drap.) var. *pini* (Westerlund), Mount Amiata, and *fusca* (Bellardi), var. *mutata* (Westerlund), Udine; Pini, Atti Soc. Ital. xxi. [1879] pp. 618, 619, 622, & 624.

Clausilia itala (Mart.), small variety from Vallarsa, S. Tirol, Gredler, Nachr. mal. Ges. 1880, p. 88.

Clausilia montenegrina (Küst.) = *gastrolepta* (Ziegl.), var. Böttger, Ber. Offenb. Ver. 1880, p. 110.

Clausilia pygmœa (Möllend.) distinct from *stolensis* (Zelebor, Möllend.), the former belongs to the group of *rugosa* (Drap.); Möllendorff, Nachr. mal. Ges. 1880, pp. 69–73.

Clausilia belluccii, sp. n., Issel, Ann. Mus. Genov. xvi. p. 278, woodcut, Monte Resas, Tunisia.

Clausilia (*Papillifera*) *josephinæ*, sp. n., Böttger, Nachr. mal. Ges. 1880, p. 50, Desphinæ near Delphi, Parnassus.

Clausilia (*Albinaria*) *thiesseæ*, sp. n., Acarnania, and *compressa* (Pfr.), var. n. *calcarea*, Cerigo, *id. l. c.* pp. 48 & 49.

Clausilia (*Idyla*) *thessalonica* (Friv.), varr. nn. *euboica*, Eubœa, and *crassilabris*, Southern Thessalia, *id. l. c.* pp. 50 & 51.

Clausilia (*Euxina*) *strauchi* (Böttg.), var. n. *mezchetica*, Mezchet, near Tiflis, and notes on *C.* (*E.*) *litotes* (A. Schmidt), *gradata* (Böttg.), *quadriplicata* (A. Schm.), and *ossetica* (A. Schm.); *id.* JB. mal. Ges. vii. pp. 143–147, the first, pl. iv. fig. 6.

Clausilia (*Oligoptychia*) *castalia* (Roth.), var. n. *pirostoma*, Corfu ?, *id.* Nachr. mal. Ges. 1880, p. 51.

Clausilia (*Oligoptychia*) *gustavi*, sp. n., *id.* JB. mal. Ges. vii. p. 381, Transcaucasia, near the Persian frontier.

Clausilia (*Nenia*) *adusta*, *quadrata*, *jolyi*, and *trigonostoma*, spp. nn., *id.* Nachr. mal. Ges. 1880, pp. 111–114.

Pupa (*Torquilla*) *psarolena* (Bourg.), *quinquedentata* (Born.), varr. nn. *præhistorica* and *speluncarum*, and *obliqua*, sp. n., diluvial deposits in the caves of Mentone; Nevill, P. Z. S. 1880, pp. 124-126, the last pl. xiii. fig. 4.

Pupa piniana, sp. n., near *secale*, and *aulusensis*, sp. n., near *pyrenœaria*, Fagot, Bull. Soc. Agric. Pyr. Or. 1880, figured, Aulus, Dép. Ariège, Pyrenees.

Pupa nansontyana, sp. n., Pic de Midi, and *clausilioides* (Boubée), described by the same, Bull. Soc. Toulouse, 1880. *P. dupuyi* (Westerl.) = *brauni* (Rossm.), juv.; *id. ibid.*

Pupa leptocheilos [*-chilus*], new name for *pyrenaica* (Farines, *nec* Boubée) = *megachilus* var. *tenuimarginata* (Desmoulins) Fagot ; (separate paper without date).

Pupa (*Pupilla*) *muscorum* (L.) var. *caucasia* (Böttg.) = *triplicata* var. *cylindrata* (Böttg., 1879), distinct from *triplicata*, Kasbek, and *signata* (Mouss.), Tiflis, Böttger, JB. mal. Ges. vii. pp. 136 & 137.

Pupa, subg. *Orcula*. The known species reviewed, and their geographical distribution pointed out, by O. Reinhardt. *P. doliolum* (Brug.) generally distributed in Central Europe ; next to it, *P. trifilaris* (Mouss.) in the Caucasus, and *imbricata* (Jickeli) in Abyssinia; somewhat more different, *P. orientalis* (Parr.) in different parts of Western Asia, *mesopotamica* (Mouss.) and *scyphus* (Friv.) = *lindermeyeri* (Parr.) in Greece ; a third group is formed by *P. dolium* (Drap.), *gularis* (Rossm.), *conica* (Rossm.), these three in and near the Alps, and *schmidti* (Küst.), Banat and Montenegro. SB. nat. Fr. 1880, pp. 12–21.

Pupa doliolum does not occur near Danzig ; Reinhardt, Nachr. mal. Ges. 1880, p. 32.

Pupa doliolum (Brug.) found in Italy at Torno, Lake of Como ; Pini, Atti Soc. Ital. xxi. p. 627.

Pupa (*Orcula*) *moussoni*, sp. n., Reinhardt, SB. nat. Fr. 1880, p. 44, Aleppo.

Pupa (*Orcula*) *schmidti* (Küst.) again found in Montenegro ; Böttger, Ber. Offenb. Ver. 1880, p. 106.

Pupa (*Sphyradium*) *truncatella* var. n. *biarmata*, id. *l. c.* p. 109, Ragusa.

Pupa (*Sphyradium*) *bourguignatiana*, sp. n., with subvar. *obesa*, var. *plagiostoma*, subvar. *angusta*, var. *præclara*, and var. or sp. n. ? *grimaldiensis*, *P.* (*Sph.*) *jolyana* and *austeniana*, spp. nn., all from the diluvial deposits in the caves of Mentone, Nevill, P. Z. S. 1880, pp. 127–131, pl. xiii. figs. 5–9.

Pupa (*Columella*) *edentula* (Drap.) var. n. *nana*, Böttger, JB. mal. Ges. vii. p. 139, pl. iv. fig. 9. *P. inornata* (Mich.) is quite distinct from *edentula* ; id. *ibid.*

Tesseraria, new group of *Pupa*, sect. *Columella* ; costulate, reddish brown, with pale spots near the suture : for *P. novoseelandica* (Pfr.). Böttger, in Martens's Conchol. Mitth. p. 69.

Pupa (*Vertigo*) *substriata* (Jeffr.) var. n. *mitis*, Böttger, JB. mal. Ges. vii. p. 140, pl. iv. fig. 7, Abastuman and Kasbek ; *P.* (*V.*) *sieversi* (Böttg.) var. n. *subalpestris*, id. *l. c.* p. 141, Kasbek.

Vertigo moulinsiana (Dupuy) ; Groves, Tr. Hertf. Soc. i. p. 81, pl. i.

Pupa (*Vertigo*) *sinistrorsa*, sp. n., Craven, P. Z. S. 1880, p. 618, pl. lvii. fig. 8, Algoa Bay and Beaufort, Cape Colony.

Cylindrovertilla, new group of *Pupa*, sect. *Vertigo*. Left-whorled, only one parietal plait. *P. fabreana* (Crosse) and *paitensis* (Crosse), New Caledonia. Böttger, in Martens's Conchol. Mitth. pp. 62–64.

Ptychochilus, new group of *Pupa*, sect. *Vertigo*. Shell costulate, a strong angular plait in the upper edge of the aperture. Type, *P. tantilla* (Gould), Tahiti, with the following varieties :—*paivæ* (Crosse), Mangarewa, *plcurophora* (Shuttl.) = *dunkeri* (Zelebor), Tahiti and Marquesas, *armata* (Pease), Borabora, *dentifera* (Pease), Hervey Islands, *godeffroyi*,

n., Samoa Islands, *tongana* (Semper), Tongatabu, and *vitiana*, n., Viti Islands. Other species:—*eapensis*, sp. n., Eap or Yap, Carolines, *newcombi* (Pfr.) = *costulosa* (Harper), with var. n. *seminulum*, Hawaiian Islands, *admodesta* (Mighels), *perlonga* (Pease), and *lyrata* (Gould) = *striatula* (Pease), Hawaiian Islands. All figured. Böttger, in Martens's Conchol. Mitth. pp. 47–62, pls. x.–xii. figs. 1–17.

Leucochilus (= *Leucochila* b. Martens, 1860), new section of *Pupa*, widely distributed; *P. pediculus* (Shuttl.) = *artensis* (Montrouz.) = *nitens* (Pease) = *nacca* (Gould) = *hyalina* (Zelebor), Marquesas, Society, Cook, Samoa, Hapai, Tonga, Viti, Ellice, Marshall, and Hawaiian Islands, and New Caledonia. *P. pfeifferi*, sp. n., Pitcairn Island. Böttger, *l. c.* pp. 64–69, the latter pl. xii. fig. 18.

Pupa cincinnatiensis (Judge) originally described in J. Cincinn. Soc. i. [1878] p. 39, with woodcut.

Pupa desiderata and *ovum-formicæ*, spp. nn., Weinland, JB. mal. Ges. vii. p. 377, with woodcuts, Hayti. [The author places them in the group *Pupilla*, but the Recorder thinks they belong rather to *Leucochila*, near *pellucida* (Pfr.).]

Pupa microdonta (Döring, 1879) = *pazi* (Hidalgo, 1869); Kobelt, Nachr. mal. Ges. 1880, p. 84.

Pupa (*Pupisoma*) *everardi* (Blanf.), between Bombay and Poona; Blanford, J. A. S. B. xlix. pt. 2, p. 199.

Goniognatha.

Bulimus (*Placostylus*) *fibratus* (Martyn). Subscalarid varieties caused by irregular healing of a former fracture; Crosse, J. de Conch. xxviii. pp. 323–325, pl. xi. figs. 3, 3 *a*, & 3 *b*.

Placostylus caledonicus var. n. *edentula*, Brazier, P. Linn. Soc. N. S. W. v. p. 190, West coast of New Caledonia.

[*Placostylus*] *Bulimus senilis* var. n. *sinistrorsa*, Gassies, J. de Conch. xxviii. p. 327, pl. x. fig. 3, Isle of Pines, New Caledonia; *B. gaudryanus*, *subsenilis*, and *arenosus*, spp. nn., *id.* Faune Conch. N. Caled. iii., New Caledonia. *B. infundibulum*, *æsopus*, *imbricatus*, *superfasciatus*, *patens*, *necouensis*, *carbonarius*, and *bulbulus* are all only varieties or monstrosities of *B. fibratus*; id. *ibid.*

Orthalicus. Some notes on the glands of its genital apparatus by C. Semper, Reis. Philippin. Landmoll. 5, p. 248, pl. xv. figs. 2, 8–10.

Zebra fulgur (Miller, 1878) = *Bulimus bifulguratus* (Rv.) juv.; Dohrn, JB. mal. Ges. vii. p. 88.

Cylindrella abdita, *unguiculata*, and *remota*, spp. nn., Arango, Faun. mal. Cub. pp. 276 & 277, Cuba.

Cylindrella klatteana, *rudis*, *mabuia*, *monticola*, spp. nn., and *sericea* (Pfr.) var. n. *kisslingiana*, Weinland, JB. mal. Ges. vii. pp. 357–364, the three latter pl. xii. figs. 15–17. *C. seminuda* (Pfr.), from Jamaica, occurs also in Hayti, p. 358.

Elasmognatha.

Succinea obliqua (Say) in North America is infested by a *Leucochloridium*; Bland, J. de Conch. xxviii. p. 203.

Succinea putris (L.), *pfeifferi* (Rossm.), *elegans* (Risso), allied to the former, but distinct, and *oblonga* (Dr.), many varieties figured, several copied from Baudon and others; Kobelt, Iconogr. vii. pp. 66–78, pls. ccii. & cciv. figs. 2045–2083. *S. hungarica* and *kobelti* (Hazay, MS.), spp. nn., *id. l. c.* pp. 72 & 75, figs. 2071–2074, & 2084, Buda-Pest.

Succinea putris var. n. *globuloides*, Vegesack, near Bremen, var. n. *bavarica*, Schwarzanger, Bavaria, and several other varieties distinguished by Baudon found also in Germany; Clessin, Nachr. mal. Ges. 1880, pp. 25–31.

Succinea suecica, sp. n., and *pfeifferi* var. n. *nilssoniana*, Clessin, Mal. Bl. (2) ii. p. 153, Medelpad, Sweden.

Succinea pleurolacha (Letourn.) var. n. *baudoniana*, Pini, Atti Soc. Ital. xxi. 1879, p. 622, Belgiojosa, Province of Pavia.

Succinea adowensis, sp. n., Bourguignat, Descr. Div. Esp. 1879, Abyssinia.

Succinea collina (Blanf.), Mahabaleshwar, Western Ghats, on rocks; Blanford, J. A. S. B. xlix. pt. 2, p. 200.

Succinea viridicata, sp. n., Gassies, Faune Conch. N. Caled. iii., New Caledonia.

Succinea sp., not named, and notes on some other known species from Hayti; Weinland, JB. mal. Ges. vii. p. 368, pl. xii. fig. 18.

Vaginulidæ.

Vaginulus hasselti (Martens), Sumatra. Radula described by Schepman, in Veth's Middel-Sumatra, iv. 3, p. 5, pl. ii. fig. 1.

Onchidiidæ.

Onchidium celticum (Cuv.). The organ opening near the hinder end on the under side of the mantle, regarded as lungs by Cuvier, is really the renal organ, homologous to the organ of Bojanus in the Bivalves; the heart is situated according to the type of the *Opisthobranchia*, and the respiratory function is performed by the dorsal surface of the mantle and its appendages, according to the anatomical researches of J. Joyeux-Laffaie, C. R. xci. pp. 997–1000; abstract in J. R. Micr. Soc. (2) i. p. 229. [In consequence of this statement, this species, and possibly all *Onchidiidæ*, must be removed from the *Pulmonata* to the *Nudibranchia*. —Rec.]

C. Semper regards (as usually) this organ as the lungs, and states the existence of a deeply-imbedded vas deferens, connecting the duct of the hermaphrodital gland with the penis, giving a table of 22 species examined by himself, according to the presence or absence of an appendicular gland of the penis, of a cartilaginous tube in the latter or a cartilaginous papilla on it, and of distinct notches in the edge of the mantle; Reis. Philippin. Landmoll. 5, pp. 251–254.

Onchidium verruculatum (Cuv.), Singapore, Philippines, &c., number and disposition of dorsal eyes very variable; *nebulosum*, sp. n., Pelew Islands; *tonganum* (Quoy & Gaim.) = ? *peroni* (Cuv.), Mauritius, Philippines, &c.; *savignii*, new name for *peroni* of Savigny, Descr. de l'Egypte, *nec* Cuvier, Red Sea and Philippines; *typhæ* (Buchanan), British India; *tumidum*, sp. n., Singapore and Port Mackay, Australia, *glabrum*, sp. n, Luzon, and *ambiguum*, sp. n., Singapore and Pelew Islands. Semper, Reis. Philippin. Landmoll. 5, pp. 255–264, pls. xix. & xx., figures of entire animal and disposition of the eyes, pls. xxii. & xxiii., anatomical figures. Some other new species not yet described are figured on these plates.

Onchidella campbelli, sp. n., Filhol, C. R. xci. p. 1094, Campbell Island. 28 marginal holes.

Auriculidæ.

A general account of this family, with peculiar regard to the anatomy, by Fischer & Crosse, Moll. de Mexique, vii. pp. 1–8.

Carychium lederi, sp. n., Böttger, JB. mal. Ges. vii. p. 383, Transcaucasia.

Pedipes (Fér.). Anatomical description; the inner septa of the whorls are not destroyed; *P. liratus* (Binn.), S. Lucas, California, and *unisulcatus* (Carp.), Mexico, described by Fischer & Crosse, *l. c.* pp. 25–30, the latter pl. xxxiv. fig. 11.

Scarabus chalcostomus (Ad.). Radula; *iid. l. c.* pl. xxxvi. figs. 16–19.

Scarabus regularis, *intermedius*, and *lacteolus*, spp. nn., Gassies, Faune Conch. N. Caled. iii., New Caledonia.

Monica firmini (Payr.). Radula; Fischer & Crosse, *l. c.* pl. xxxvi. figs. 20 & 21.

Melampus (Montf.). Anatomical notes on *M. luteus* (Q. & G.); *iid. l. c.* pp. 11–20, pl. xxxvi. figs. 4–13. *M. coffea* (L.), East coast of Mexico and Central America, and *olivaceus* (Carp.), Mazatlan, pp. 20–24, pl. xxxiv. figs. 9 & 10, radula of the latter pl. xxxvi. figs. 14 & 15.

Auriculastra, subg. n. of *Marinula*. With thickened lip of the aperture; distinct from *Auricula* proper by the normal position of the eyes. Type, *Auricula subula* (Q. & G.) and *elongata* (Parr.). Martens, Moll. Maur. p. 207.

Melampus frayssii (Montr.) and *sulcatus*, spp. nn., Gassies, Faune Conch. N. Caled. iii., New Caledonia. The former = *ovuloides* (Baird, 1873); Crosse, J. de Conch. xxviii. p. 264. The latter name, being pre-occupied, is changed into *caledonicus*; Gassies, J. de Conch. xxviii. p. 328, pl. x. fig. 4.

Blauneria heteroclita (Montagu). History and some anatomical notes by Fischer & Crosse, *l. c.* pp. 9 & 10, shell pl. xxxiv. fig. 14, radula pl. xxxvi. figs. 1–3.

Cœlestele. History of the genus, and 11 new species described:—

(*a*) Smooth: *scalaris* (Bens.), India; *africana* and *ægyptiaca*, spp. nn., Egypt; *lævigata*, *castroiana*, and *hispanica*, spp. nn., Spain.

(*b*) Striated: *arabica* and *isseli*, spp. nn., Arabia; *servaini* and *tumidula*, spp. nn., Spain.

(*c*) Plaited: *letourneuxiana* and *raphidia*, spp. nn., Spain.

Bourguignat, Description di *Celestele* et *Paladilhia*, pp. 1–19.

Limnæidæ.

General historical and anatomical account of this family, by Fischer & Crosse, Moll. de Mexique, 7, pp. 31 & 32, with table of 12 genera.

Chilina portillensis, sp. n., Hidalgo, J. de Conch. xxviii. p. 322, pl. xi. fig. 1, Portillo, in the Cordillera, between Chili and the Argentine Republic, 4000 metres.

Limnæa. General anatomical and historical observations on the genus by Fischer & Crosse, *l. c.* pp. 38–48. The edge of the aperture becomes expanded, if the animal comes into rough water, where it is compelled to cling to the ground. Dietz, JB. Ver. Augsb. xxv. [1879] p. 94.

Limnæa (*Bulimnæa*) *megasoma* (Haldem.), anatomical description, by A. G. Wetherby, J. Cincinn. Soc. ii. [1879], pp. 93–97, with woodcuts. According to the author, the anatomical relations of *Limnæa* are nearer to *Limax* than *Planorbis*.

Limnæa stagnalis, var. n. *violacea*, Mme. Paulucci, Catalogo delle Sezione Italiana dell' Esposizione internazionale di Pesca in Berlino, 1880, p. 189 (German edn. p. 71). Rome.

Limnæa stagnalis (L.), var. *lacustris* (Stud.), *turgida* (Menke), and *goktschana* (Mouss.), and *L. ovata*, var. *papilla* (Hartm.), all from Lake Goktscha, Armenia; Martens, Mél. Biol. x. pp. 389–391.

Limnæa anglica, sp. n. [?], Mabille, Guide Nat. 1880, No. 3, Manchester.

Limnæa ovata, var. *glacialis* (Dupuy), Lac de Guery, Dép. Puy de Dôme, described, P. Fischer, J. de Conch. xxviii. pp. 297 & 298.

Limnæa frigida, var. n. *nivalis*, Val Brembana, Province of Bergamo, and var. n. *glaçialis* [pre-occupied], Val Gavia, Prov. of Sondrio, Pini, Atti Soc. Ital. xxi. [1879], pp. 620 & 621.

Limnæa parvula, sp. n., and *ovata*, var. n. *piniana* (Hazay, MS.), both from Buda-Pest, and some varr. of *auricularia* and *peregra*; Kobelt, Iconogr. vii. pp. 78 & 79, pl. 204, figs. 2089–2093.

Limnæa truncatula (Müll.), var. n. *umbilicata* [name pre-occupied], Brevière, Cat. des Moll. test. du Dép. de la Nièvre, p. 19, Saint Saulge, Dép. de la Nièvre, France.

Limnæa martorelli (Bourguignat), figured in Fr. Martorell y Peña's Apuntos Arqueologicos (Barcelona: 1879).

Limnæa taurica, sp. n., Feodosia, Crimea, and *karpinskii* (Siemaschko), Moscow; Clessin, Mal. Bl. (2) ii. pp. 198 & 197.

Limnæa attenuata (Say) = *subulata* (Dunker), and *L. cubensis* (Pfr.) = *umbilicata* (C. B. Adams), Mexico; Fischer & Crosse, Moll. de Mexique, 7, pp. 38–53, pl. xxxvii. figs. 11 & 12.

Limnæa mauritiana (Morelet), very near the Indian *sulcatula* (Troschel) and *acuminata* (Lam.), Martens, Moll. Maur. p. 209, pl. xix. figs. 9 & 10.

Limnæa javanica (Hasselt), Sumatra, radula, Schepman, in Veth's Middel-Sumatra, iv. 3, p. 9, pl. ii. fig. 5.

Limnæa subaquatilis and *papyracea*, spp. nn., Tate, Tr. R. Soc. Adelaide, iii. p. 103, pl. iv. figs. 5 & 6, South Australia.

Aplexa aurantiaca (Carp.) and *elata* (Gould), Central America, figured, but not yet described, by Fischer & Crosse, Moll. de Mexique, 7, pl. xxxii. figs. 1 & 2, pl. xxxiii. fig. 1.

Physa stabilii, sp. n., Lessona, Atti Soc. Rom. (3) vii. Mem. Sci. fis. p. 370, pl. iv. fig. 12, Lago d'Azeglio, Piedmont.

Physa borbonica (Fér., 1827) = *seychellana* (Martens), a variety of it, *nana* (Pot. & Mich.), Réunion; Martens, Moll. Maur. p. 209, the latter pl. xix. figs. 11 & 12.

Physa lirata, sp. n., Craven, P. Z. S. 1880, p. 617, pl. lvii. fig. 10, Mooi River, Transvaal.

Physa perlucida, sp. n., Gassies, Faune Conch. N. Caled. iii., New Caledonia.

Physopsis. List of known species, *eximia*, *stanleyana*, *præclara*, *ovoidea*, *letourneuxi*, and *lhotelleri*, spp. nn., the two latter from Egypt, Bourguignat, Descr. Div. Esp. 1879.

Pyrgophysa mariei (Crosse, 1879), fully described by Crosse, J. de Conch. xxviii. pp. 140–142, pl. iv. fig. 3, Nossi-bé, Madagascar. The genus is characterized by the turreted spire, and also *P. wahlbergi* (Krauss) and *ludoviciana* (Rang.) are referred to it. [The Recorder thinks that it passes gradually into *Isidora* (Ehrenberg)].

Isidora forskali (Ehrenb.), from Mauritius, perhaps = *cernica* (Morelet); Martens, Moll. Maur. p. 210, pl. xix. figs. 7 & 8.

Planorbis: general anatomical account of the genus; Fischer & Crosse, Moll. de Mexique, 7, pp. 53–60.

Planorbis corneus (L.), found at Schaffhausen, Switzerland; Sterki, Nachr. mal. Ges. 1880, p. 84.

Planorbis glabratus (Say), the genuine species from the Miami country, Florida, not recognized by subsequent authors, described, and *P.* (*Helisoma*) *durii*, sp. n., also from Florida; Wetherby, J. Cincinn. Soc. ii. [1879], pp. 97–99, with woodcuts.

Planorbis tenuis (Phil.) = *wyldii* (Tryon), with var. n. *boucardi* (Mexico), *tumens* (Carp.), Mazatlan and Guatemala, *ancylostomus* (Crosse & Fischer, 1879) = *trivolvis*, var. ? of Strebel, with varr. *strebelianus* and *chiapasensis*, Mexico, *lentus* (Say), New Orleans and ? Mexico, *tumidus* (Pfr.), Mexico, and *belizensis* (Crosse & Fisch.), Tabasco and Coban; Fischer & Crosse, Moll. de Mexique, 7, pp. 60–68, pl. xxxii. figs. 3–6, pl. xxxiii. fig. 3, pl. xxxiv. figs. 1–4.

Planorbis marginatus harbours the *Cercaria* of the smaller fluke (*Distoma lanceolatum*), *Limnæa truncatula* probably that of the larger species (*D. hepaticum*); Cobbold, Zool. Anz. iii. p. 257. Rolleston thinks that *Arion ater* is the slug which harbours the younger stages of the fluke; *tom. cit.* p. 258.

Planorbis vorticulus (Trosch.), with var. *charteus* (Held) = *bavaricus* (Westerl.) = *acies* (Mühlf., Rossm.), and var. n. *helvetica*, probably from Switzerland; the species extends from Holland to Central Russia, and

from Southern Sweden to Northern Italy. Clessin, Mal. Bl. (2) ii. pp. 208–210.

Planorbis dispar (Westerl.), distinct from *contortus* (Müll.); *id. l. c.* pp. 158–160.

Planorbis pauluccianus, sp. n. (Caroti, MS.), Mme. Paulucci, Catalogo della Sezione Italiana dell' Esposizione internazionale di Pesca in Berlino, 1880, p. 191 (German edn., p. 71), Viareggio.

Planorbis rollandi, sp. n., Morlet, J. de Conch. xxviii. p. 355, subfossil at Tamerna, Djedida, in the Saharan region of Algeria.

Planorbis adowensis, sp. n., Bourguignat, Descr. Div. Esp. 1879, Abyssinia.

Planorbis rossiteri (Crosse, 1871) = *fabrii* (Gass., 1880); Crosse, J. de Conch. xxviii. p. 142, pl. iv. fig. 4, Loyalty Archipelago, New Caledonia.

Planorbis (*Tropidiscus*) *cultratus* (Orb.), Mexico, and *sumichrasti* (Cr. & Fisch.), Tehuantepec; Fischer & Crosse, Moll. de Mexique, pp. 68–70, pl. xxxii. fig. 7, & pl. xxxiii. fig. 6.

Planorbis (*Gyrorbis*) *orbiculus* (Morelet) = *haldemani* (Dunker), Mexico, *maya* (Morelet), Yucatan and Tehuantepec, *retusus* (Morelet) Yucatan, *petenensis* (Morelet), Guatemala, and *æruginosus* (Morelet), Guatemala; *iid. l. c.* pp. 70–75, pl. xxxii. figs. 8–10, pl. xxxiii. figs. 4 & 5.

Drepanotrema, subg. n. of *Planorbis*. "Anfractus subglobosi, ultimus amplectens, apertura anguste lunata." American, analogous to the European *P. contortus*. *P.* (*Dr.*) *yzabalensis* (Cr. & Fisch., 1879), Tabasco and Guatemala. *Id. l. c.* pp. 59 & 75, pl. xxxiii. fig. 2.

Planorbula (Hald.) is generically distinct on account of the internal teeth. *P. obstructa* (Morelet, as *Planorbis*) = *berendti* (Tryon), Mexico and Yucatan, and *dentiens* (Morelet), with var. *cannarum*, Central America; *iid. l. c.* pp. 76–80, pl. xxxiii. figs. 7 & 8, & pl. xxxiv. figs. 6 & 7.

Ancylus. General anatomical account of the genus; *iid. l. c.* p. 33.

Clessin begins a monograph of this genus in Küster's Conch. Cab. pt. 299, pp. 11–40. To the subgenera *Ancylastrum* (Bourg.), type *fluviatilis*, and *Velletia* (Gray), type *lacustris*, he adds the two following as new:—

Cumingia ‖; shell conical, top coiled, aperture oval. *A. cumingianus*, Australia, p. 14.

Haldemania: shell conical, top slightly eccentric, but not bent backwards, aperture rounded or oval; type, *A. obscurus* (Hald.), N. America, *ibid.*

Ancylus. 39 species described and the majority figured by Clessin, *l. c.*; the following have not been figured before:—*A. textilis* (Guppy), p. 26, pl. viii. fig. 6. Trinidad; *orbicularis* (Held, 1837) = *cyclostoma* (Bourg., 1853) = *vitraceus* (Morelet, 1845), p. 32, pl. v. fig. 5, France, Southern Germany and Portugal; *subcircularis*, sp. n., p. 33, pl. iv. fig. 13, Reichenberg in Bohemia; *dybowskii*, sp. n., p. 38, pl. vii. fig. 1, Lake Baikal; *ellipticus*, sp. n., p. 39, pl. iii. fig. 12, Bœotia and Eubœa; *pileolus* (Fér.), p. 40, pl. viii. fig. 3, Greece.

Ancylus modestus, sp. n., Crosse, J. de Conch. xxviii. p. 150, Nossi-bé, Madagascar.

Ancylus transvaalensis, sp. n., Craven, P. Z. S. 1880, p. 617, pl. lvii. fig. 11, Mooi River, Transvaal.

Ancylus australicus, sp. n., Tate, Tr. R. Soc. Adelaide, iii. p. 102, pl. iv. fig. 4, South Australia.

Ancylus excentricus (Morelet), Guatemala, and *sallæi* (Bourg.), Mexico, Fischer & Crosse, Moll. de Mexique, 7, pp. 36–38, pl. xxx. figs. 16 & 17.

Lanx, g. n. "Testa magna, patelliformis, antice et postice elevata, tenuis, striis concentricis ornata, vertice obtusissimo, rotundato, apertura ovata, marginibus acutis; dentes laterales radulæ lati, bicuspidati; dens centralis minutus, simplex." For *L. newberrii* (Lea, as *Ancylus*). Clessin, in Küster's Conch. Cab. pt. 299, pp. 10 & 11, pl. v. fig. 8. *A. patelloides* (Lea) probably belongs also to this genus.

Gundlachia. 5 known species described and figured by Clessin, *l. c.* pp. 2–5, pl. i. figs. 1–5, pl. ii. figs. 1–9, pl. iii. figs. 1–3, & pl. vi. fig. 1, Cuba and United States.

Poeyia gundlachioides (Bourg.), *id. l. c.* p. 6, pl. vi. fig. 3, Cuba.

Brondelia, 2 known species; *id. l. c.* p. 7, pl. iv. figs. 3 & 5, Algeria.

Latia, 2 known species; *id. l. c.* pp. 8 & 9, pl. ii. figs. 10–14, & pl. v. fig. 6.

Thalassophila.

Siphonaria redimiculum (Reeve). Anatomical note; T. Studer, MT. Ges. Bern, 1880, pp. 14 & 15.

Siphonaria. The Australian species enumerated and discussed, *S. zonata*, sp. n., = *denticulata* var. *tasmanica* (Woods, *olim*), South Tasmania; J. E. Tenison Woods, P. R. Soc. Tasm. 1877 [1878], pp. 99 & 100. Note on a species from N.E. Australia, *id.* P. Linn. Soc. N. S. W. v. p. 113.

Gadinia mauritiana, sp. n., Martens, Moll. Maur. p. 310, pl. xxii. fig. 3, Mauritius.

PULMONATA OPERCULATA.

Cyclophoridæ.

Opisthophorus biciliatus (Mouss.). Note by Jousseaume, Le Nat. No. 42, p. 333.

Spiraculum travancoricum (Beddome, MS.), sp. n., Blanford, J. A. S. B. xlix. pt. 2, p. 212, pl. iii. fig. 6, Mountains of Travancore.

Cyclotus alabastris, sp. n., Craven, P. Z. S. 1880, p. 619, pl. lvii. fig. 9, Algoa Bay.

Amphicyclotus, g. n., *boucardi* (Sallé, as *Cyclophorus*), *texturatus* (Sow.), and *ponderosus* (Pfr.), Central America, figured but not described by Fischer & Crosse, Moll. de Mexique, pt. vii. pl. xxxv. figs. 1–3.

Habropoma, g. n., *salleanum* (Martens, as *Cyclophorus*) and *mexicanum* (Menke), Mexico, figured but not described; *iid. l. c.* pl. xxxv. figs. 4 & 5.

Cyclophorus magilensis, sp. n., Craven, P. Z. S. 1880, p. 218, pl. xxii. fig. 1, Magila, Usambara Country, E. Africa.

Pupinidæ.

Pupina superba (Pfr.), Sumatra, Schepman, in Veth's Middel-Sumatra, iv. 3, p. 11, pl. i. fig. 2 ; radula, pl. ii. fig. 6.

Cataulus costulatus and *albescens*, spp. nn., Blanford, J. A. S. B. xlix. pt. 2, pp. 213 & 214, Mountains of Travancore, the first, pl. iii. fig. 7. *C. calcadensis* (Blanf.), fresh of golden-brown colour, *tortuosus* (Chem.), nearly allied to it, and probably also from Southern India, *id. l. c.* pp. 215 & 216.

Hybocystis. Operculum calcareous, outside 4-5, inside 1½ whorls; Crosse, J. de Conch. xxviii. p. 138.

Hainesia (Pfr., 1856) = *Mascaria* (Angas, 1878), distinct from *Megalomastoma* by the paucispiral angular operculum. Sect. 1. *Hainesia* (s. str.), without epidermis, whorls somewhat convex; *crocea* (Sow.), Madagascar, and *bifasciata* (Sow.), probably not from Guayaquil, which locality is given by Sowerby. Sect. 2. *Dacrystoma* (Cr. & Fisch., 1871), with very thin deciduous epidermis, whorls flattened; *arborea* (Cr. & Fisch.) and *liturata* (Morel.), both from Madagascar, Crosse, J. de Conch. xxviii. pp. 135–140.

Cyclostomatidæ.

Ligatella, subg. n. of *Cyclostoma*. Shell rounded, conical, of moderate size, ordinarily banded. aperture simple. Type, *C. ligatum* (Müll.), Martens, Moll. Maur. p. 187.

Cyclostoma sulcatum var. = ? *physetum* (Bourg.), sub-Alpine region of the Alpes Maritimes, and *lutetianum* (Bourg.) diluvial deposits in the caves of Mentone ; Nevill, P. Z. S. 1880, p. 141.

Cyclostoma scrobiculatum (Mouss.), Morelet, J. de Conch. xxviii. p. 65, pl. iii. fig. 3, Morocco.

Cyclostomus habichi var. n. *minor* and *C. dentilobatus*, sp. n., Weinland, JB. mal. Ges. vii. pp. 343 & 344, Hayti.

Cyclostoma (*Tudora*) *kazika* (Weinl.) = *basicarinatum* (Pfr.), Weinland, JB. mal. Ges. vii. p. 349. *Chondropoma santacruzense* (Pfr.) is its living representative ; *id. ibid.*

Cyclostoma (*Choanopoma*?) *gonavense* and *latius*, spp. nn., *id. l. c.* pp. 340 & 342, pl. xii. figs. 2 & 3, Hayti.

Choanopoma blandi and *laceratum*, spp. nn., *id. l. c.* pp. 541 & 542, Hayti.

Cyclostoma (*Chondropoma*?) *inaguense*, Bahamas, and *kisslingianum*, Hayti, spp. nn., *id. l. c.* pp. 345 & 346, the latter pl. xii. fig. 13.

Chondropoma lindenianum and *brownianum*, spp. nn., *id. l. c.* pp. 344 & 347, pl. xii. figs. 5 & 14, Hayti.

Pomatias lapurdensis, sp. n., Fagot, Bull. Soc. Toulouse, 1880, Lourdes.

Pomatias fagoti, sp. n. (Bourguignat, MS.), *id.* Bull. Soc. Agric. Pyr. Or. 1880, figured ; Aulus, Dép. Ariège, Pyrenees.

Pomatias herculaeus (Bourguignat, MS.), sp. n., Nevill, P. Z. S. 1880, p. 139, pl. xiv. fig. 8, diluvial deposits in the caves of Mentone, with *Helix paretiana*.

Pomatias stabilii, sp. n., Lessona, Atti Acc. Rom. (3) vii. Mem. Sci. fis. 1879–80, Piedmont.

Pomatias reitteri, sp. n., Böttger, JB. mal. Ges. vii. p. 232, Croatia.

Pomatias hirci (Stossich), *clessini* (Stoss.), and *stossichi* (Clessin), from the Karst, Illyria, described by D. Hirc, Verh. z.-b. Wien, xxx. pp. 521 & 522.

Pomatias martensianus (Möllend.), var. n. from Montenegro; Böttger, Ber. Offenb. Ver. 1880, p. 112.

Omphalotropis mœbii, sp. n., Mauritius, and table of peculiar characters of the known species from this island; Martens, Moll. Maur. p. 189, pl. xix. fig. 1.

Realia (*Omphalotropis*) *andersoni*, sp. n., Blanford, J. A. S. B. xlix. pt. 2, p. 216, pl. ii. fig. 18, Andaman Islands.

Realia pallida and *decussata*, spp. nn., *id. l. c.* pp. 217 & 218, Andaman Islands.

Truncatellidæ.

Acme foliniana, sp. n., with varr. *emaciata* and *pachystoma*, diluvial deposits in the caves of Mentone, Nevill, P. Z. S. 1880, pp. 136 & 137, pl. xiv. figs. 4–6.

Acme perpusilla, Banat, and *similis*, Transylvania, spp. nn., *œdogyra* (Palad.), found also in Transylvania, and *veneta* (Pirona) = *moutoni* (Dupuy), Reinhardt, SB. nat. Fr. 1880, pp. 45–47.

[*Acme*] *Acicula moussoni* (Böttg.), Transcaucasia, description completed from full grown specimens; Böttger, JB. mal. Ges. vii. p. 148.

A paper on this genus by L. de Folin, "Considérations sur le genre *Acme*" (Bordeaux: 1880, 20 pp., 1 pl.) has not been seen by the Recorder.

Renea, g. n. "Testa imperforata, perelongata, cylindrica, anfractibus numerosis, compressis ac costulatis, labro externo prope angulum superiorem scissura notabili munito, margine peristomatis obtuso, intus incrassato, extus costa callosa nulla." *R. bourguignatiana*, sp. n., diluvial deposits in the caves of Mentone. *Acme moutoni* (Dupuy) also belongs to this genus. Nevill, P. Z. S. 1880, pp. 137 & 138, pl. xiv. fig. 7.

Albertisia, g. n.; no generic character given; animal not known. *A. punica*, sp. n., Issel, Ann. Mus. Genov. xvi. p. 275, with woodcut. Megerdah, near Utica, Tunisia. [Looks very like a *Truncatella*.]

Locardia, g. n. "Testa elongato-conica, apice obtuso, rotundato, anfractibus valde rapide accrescentibus, parum convexis, suturis satis profunde separatis; apertura inferne dilatata, margine columellari obliquo; operculata." *L. apocrypha*, sp. n., 4 & 5 millim. in length, alluvial deposits of the Rhone, Folin, J. de Conch. xxviii. pp. 235–238, pl. x. fig. 5. [This figure very much resembles some of the small tropical *Stenogyræ*, which, however, have no operculum.]

Assimineidæ.

Assiminea sinensis, Hongkong, *peaseana*, Ceylon, *bifasciata*, Port Natal, *dohrniana*, Hongkong, *woodmasoniana*, *beddomeana*, *theobaldiana*, *micro-*

sculpta, all from Port Canning, near Calcutta, *hungerfordiana*, mouth of the Rangoon River, and *templeana*, Nicobar Islands, spp. nn., Nevill, J. A. S. B. xlix. pt. 2, pp. 161–166.

Assiminea antipodum, sp. n., Filhol, C. R. xci. p. 1094, Campbell Island. Allied to *A. purchasi*.

Helicinidæ.

Helicina cruciata, *newcombiana*, and *anaguana*, spp. nn., Weinland, JB. mal. Ges. vii. pp. 351 & 352, Hayti, the first and third, pl. xii. figs. 7 & 8.

Trochatella blandi and *brownia*, spp. nn., *id. l. c.* p. 350, pl. xii. figs. 17 & 11, Hayti.

Alcadia blandiana and *gonavensis*, spp. nn., *id. l. c.* pp. 353 & 354, Hayti.

SOLENOCONCHÆ.

Dentalium huttoni and *ecostatum*, spp. nn., Kirk, Tr. N. Z. Inst. xii. pp. 306 & 307, & Ann. N. H. (5) vi. p. 15, New Zealand.

Siphonodentalium honoluluense, sp. n., Watson, J. L. S. xv. p. 89, Honolulu, 40 fath.

BIVALVIA.

E. v. Martens calls attention to certain marks on the inside of the shells of some Bivalves, several of which appear to correspond to the spot where in the living animal the eggs are either formed or hatched. SB. nat. Fr. 1880, pp. 22–24 & 59–62, with woodcuts. [See special instances in the families *Astartidæ*, *Lucinidæ*, *Veneridæ*, and *Corbulidæ*.]

Tubicola.

Aspergillum kobeltianum, sp. n., Löbbecke, JB. mal. Ges. vii. p. 78, pl. ii. fig. 1, locality unknown; *A. cumingi* (Chenu), for comparison, fig. 2.

Pholadidæ.

Scobina, new name for *Pholas* (s. str., H. & A. Adams), type *P. costata* (L.), *Pholas* being restricted to *P. dactylus* (L.) = *Dactylina* (Gray); Bayle, J. de Conch. xxviii. p. 242.

Corbulidæ.

Corbula sulcata (Lam.), from W. Africa, perhaps not distinct from *truncata* (Hinds); Dohrn, JB. mal. Ges. vii. p. 163.

Corbula smithiana, new name for *venusta* (Angas, pre-occupied); Brazier, P. Linn. Soc. N. S. W. iv. p. 388.

Corbula (*Potamomyia*) *prisca*, sp. n., found in shell mounds at Rio

Luiz Alves and Rio Bahu, Prov. Santa Catarina, Southern Brazil; Martens, SB. nat. Fr. 1880, p. 124.

Poromyia granulata (Nyst.). The umbonal part of the mantle-lobes contains a number of eggs, which are seen from without in alcoholized specimens, and this spot corresponds to two internal oblique ridges in the nearly allied genus *Eucharis*, and to the space between the two oblique furrows in *Thetis*. E. v. Martens, SB. nat. Fr. 1880, pp. 61 & 62, with 3 woodcuts.

Saxicavidæ.

Glycymeris kurriana (Dunker), Cumberland Sound, W. of Baffin's Bay, Dall, Bull. U. S. Nat. Mus. No. 15, pp. 145 & 146.

Anatinidæ.

Myodora. Monograph of that genus by E. A. Smith; 22 species described, the following figured: *oblonga* (Reeve) = *curvata* (R.), *ovata* (R.), *trigona* (R.) = *tincta* (R.), *plana* (R.), all from the Philippines, *novæ-zealandiæ*, sp. n., Steward Island, *subrostrata*, sp. n., *antipodum*, sp. n., *boltoni*, sp. n., all from New Zealand, *proxima*, sp. n., Japan, *reeveana*, sp. n. (A. Adams, MS.), China, *tenuisculpta* and *compressa*, spp. nn., localities unknown. P. Z. S. 1880, pp. 578–587, pl. liii.

Thracia angasiana and *jacksoniana*, spp. nn., *id.* J. L. S. xii. 1876, pp. 560 & 561, pl. xxx. figs. 23 & 24, Port Jackson.

Solenidæ.

Solen. Critical notes on some species in Sowerby's continuation of Reeve's Conchologia Iconica, by H. Dohrn, JB. mal. Ges. vii. p. 162.

Tellinidæ.

Heteroglypta, subg. n. of *Psammobia*, distinguished by the remarkable difference in the direction of the sculpture in the anterior and posterior part of the shell. *P. squamosa* (Lam.), *cærulescens* (Lam.) = *tripartita* (Desh.), *bipartita* (Philippi) = *cærulescens* (Reeve), *contraria* (Desh.), &c. Martens, Moll. Maur. p. 331.

Tellina christovalis, E. A. Smith, J. L. S. xii. 1876, p. 560, pl. xxx. fig. 22, Solomon Islands.

Paphiidæ.

Paphia striata (Gmel.), on the Australian coast, from Moreton Bay to Torres Straits; Brazier, P. Linn. Soc. N. S. W. iv. p. 389.

Mactridæ.

Mactra. Weinkauff continues his monograph of this genus in Küster's Conch. Cab. pt. 294, pp. 9–36, pls. vii.–xii., describing and figuring 28 known species. He limits the specific name *stultorum* (L.) to Oceanic

specimens, and calls both the Mediterranean varieties, coloured and white, *M. corallina* (L.), although he himself considers this an artificial separation, p. 22, and admits his doubts as to the true species of Linné, p. 14. *M. portoricensis* (Shuttl.), p. 30, pl. x. figs. 3 & 4, not before figured.

Mactra largillierti (Phil.), *lisor* (Desh.), and *grandis* (Gmel.) : critical notes on them by Dohrn, JB. mal. Ges. vii. pp. 164–166.

Veneridæ.

The line on the inner side of the valves which will be mentioned (p. 101) in the *Astartidæ*, is also seen in *Cytherea crassatelloides* (Conrad), *ponderosa* (Koch), *Venus donacina* (Chemn.), *melanægis* (Dunker), and *undulosa* (Lam.), all comparatively thick shells; Martens, SB. nat. Fr. 1880, pp. 59 & 60.

Circe pythinoides, sp. n., J. E. Tenison Woods, Tr. R. Soc. Vict. xiv. [1878], p. 60, Victoria, Australia.

Venus brasiliana (Gmelin), and a new species of *Corbula* found in old shell mounds ("sambaquis") of Southern Brazil, province Santa Catarina, the former nearly exclusively in all mounds near the coast, the latter in some mounds near the rivers Rio Luiz Alves and Rio Bahu, 12–18 kilometres from the coast. E. v. Martens, SB. nat. Fr. 1880, pp. 123–125.

Chione calophylla (Jonas) with a pearl; Brazier, P. Linn. Soc. N. S. W. iv. p. 471.

Sunetta clessini, sp. n., Ancey, Le Nat. 1880, No. 26.

Tapes victoriæ, sp. n., J. E. Tenison Woods, Tr. R. Soc. Vict. xiv. [1878], p. 60, Hobson's Bay, Australia.

Cyrenidæ.

Corbicula largillierti (Phil.), *obtruncata*, *adunca*, *gentiliana*, *bezauriana*, *foukiensis*, *astronomica*, *cordieriana*, *bicolor*, *diminuta*, *aquilina*, *uncinulata*, *colombeliana*, *vicina*, *conica*, *porcellanea*, *concinna*, *ingloriosa*, *gravis*, *indigotina*, *rathouisiana*, *debrixiana*, *fenouilliana*, *scholastica*, *montana*, *cheniana*, *gryphæa*, *polychromatica*, *lapicida*, *portentosa*, *ignobilis*, *bilineata*, *grilloana*, *papyracea*, *cantatoris*, *sphærica*, *ferruginea*, *iridinea*, *squalida*, *variegata*, *subquadrata*, and *iodina*, spp. nn., Province of Nanking and adjacent regions. Heude, Conchyliologie fluviatile, fasc. x. pls. i.–viii. coloured.

Corbicula oliphantensis, sp. n., Craven, P. Z. S. 1880, p. 618, pl. lvii. fig. 12, Oliphant's River, Transvaal.

Corbicula iravadica (Blanf.), Mandalay, Blanford, J. A. S. B. xlix. pt. 2, p. 221.

Corbicula bavayi, sp. n., Ancey, Le Nat. 1880, (No. 42), p. 334, Maroni River, Cayenne.

Cyrena yukesi (Desh.), common in the mangrove swamps of North-east Australia, eaten by the blacks; J. E. T. Woods, P. Linn. Soc. N. S. W. v. p. 122.

Sphærium rivicola (Lam.), *pallidum* (Gray), *scaldianum* (Normand),

solidum (Norm.), *corneum* (L.), *duplicatum* (Clessin), *wildi* (Cless.), *lacustre* (Müll.) = *calyculata* (Drap.), *deshayesianum*, sp. n. (Hazay, MS.), *terverianum* (Dup.), *ryckholti* (Norm.), and *creplini* (Dunk.); Kobelt, Iconogr. vii. pp. 83–90, pl. ccvii. & ccviii. figs. 2103–2123.

Sphærium padanum, sp. n., Lessona, Atti Acc. Rom. (3) vii. Mem. Sci. fis. p. 370, Piedmont.

Sphærium spinellii, sp. n., intermediate between *rivicola* (Leach) and *cornea* (L.), Mme. Paulucci, Bull. Soc. mal. Ital. vi. pp. 162–165, near Venice.

Calyculina lacustris (Müll.) var. n. *gerfalchensis*, Gerfalco, Prov. of Grosseto, Tuscany, Paulucci, *l. c.* p. 169.

Pisidium amnicum (Müll.) var. *nova* (Clessin, MS.), Milan, and *targionianus* [*-um*], sp. n., Camaldoli, Paulucci, *l. c.* p. 176.

Pisidium, sp. n. ?, without name, Böttger, JB. mal. Ges. vii. p. 149, pl. iv. fig. 5, Suram, Transcaucasia.

Cardiidæ.

Cardium richardsoni, sp. n., Whiteaves, Canad. Nat. viii. [No. 8, Dec. 1878], British Columbia.

Cardium fornicatum (Sow.) is from New Caledonia; Brazier, P. Linn. Soc. N. S. W. iv. p. 391.

Tridacnidæ.

Tridacna squamosa (Lam.) and *Hippopus maculatus* (Lam.) common on the reefs of North-east Australia, the former attached to or imbedded in the coral rock, the latter lying loose, both variable in the colour of the mantle; *T. gigas* only on the edge of the reef. J. E. Tenison Woods, P. Linn. Soc. N. S. W. v. pp. 124 & 125.

Lucinidæ.

Lucina. Certain marks and blotches on the inner face of the valves correspond to a vessel-like cavity in the mantle, which, perhaps, may be filled with eggs at certain seasons; they occur in many recent and fossil species, but are not constant in all specimens of the same species. E. v. Martens, SB. nat. Fr. 1880, pp. 60 & 61, with woodcut, p. 62, *L. clausa* (Phil.).

Divaricella, subg. n. of *Lucina*, distinguished by the diverging furrowed sculpture of the shell. Type, *L. divaricata* (L.), *L.* (*D.*) *angulifera*, sp. n., Mauritius. Martens, Moll. Maur. p. 321, pl. xxii. fig. 14.

Kelliidæ.

Kellia antipodum, sp. n., Filhol, C. R. xci. p. 1095, Campbell Island. Near *K. cycladiformis* (Phil.).

Galeommatidæ.

Scintilla aurantia (Lam.), figure of living animal by Möbius, in Martens's Moll. Maur. p. 322, pl. xxi. fig. 10.

Astartidæ.

Crassatella and *Astarte*. An oblique line seen on the inner face of both valves, originating in the umbonal region, and descending backwards, corresponds to the front edge of the external gill; it is very conspicuous in *C. decipiens* (Reeve) and in many specimens of *A. arctica* (Gray) and *castanea* (Say). Perhaps the young remain in the gills for some time in these genera, as well as in the *Unionidæ*. E. v. Martens, SB. nat. Fr. 1880, pp. 22–24, with 2 woodcuts. The same line is seen in several tertiary species of *Crassatella* and *Cardita*; id. *l. c.* p. 59.

Crassatella uruguayensis, sp. n., E. A. Smith, Ann. N. H. (5) vi. p. 321, East of Uruguay, 48 fath.

Cardita lutea, new name for *zelandica* (Desh., *nec* Potiez & Mich.); Hutton, Manual N. Zeal. Moll. p. 159.

Cardita, sp. n. not named, Dohrn, JB. mal. Ges. vii. p. 170, Prince Island, Guinea.

Unionidæ.

Unio tumidus var. n. *borysthenis*, Dnieper, and var. n. *rohrmanni*, Silesia, *U. cumensis*, sp. n., Lake of Cumæ near Naples, *byzantinus* (Parr.), *lusitanus* (Drouet), and *requieni* var. = *elongatulus* (Drouet, *nec* Mühlf.); Kobelt, Iconogr. vii. pp. 32–34, pl. cxcii. & cxciii. figs. 1950–1957.

Unio ksibianus (Mouss.) = *littoralis* (Cuvier), and *letourneuxi* (Bourg.) = *hispanus* (Lowe); critical notes by Morelet, J. de Conch. xxviii. pp. 79–81.

Unio kleciaki, dalmaticus, ceratinus (all of Drouet), Dalmatia, *schwerzenbachi* (Parr.), Messenia, *dissectus* (Drouet), Volo, Kobelt, Iconogr. vii. pp. 80–82, pls. ccv. & ccvi. figs. 2094–2100.

Unio schrenkianus and *gerstfeldtianus*, spp. nn., Sestra River, tributary of the Volga, near Klin; Clessin, Nachr. mal. Ges. 1880, pp. 80 & 81.

Unio rothi (Bourg.) var. n. *komarowi*, Böttger, JB. mal. Ges. vii. p. 160, pl. v. fig. 1, Kars.

Unio larteti, pietri, and *maris-galilæi*, spp. nn., Locard, C. R. xci. p. 500, Lake of Tiberias.

Unio tanganyicensis, sp. n., E. A. Smith, P. Z. S. 1880, p. 351, pl. xxxi. fig. 9, Lake Tanganyika.

Unio horii and *thompsoni*, spp. nn., E. A. Smith, Ann. N. H. (5) vi. pp. 429 & 430, Lake Tanganyika.

Margaritana margaritifera (L.). Historical and statistic notes on the pearl-fishery in Saxony by H. Nitsche in the General Catalogue of the International Exhibition of Fishery at Berlin, 1880, pp. 17–19.

Anodonta idrina var. *trasymenica* [*trasim-*], Lake Trasimenus, *scaldiana*

(Dupuy), Scheldt River, and an undetermined species from Naples; Kobelt, Iconogr. vii. p. 35, pl. cxciv. figs. 1958–1960.

Anodonta vescoiana (Bourg.), Kobelt, Iconogr. vii. p. 83, pl. ccvii. fig. 2102, Euphrates, near Bagdad.

Anodonta bigibba, despecta, obtusa, navicella, orbicularis, limosa, livida, castanea, minuta, succinea, cheniana, scaphydium, puerorum, and *indecora*, spp. nn., provinces Kiangsi, Kiangsu, and Nganhoue, China; Heude Conchyliologie fluviatile, fasc. vi. pls. xli.–xlviii. [The author goes to extremes in the multiplication of species.]

Pliodon pachyodon, diolibanus, elongatus, and *letourneuxianus*, spp. nn., the two latter from the Senegal, Bourguignat, Descr. Div. Esp. 1879.

Cameronia, g. n. for *Iridina spekii* (Woodward, 1850); *id. ibid.*

Spatha tanganyicensis, sp. n., E. A. Smith, P. Z. S. 1880, p. 350, pl. xxxi. fig. 8, Lake Tanganyika.

Mytilidæ.

Mytilus pictus (Born), Hidalgo, Moll. Mar. de España, pl. xxvi. *a*, fig. 1.

Mytilus senegalensis (Lam.) = *variabilis* (Krauss) = *charpentieri*, and *tenuisulcatus* (Dunker), variable in form, Cape Verde Islands, Senegal, Guinea, Cape of Good Hope; Dohrn, JB. mal. Ges. vii. pp. 170 & 171.

Modiola martorelli (sp. n. ?), Hidalgo, Moll. Mar. de España, pl. lxxv. fig. 6, without description; also figured in Martorell, "Apuntos Arqueologicos" (Barcelona: 1879).

Modiolaria (*Crenella*) *faba* (Dunker), Cumberland Sound, W. of Baffins Bay; Dall, Bull. U. S. Nat. Mus. No. 15, pp. 145 & 146.

Aviculidæ.

Avicula. Dunker finishes his monograph in Küster's Conch. Cab. pt. 288, pp. 69–84, pls. xxv.–xxvii. He describes as new, *A. jeffreysi*, p. 69 (pl. xxiv. fig. 3), Guinea, *bicolor*, p. 70 (pl. xxiv. fig. 7), locality unknown, *fluctuosa*, p. 71. pl. xxv. fig. 2, locality unknown; *martensi*, new name for *japonica* (Dkr.), p. 79; distinguishes *A.* (*Meleagrina*) *inflata* (Schumacher), p. 74, pl. xxv. figs. 6 & 7, Ceylon, from the true *margaritifera* (L.); and gives many critical remarks concerning various described species, and also notes and corrections to those described by himself, pp. 75–79.

Avicula atlantica (Lam.) variable in shape; Dohrn, JB. mal. Ges. vii. p. 180.

Isognomon perna (L.) from the Cape Verde Islands, very variable in shape; Dohrn, JB. mal. Ges. vii. p. 181.

Pinna nobilis (L.). Note on the fishery of it in Italy, chiefly at Taranto, by Tapparone-Canefri, Catal. Sez. Ital. Esposiz. internaz. di Pesca, Berlin, 1880, pp. lxxxvii. & 213.

Pinna rudis (L.), Cape Verde Islands and Guinea, West Indies and Mediterranean; *P. pernula* (Chemn.) is its young. Dohrn, JB. mal. Ges. vii. pp. 177–179.

Pinna æquilatera, sp. n., Martens, Moll. Maur. p. 317, pl. xxii. fig. 4, Mauritius.

Arcidæ.

Arca stigmosa (Dunker), young, = *Barbatia eximia* (Dunker), full grown, Liberia and Prince Island, W. Africa; *A. plicata* (Chemn.), specimens from the Cape Verde Islands and Red Sea not specifically distinct; *A. afra* (Gmel.), Cape Verde Islands. Dohrn, JB. mal. Ges. vii. pp. 173–177.

Pectunculus gaditanus (Gmelin), Hidalgo, Mol. Mar. de España, pl. lxxiii fig. 23, one of the large species of the Mediterranean.

Pectunculus formosus (Reeve) from the Cape Verde Islands, Dohrn, JB. mal. Ges. vii. pp. 172 & 173 (Reeve's fig. *a* is another species).

Nuculidæ.

Nucula uruguayensis, sp. n., E. A. Smith, Ann. N. H. (5) vi. p. 320, off the estuary of the Rio de la Plata, Uruguay, 48 fath.

Yoldia vancouverensis, sp. n., *id. l. c.* p. 289, Vancouver Island.

Pectinidæ.

Pecten mirificus (Reeve), specimen from Mauritius, *P. lividus* (Lam.) = *serratus* (Reeve), and *cuneolus* (Reeve), varieties in colour; Martens, Moll. Maur. pp. 313 & 314, pl. xxii. figs. 5–15.

Lima (*Mantellum*) *tenuis* (H. Ad.), note on the living animal by Möbius, it swims and crawls by means of the cirri of the mantle. Martens, Moll. Maur. p. 315.

Ostreidæ.

Ostrea. A small anterior (probably pedal) muscle pointed out by W. Dall, Bull. Soc. Washington, iii. p. 36.

Intestinal tract of the oyster described by J. A. Ryder, Am. Nat. xiv. pp. 674 & 675.

Ostrea edulis. The green colour of some oysters is caused by occurrence of a Diatomacean, *Navicula fusiformis* var. *ostrearia* (Grunow); Puysegar, "Notice sur la cause du verdissement des huitres" (Paris: 1880, 9 pp. 1 pl.); also in Revue maritime et coloniale, Feb. 1880; abstract in Nature, xxii. p. 549, and in J. R. Micr. Soc. iii. p. 931.

Oysters are found in Norway from the mouth of Christianiafjord to that of Namsenfjord, 65° N. lat., but of no great importance; H. B. [Baars], Die Fischerei-Industrie Norwegens (Bergen: 1880, p. 53). On the Swedish coasts of the Kattegat; G. v. Yhlen, Catal. of the Swedish part of the International Exhibition of Fishery at Berlin, p. 53.

Oysters of S.W. France. *Ostrea angulata* (Lam.) lives in the mouth of the Gironde, in the littoral zone, above low water mark, with *Patella vulgata*, &c., *O. edulis* (L.) in the Laminarian zone, *O. cochlear* (Poli) in the zone of Corallines; P. Fischer, J. de Conch. xxviii. pp. 83–86.

Note on the oysters of Venice by A. Ninni, Catalogo della Sezione

Italiana dell' Esposizione internaz. di Pesca in Berlin, 1880, p. 176. On oysters of Italy generally by Targioni-Tozzetti, *l. c.* p. lxxxvii.

Ostrea cochlear (Poli). Its living and fossil varieties examined and described by L. Foresti, Mem. Ac. Bologn. (4) i. pp. 545–553, with 2 pls.; he figures the living typical form, pl. i. fig. 8, and a common living variety, *alata*, pl. i. fig. 7. *O. navicularis* (Brocchi) is a very remarkable fossil variety, now extinct; another fossil variety has a prominent incurved umbo, like that of *Gryphæa*.

Ostrea angulata [Lam., as *Gryphæa*], Hidalgo, Moll. Mar. de España, pls. lxxvi. & lxxvii. fig. 3.

Ostrea virginica (Gmel.), East American oysters, and *lurida* (Carp.), West Coast oysters: notes on their localities, enemies, and development, as exhibited in the Berlin Internationale Fischerei-ausstellung, by Brown Goode, Bull. U. S. Nat. Mus. No. 18, pp. 43–49.

Ostrea gigas (Thunberg), from Taichow Bay, south of Chusan, China, 50 centimetres long, notes on its occurrence and fishery, by A. Fauvel, Mém. Soc. Cherbourg, xxii. [1879], p. 304.

Ostrea cornucopiæ (Chemn.) = *lacerans* (Hanley), Benguela and Prince's Island, W. Africa, distinct from *guineensis* (Sow.); Dohrn, JB. mal. Ges. vii. p. 181.

Ostrea radiata (Valenc.) = *cristata*, var. *b* (Lam.) = *bicolor* (Hanley) = *orientalis* (Jay) = *vitrefacta* (Sow.), Mauritius; Martens, Moll. Maur. p. 312.

Ostrea cucullata (Born) = *cornucopiæ* (Chemn.), common on rocks in N.E. Australia; J. E. T. Woods, P. Linn. Soc. N. S. W. v. p. 108.

Anomiidæ.

Carolia (Cantr.), fossil, the resemblance of its young state with *Anomia*, and its gradual change pointed out; P. Fischer, J. de Conch. xxviii. pp. 345–353, pl. xii.

MOLLUSCOIDEA.

BY

PROF. EDUARD VON MARTENS, M.D., C.M.Z.S.

LIST OF PUBLICATIONS.

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NICHOLSON, H. ALLEYNE. On the minute structure of the recent *Heteropora neozelanica*, and of the relations of the genus *Heteropora* to *Monticulipora*. Ann. N. H. (5) vi. pp. 329–339, & 414–423, with woodcuts.

ŒHLERT, D. La position systématique des Brachiopodes, d'après les travaux de M. Morse. J. de Conch. xxviii. pp. 109–135.

REINHARD, W. Zur Kenntniss der Süsswasser-Bryozoen. Zool. Anz. iii. pp. 208–212.

REPIACHOFF, W. On the morphology of the *Bryozoa* [in Russian, from Mém. Soc. Nouv. Russ. vi.]. Odessa: 1880, 69 pp. 4 pls.

——. Zur Kenntniss der *Bowerbankia*-larva. Zool. Anz. iii. p. 260.

TRAUSTEDT, M. Oversigt over de fra Danmark og dets nordlike Bilande kjendte Ascidiæ simplices. [Review of the known simple Ascidians from Denmark and its northern dependencies.] Vid. Medd. 1879–80, pp. 397–443.

WATERS, A. W. The use of the Opercula in the determination of the Cheilostomatous *Bryozoa*. P. Soc. Manch. xviii. [1878–79] pp. 8–11.

WILSON, J. B. New Genus of *Polyzoa*. J. Micr. Soc. Victoria, i. pp. 64 & 65, with 1 pl. Abstract in J. R. Micr. Soc. iii. p. 774.

WOODS, J. E. TENISON. On the genus *Amathia*, with description of a new species. Tr. R. Soc. Vict. xvi.

——. On some recent and fossil species of Australian *Selenariadæ*. Tr. Phil. Soc. Adelaide, 1880.

BRACHIOPODA.

Full abstracts of E. Morse's and W. Dall's contradictory papers on the systematic position of the Brachiopods [Zool. Rec. xi. p. 194, vii. p. 182, xi. p. 176], in French, by D. ŒHLERT, J. de Conch. xxviii. pp. 109–135, & 216–234.

P. FISCHER thinks that the *Tunicata*, the *Brachiopoda*, and the *Bryozoa* (*Polyzoa*) form each a distinct primary division of the *Malacozoaria*, each equivalent to the *Mollusca* proper, and that they cannot be united into a common group *Molluscoidea*; J. de Conch. xxviii. p. 238.

L. JOLIET, from a discussion of Brooks's observations on the development of *Lingula*, comes to the conclusion that the Brachiopods may be taken to be the most highly specialized representatives of the Bryozoan branch, and nearer to them than to the true *Mollusca*. Arch. Z. expér. 1880, p. 390. Abstract in J. R. Micr. Soc. iii. p. 772.

F. BALFOUR discusses the development of the *Brachiopoda*, in his treatise on comparative embryology. London : 1880, vol. i. pp. 257–263.

T. Davidson gives a list of the known species of living *Brachiopoda*, with indications of their geographical and bathymetrical range; *Terebratula vitrea* var. *minor* (Phil.), *wyvillii* (Dav.), *Terebratulina caput-serpentis* (L.), *Waldheimia cranium* (Müll.), *Platydia anomioides* (Scacchi), and *Discina atlantica* (Gould), are widely distributed in the deep sea zone; *Rhynchonella psittacea* (Gm.) is circumpolar. Zool. of Challenger Exp. i. pt. 1, pp. 11–26.

Bay of Biscay. 6 species enumerated by J. G. Jeffreys, Rep. Brit. Ass. 1880, p. 382.

North America. 3 species enumerated in Verrill's Check List of the marine *Invertebrata* from Cape Cod to the Gulf of the St. Lawrence (1879).

West Indies. 4 known species from Cuba, enumerated by Arango y Molina, Faun. Mal. Cub. pp. 274 & 275.

Mauritius. 3 known species from Mauritius and Bourbon, enumerated by E. v. Martens, Moll. Maur. p. 332.

Australia. 5 species collected at Port Jackson by J. Brazier, with critical notes on them, by Davidson; P. Linn. Soc. N. S. W. iv. pp. 399 & 400. 4 species from New South Wales, and 8 others from other parts of Australia, enumerated by Brazier, P. Linn. Soc. N. S. W. iv. p. 399.

New Zealand. 8 species belonging to 7 genera enumerated and briefly described by Hutton, Manual of New Zealand *Mollusca*, pp. 176–178; 6 species observed near Wellington, by T. W. Kirk, Tr. New Z. Inst. xii. p. 306.

Terebratulidæ.

T. Davidson recapitulates what is known concerning the changes in the internal skeleton of the *Terebratulidæ* during age; Zool. of Challenger Exp. i. pt. 1, pp. 9 & 10.

Terebratula wyvillii, sp. n., South Australia, Falkland Islands and Chile, from 1035 to 2900 fathoms, the greatest depth in which a Brachiopod has been found hitherto, *cubensis* (Pourtalès), off Ascension Island, 420 fath., *vitrea* (L.), var. *minor* (Phil.), off the Cape of Good Hope, 150 fath., *moseleyi*, sp. n., W. of Kerguelen Island, 210 fath., and *uva* (Brod.), off Buenos Ayres, 600 fath.; Davidson, *l. c.* pp. 27–31, pl. ii. figs. 3–14.

Terebratulina. Generic distinctness defended, *T. wyvillii*, sp. n., off Culebra Island, West Indies, 390 fath., *caput-serpentis* (L.), var. *septentrionalis* (Couth.), found also E. of the Cape of Good Hope, 150 fath., and var. n. *mediterranea* (Jeffr., MS.), Mediterranean, sp. ?, Philippines, 82 fath., *cailetti* (Crosse), off Pernambuco, 350 fath., *cancellata* (Koch), Bass's Strait, 38–40 fath.; Davidson, *l. c.* pp. 8, 32–38, & 67, pl. i. figs. 1–15, pl. ii. figs. 1 & 2.

Terebratula or *Terebratulina*? *dalli*, sp. n., Japan, 1875 fath., and *Terebratulina*? *murrayi*, sp. n., Kermadec Island, 600 fath., *id. l. c.* pp. 38 & 39, pl. ii. figs. 1 & 15.

Magellania, new name for *Waldheimia* (King, 1850, *nec* Brullé, *Insecta*, 1846); Bayle, J. de Conch. xxviii. p. 240.

Waldheimia. Generic distinctness defended. *W. kerguelensis*, sp. n., = *globosa*, Sow., Thes. Conch. figs. 99–101 (*nec* Lam.), Kerguelen and Marion Islands, 20–150 fath., *flavescens* (Val.) = *australis* (Q. & G.), Port Jackson, 2–10 fath., *wyvillii*, sp. n., off Valparaiso, 2160 fath.; Davidson, *l. c.* pp. 8 & 40–44, woodcuts, & pl. iii. figs. 1–13. *W. septigera* (Lovén), not yet found living; p. 66.

Terebratella dorsata (Gm.), Kerguelen, 20–30 fath., and *frielii*, sp. n., off Halifax, 1340 fath., and Philippine Islands, 82–102 fath.; Davidson, *l. c.* pp. 44–46, pl. iv. fig. 4, & pl. iii. figs. 19 & 20. *T. pulvinata* (Gould) is probably the young state of *T. dorsata*, and *patagonica* (Gould) that of *Magasella flexuosa* (King); *id. l. c.* p. 67.

Megerlia ? *incerta*, sp. n., Atlantic, 1° N., 1850 fath., *truncata* (L.), Teneriffe, 70–75 fath., *willemoesi*, sp. n., South Australia, 120 fath., *sanguinea* (Chemnitz), Zamboanga, 10 fath.; Davidson, *l. c.* pp. 49–53, pl. ii. figs. 17 & 18, pl. iii. figs. 14–18, & pl. iv. figs. 1–3. *M. pulchella* (?), at Port Jackson; *id. l. c.* p. 66.

Muehlfeldtia, new name for *Megerlia* (King, 1850, *nec* Desvoidy, *Diptera*, 1830); Bayle, J. de Conch. xxviii. p. 240.

Magasella. Generic distinction doubtful; it is perhaps the young stage of *Terebratella.* *M. flexuosa* (King) = *magellanica* (Reeve, *nec* Chemnitz), near Cape Horn, 1450 fath., *incerta*, sp. n., St. Thomas, W. Indies, 390 fath., *cumingi* (Dav.), off Port Jackson, 2–10 fath., *Terebratula fibula* (Reeve) is perhaps the same. Davidson, *l. c.* pp. 10, 46–49, & 66, the first two, pl. iv. figs. 5 & 6.

Waltonia valencienn[*es*]*i* (Davids.), probably = *Magas. evansi* (Davids.), which possibly = *Terebratella cruenta* (Dillw.), juv.; Hutton, Manual of New Zeal. Moll. p. 177.

Kraussina lamarckiana (Dav.), Port Jackson, shore to 10 fath., and *pisum* (Val.), off the Cape of Good Hope, 150 fath.; Davidson, *l. c.* pp. 53–55, pl. iv. figs. 7–9.

Platydia anomioides (Scacchi), Marion and Prince Edwards' Island, 100 fath.; *id. l. c.* pp. 55–57, pl. iv. figs. 10 & 11.

Argiope decollata (Chemnitz), Teneriffe, 70–75 fath.; *id. l. c.* p. 57, pl. iv. figs. 12 & 13.

Argiope capsula found at low water on Jersey; no trace of septum in either valve; J. G. Jeffreys, Ann. N. H. (5) vi. p. 408.

Cistella rubro-tincta (Dall), *antillarum* and *schrammi* (Crosse) = *barretiana* (Dav.); Davidson, *l. c.* p. 67.

Rhynchonellidæ.

Rhynchonella nigricans (Sow.), var. *pixydata* [*pyxid-*] (Watson), south of Kerguelen Island, 150 fath.; Davidson, Zool. of Challenger Exp. i. pt. 1, p. 59, pl. iv. fig. 14.

Discinidæ.

Discina atlantica (King), Atlantic and Pacific, 200–2400 fath., *stella* (Gould), off Bermuda, 49 fath.; Davidson, *l. c.* p. 64, pl. iv. fig. 19. *D. tenuis* and *lævis* (Sow.) are one species; *id. l. c.* p. 67.

Lingulidæ.

Lingula anatina (Lam.), Zamboanga, in sand at low water; Davidson, *l. c.* p. 60, pl. iv. figs. 15 & 16. *L. tumidula* (Reeve), probably = *murphiana*, var.; *id. l. c.* p. 67.

TUNICATA.

The body of *Botryllus* contains 93 per cent. water; Krukenberg, Vergl. Physiol. Studien, ii. pp. 96 & 97.

Uric acid found in the glandular appendages of the intestine of some Ascidians; *id. l. c.* pp. 18 & 22. Leucine, but no tyrosine, in the intestinal glands of *Phallusia fumigata*; p. 34. A quantity of fat in various *Tunicata*; p. 42.

New observations on the first stages of development in the eggs of *Salpa* and the contemporaneous changes in the uterus, by F. Todaro, Atti Acc. Rom. Transunti, iv. p. 86; abstract, J. R. Micr. Soc. iii. p. 419.

North Sea. 20 species of Danish *Tunicata*, 7 from the Færöe Islands, 7 from Iceland, and 14 from Greenland, 8 of which are common with Denmark, enumerated and described by Traustedt, Vid. Medd. 1880, pp. 399 & 400.

43 species are enumerated in Verrill's Check List of the marine *Invertebrata* from Cape Cod to Gulf of St. Lawrence, 1879.

Mediterranean. List of 13 *Tunicata* from various parts of Italy by Targioni-Tozzetti, Catalogo della Sezione Italiana dell' Esposizione internazionale di Pesca in Berlino, 1880, p. 137.

General remarks on the *Tunicata* exhibited in the aquarium of the Zoological Station at Naples by Dohrn & Schmidtlein, Leitfaden für die Aquarien der zoologischen Station zu Neapel, 1880, pp. 52–57.

Some observations on the appearance of *Salpa* and *Pyrosoma* at Naples, the former almost during the whole year, by Schnitzlein, MT. zool. Stat. Neap. ii. pp. 163 & 164.

Preliminary notes on the *Tunicata* from the 'Challenger' Expedition, about 150–200 species, the majority new, with description of new genera and species of simple Ascidians, by Herdman, P. R. Soc. Edinb. 1879–80, pp. 458 & 714.

List of 9 species of *Appendiculariidæ* observed at Madeira, by P. Langerhans, Z. wiss. Zool. xxxiv. p. 145.

Ascidiæ Simplices.

Halocynthia, new name for *Cynthia* [pre-occupied]. *H. rustica* (L., O. Fabr.) = *monoceros* (Möller) = *condylomata* (Packard), Cumberland Sound, W. of Baffin's Bay; *H. tuberculum* (O. Fabr.) = *carnea* (Ag., Verrill) = *placenta* (Packard), Cape Cod to Greenland; and 5 more

species, occurring N. of Cape Cod, enumerated. Verrill, Bull. U. S. Nat. Mus. No. 15, pp. 147 & 148, 1879.

Cynthia echinata (L.), *papillosa* (L.) = *pyriformis* (Möller, Stimps.), and *tessellata* (Forbes) = *loricata* (Kupffer), Denmark and Norway, described by Traustedt, Vid. Medd. 1880, pp. 403–410.

Styela (Sav.), is distinct from *Cynthia* by the simple tentacles. *S. aggregata* (Müll.), *rustica* (L.) = *monoceros* (Möller) = *condylomata* (Packard), *comata* (Alder) = *ampulla* (Forb. & Hanl.), *pomaria* (Sav.) = *coriacea* (Alder) = *tuberosa* (Macg.), and *grossularia* (Bened.) = *glomerata* (Ald.) = *gutta* (Stimps.), all from Denmark, and *lineata*, sp. n. (Beck, MS.), Spitzbergen, described by Traustedt, *l. c.* pp. 401, 414–418.

Ascidia meridionalis, vasculosa, translucida, tenera, pyriformis, falcigera, cylindracea, despecta, and *placenta*, spp. nn., from the 'Challenger' Expedition, Herdman, P. R. Soc. Edinb. 1879–80, pp. 458, 714, *et seq.*

Pachychlæna, subg. n. of *Ascidia*. Test very thick and solid. *P. oblonga, obesa,* and *gigantea*, spp. nn., also from the 'Challenger' Expedition, *id. l. c.* p. 458.

Phallusia. Analytic table of 7 species, *mentula* (Müll.) = *monachus* (Cuv.), Norway and Greenland, *prunum* (Müll.), Denmark, *aspersa* (Müll.) = *pustulosa* (Ald.), Denmark and Norway, *venosa* (Müll.), Norway, *virginea* (Müll.), Denmark and Norway, *conchilega* (Müll.), Norway, and *patula* (Müll.), Norway, described by Traustedt, Vid. Medd. 1880, pp. 434–441.

Corella parallelogramma (Müll.), Denmark and Norway; *id. l. c.* p. 431.

Corella japonica, sp. n., Herdman, P. R. Soc. Edinb. 1879–80, p. 458, Japan.

Ciona canina (Müll.) = *intestinalis* (L.) = *corrugata* (Müll.), Denmark and Norway; Traustedt, *l. c.* pp. 432–434.

Ciona flemingi, sp. n., Herdman, P. R. Soc. Edinb. 1879–80, p. 458, from the 'Challenger' Expedition.

Abyssascidia, g. n. About 12 lobes to the branchial and 8 to the atrial aperture; branchial sac not longitudinally plaited, viscera on its right side, intestine small, stomach short and wide. *A. wyvillii*, sp. n., Seas of Australia, 2600 fath. Herdman, *l. c.* p. 458.

Boltenia bolteni (L.) = *clavata* (Müll.) = *fusiformis* (Sav.) = *globifera* (Sabine) = *rubra* (Stimps.) = *ciliata* (Möller), Greenland and New England; Traustedt, *l. c.* pp. 401–403.

Pelonæa corrugata (Forbes) = *villosa* (Sars), Norway, Færöes, Iceland; *id. l. c.* pp. 418 & 419.

Chelyosoma macleayanum (Brod. & Sow.), Northern Norway and Greenland; *id. l. c.* p. 429.

Molgula. Analytic table of 10 species, *crystallina* (Möll.) = *pellucida* (Stimps.), Iceland and Greenland, *ampulloides* (Bened.), Denmark, *tubifera* (Örsted) = *macrosiphonica* (Kupffer) = ? *siphonalis* (Sars), Denmark, *impura* (Heller) or more probably *koreni*, sp. n., Bergen, Norway, *psammodes*, sp. n., Denmark, *grœnlandica*, sp. n., Greenland, *nana* (Kupff.), and *occulta* (Kupff.), Denmark, described; *id. l. c.* pp. 421–427.

Eugyra glutinans (Möller) = *tubulosa* (Forbes) = *arenosa* (Ald. & Hanc., Lacaze-Duth.), Denmark; *id. l. c.* pp. 428 & 429.

Clavelinidæ.

Herdman discusses the affinities of this family, and comes to the conclusion that they are much nearer the simple than the compound Ascidians, the buds on the stolons being developed from the ends of the blood-vessels, at first merely slight enlargements similar to and comparable with the knobs on the end-twigs of the vessels of the test of an Ascidian. P. R. Soc. Edinb. 1879-80, p. 714 *et seq.*

Clavelina oblonga and *abnormis*, spp. nn., from the 'Challenger' Expedition, *id. ibid.*

Ecteinascidia, g. n. With well-marked internal longitudinal bars, like *Ciona* and *Rhopalæa*, but without papillæ in the branchial sac. *E. crassa*, *fusca*, and *turbinata*, spp. nn., from the 'Challenger' Expedition, *id. l. c.* p. 714.

SALPÆ.

C. F. W. Krukenberg has made several experiments upon the heart in *Salpa* (chiefly *S. africana*). The number of pulsations in one direction is very variable; ordinarily the pulsations in the direction towards the nucleus are somewhat numerous, for example, 5–6 or even 10–13, and only 2–6 in the opposite direction; the former are also rather quicker and more powerful. If the animal is kept in confinement, the number of pulsations diminishes, and is not augmented by dyspnœa; if the heart has been cut out, and is not emptied of blood, it continues its pulsations for some time, and shows the same change in their directions. Curare paralyses the movements of the heart sooner than those of the other parts of the animal, and there is no remedy against it; atropine has no effect on the pulsations; helleborine augments the number of pulsations in the same direction; nicotine diminishes them: veratrine and quinine eventually paralyse the heart, later than the other parts of the body; strychnine paralyses it, and produces no tetanus. Vergleichend-physiologische Studien, iii. pp. 151–176.

Appendiculariæ.

The muscular bands in the *Appendiculariæ* are composed of several (10) muscular blades, one behind the other, as in *Amphioxus* and *Petromyzon*. The motory nerves correspond in number and place to these 10 segments, and are without ganglia; the sensorial nerves do not correspond to them, and are provided with ganglia. Langerhans, Z. wiss. Zool. xxxiv. pp. 144 & 145, pl. vi. figs. 66, 68–73.

Œcopleura velifera and *magna*, spp. nn., *id. l. c.* p. 145, Madeira.

Œcopleura flabellum (Müll.), Denmark; Traustedt, Vid. Medd. 1880, p. 442.

POLYZOA.

T. Hincks's account of the British marine *Polyzoa* is in all respects

a very valuable text-book for the student of this class of animals. The introduction, 141 pp., gives a condensed but full account of the present state of knowledge as to the organization, development, geographical distribution, and classification of the subject, preceded by clear definitions of the principal descriptive terms. With regard to some controversial questions, he impartially relates the reasons brought forward by the principal authors, and advocates the necessity of further research before definitively settling some of them, but he decidedly rejects F. Müller's theory of the "colonial nervous system," and accepts instead of it Joliet's "endosarc," urging its importance in the economy and propagation of the animal in rather general terms. As to the "brown bodies," he remains still somewhat in doubt; acknowledging them to be the residua of the decaying polypids, he thinks they may possibly be utilized in some cases as nourishment for the new bud. He agrees with E. Ray Lankester in urging the Molluscan affinities of the *Polyzoa*, comparing their epistome with the foot and their crown of tentacles with the gills of the *Mollusca*, especially the Bivalves, and also of the Brachiopods. Busk's classification is regarded as artificial, very good for the identification of species, but giving no clue to their natural relations; Smitt's, as the first serious attempt towards a natural system, but rather premature and still uncertain in many details; and Barrois's sketch quite hypothetical. Hincks prefers at the present stage to keep separate and clearly discriminate the more constant and permanent forms, with due attention to their evolutionary history and varietal tendencies; but he acknowledges theoretically the higher systematical value of the structure of the single cell (zoœcium), chiefly of its aperture, compared with the general form and growth of the colonies. The first part of his scheme of classification is already given in Zool. Rec. xvi. *Moll.* p. 107; the continuation is as follows:—

Suborder 2.—*Cyclostomata*, Busk.
(1) *Radicellata*, Orb. Fam. *Crisiidæ*.
(2) *Incrustata*, Orb. Fam. *Tubuliporidæ*, *Horneridæ*, and *Lichenoporidæ*.

Suborder 3—*Ctenostomata*, Busk.
(1) *Halcyonella*, Ehrenb. Fam. *Alcyonidiidæ*, *Arachnidiidæ*, and *Flustrellidæ*.
(2) *Stolonifera*, Ehlers.
(a) *Orthonemidæ*, Hincks. Fam. *Vesiculariidæ*, *Buskiidæ*, *Cylindrœciidæ*, and *Triticellidæ*.
(b) *Campylonemidæ*, Hincks. Fam. *Valkeriidæ*, *Mimosellidæ*, and *Victorellidæ*.

Order PHYLACTOLÆMATA, Allman. No marine species.

Group *ENTOPROCTA*, Nitsche.

Order PEDICELLINEA. Fam. *Pedicellinidæ* and *Loxosomidæ*.

Sub-class PTEROBRANCHIA, Ray Lankester. Fam. *Rhabdopleuridæ*.

In the special part, the author endeavours to give detailed and minute

descriptions, taking account not merely of a few salient characters, but of all the minor features and varietal modifications of the specific type. With a few exceptions, all species are figured, and very satisfactorily. Only those species will be mentioned *infrà*, which have not been described before with the same names, or have not been figured before.

Allman gives an abstract of the observations made by Salensky and C. Vogt on *Loxosoma*, and by Ehlers on *Hypophorella* in 1877 [see Zool. Rec. xiv. *Moll.* pp. 97 & 98]; J. L. S. xv. pp. 1–8.

Repiachoff's paper on the morphology of the *Bryozoa* [in Russian] has not been accessible to the Recorder. A preliminary note on it, and an important correction to his former paper on the development of *Bowerbankia* [Zool. Rec. xvi. *Moll.* p. 106], the pretended mouth not leading into the digestive cavity at all, are given by the author in Zool. Anz. iii. p. 260 (abstract in J. R. Micr. Soc. iii. p. 611).

Polyzoa (Thompson, 1830) or *Bryozoa* (Ehrenberg, 1831)?. A. Waters prefers the latter name, because *Polyzoa*, fem. singular, has been proposed originally by Thompson as a generic name, not as a name of a higher group; Ann. N. H. (5) v. p. 34. T. Hincks replies that Thompson's idea in using the word was evidently that of a distinct type of structure of animal, in opposition to *Hydra*, and he consequently uses *Polyzoa*, changed to neuter plural, as the name of the class; Ann. N. H. (5) v. pp. 127–129, & Brit. mar. Polyzoa, introduct. pp. cxxxi.–cxxxiv. A further assenting note by R. Jones, Ann. N. H. (5) v. p. 220. Waters replies, persisting that Thompson meant by "*Polyzoa*" a single polypid, and not a class designation; and urges that Ehrenberg in his first paper did not include the *Foraminifera* within his *Bryozoa*: Ann. N. H. (5) vi. pp. 157 & 158. The same question is also ventilated in a review of Hincks's recent book in Pop. Sci. Rev. April, 1880.

L. Joliet describes the segmentary organ or vibratile channel of *Loxosoma* and *Pedicellina*; it is opened internally into the perigastric cavity between the œsophagus and rectum, externally on a small prominence between the tentacles; and the movement of its cilia is directed from within to without. Perhaps the same structure exists also in *Membranipora* and some other ectoproctal *Polyzoa*, and serves for giving passage to the spermatozoids, but in these it is not yet satisfactorily ascertained. Arch. Z. expér. viii. pp. 497–512, pl. xxxix.; abstract in J. R. Micr. Soc. (2) i. p. 233.

Some instances of phosphorescence in *Polyzoa* mentioned by Hincks, *l. c.* p. cxxxv.

Embryology.

Development of the *Polyzoa* discussed by F. M. Balfour in his treatise of Comparative Embryology, vol. i. pp. 242–256 (German Translation, pp. 280–296), with woodcuts.

J. Barrois has observed the metamorphoses of the larva of *Escharina*, and describes it minutely, distinguishing and figuring four stages of the larva and seven of the metamorphosis into the fixed, developed, but yet simple animal. The invaginated portion of the larva is again evaginated

and forms a square prominence for fixation; the crown makes its first appearance also internally, and is afterwards evaginated on the opposite end of the animal; the basal peripheric edge is overlapped like an umbrella and overgrows the whole animal like the mantle of a Mollusk; the ab-oral face of the larva finally becomes the outside of the adult, and a part of it by invagination the epithelial layer of the polypid, the oral face of the larva becoming partly the muscular layer of the adult; the whole metamorphosis therefore consists of a thorough reversal of the larval organs, but not a total annihilation of them, as thought by other authors from the transformation of *Cyphonautes* into *Membranipora*. Ann. Sci. Nat. (6) ix. Art. 7, 67 pp. 3 pls.; abstract in J. R. Micr. Soc. (2) i. pp. 30–33.

Segmentation of the egg, spermatozoids, and further development of *Alcyonella fungosa* (Pall.) described by W. REINHARD; he describes a sort of atrophied stolones, and thinks that what has been described as œcium by Metschnikoff and Nitsche, is only the extended ovary itself, in which all embryos except one perish and become "brown bodies." Zool. Anz. iii. pp. 208–210.

The same author gives some notes on the gemmation in *Cristatella* and the first stages of it after leaving the statoblast; *l. c.* pp. 211, 212, 234 & 235; abstract in J. R. Micr. Soc. iii. p. 609.

GEOGRAPHICAL DISTRIBUTION.

A new genus of freshwater *Polyzoa*, *Norodonia*, apparently allied to *Hippothoa*, from Cambodia and China; JULLIEN, Bull. Soc. Z. Fr. 1880, p. 77, woodcut.

Saimen, Finland. *Alcyonella benedeni*, *Cristatella mucedo*, and *Plumatella repens*; SAHLBERG, Medd. Soc. Fenn. iii. [1878], pp. 168 & 169.

Arctic Sea. 33 species of *Polyzoa* from Barents Sea near Novaya Zemlya mentioned with distinct localities by W. S. M. D'URBAN, Ann. N. H. (5) vi. pp. 263, 264, & 272–276; the new species described by T. Hincks, *l. c.* pp. 280–286.

16 species of marine *Polyzoa* collected in Smith Sound by H. W. Feilden, are enumerated by G. BUSK, J. L. S. xv. pp. 231–241, pl. xiii.

8 species of *Polyzoa* found in Cumberland Gulf and Annanactook Harbour, Baffins Bay, by the Howgate Polar Expedition, enumerated by A. E. VERRILL, Bull. U. S. Nat. Mus. No. 15, pp. 148–150.

North Sea. 9 species of marine *Polyzoa* from Göteborg (Sweden) with indication of the depth at which they are found, by A. W. MALM, Gothenburg's Naturhist. Museum, i., Catalog d. in d. Fischerei-Ausstellung in Berlin ausgest. Sammlung, p. 23.

British Seas. 235 species of marine *Polyzoa* are included in Hincks's work; for 28 species, Shetland is the only British locality, 1 of them, *Cellaria johnsoni*, is Mediterranean and Madeiran, another, *Porina borealis*, Arctic and abyssal; Devon, Cornwall, and the Channel Islands are the northern limit of a number of Mediterranean species; the north-eastern shores of England, Northumberland and Durham, although thoroughly

investigated, are poorer in species than either Shetland or the south-west. *Cellaria fistulosa*, *Microporella ciliata*, *M. malusii*, and *Caberea barii* are remarkably widely distributed in the temperate and tropical zone, but not abyssal. About 60 of the recent British species have been thus far recorded from tertiary beds, 2–3 from the cretaceous epoch. HINCKS, *l. c.* pp. cxiii.–cxviii.

Mediterranean. List of 63 *Polyzoa* from the Sea of Tuscany by RICHIARDI, Catalogo della Sezione Italiana dell' Esposizione internaz. di Pesca in Berlino, 1880, pp. 153 & 154 (German edn. p. 34).

General remarks on the *Polyzoa* exhibited in the aquarium of the zoological station at Naples by DOHRN & SCHMIDTLEIN, Leitfaden für die Aquarien der Zoologischen Station zu Neapel, 1880, p. 26.

Madeira. About 75 species of *Polyzoa* are known, 35 of them are also British, a third of them are found in the Crag. HINCKS, Ann. N. H. (5) vi. p. 80.

Australia. 59 species from the coast of Queensland, among which several new, enumerated by A. W. HASWELL, P. Linn. Soc. N. S. W. v. pp. 33–44, pls. i.–iii.

New Zealand. One freshwater species, *Plumatella aplini* (Macq.) and 100 marine species enumerated and shortly described by HUTTON, Manual of N. Z. Moll. pp. 179–199.

CHILOSTOMATA.

WATERS has made some remarks concerning the use of the opercula in determination; P. Manchester Soc. xviii. [1878] pp. 8–11. [Not seen by the Recorder.]

CATENICELLIDÆ.

Catenicellopsis, g. n. Cells arising for the most part from the upper side and back of other cells by a short chitinous tube; cells at each bifurcation ordinarily geminate; cells also frequently arising by a short chitinous tube from the side of another simple cell immediately below the lateral process. *C. pusilla* and *delicatula*, sp. nn., Australia. Wilson, J. Micr. Soc. Victoria, i. pp. 64 & 65, with a plate; abstract in J. R. Micr. Soc. iii. p. 774

EUCRATIIDÆ.

Scruparia. This generic name restricted to *S. clavata* (Hincks) an intermediate form which connects the uniserial and biserial genera; Hincks, Brit. Polyz. p. 21, pl. iii. figs. 5–8.

Brettia tubiformis (Norman), Hincks, *l. c.* p. 28, pl. ii. fig. 2, & pl. v. fig. 1, South-east Coast of England and Hebrides.

CELLULARIIDÆ.

Cellularia cuspidata (Busk.) var. from Queensland; Haswell, P. Linn. Soc. N. S. W. v. p. 36.

Menipea gracilis, sp. n., = *Cellaria ternata* var. *gracilis* (Smitt), and its specific distinctness affirmed; Busk, J. L. S. xv. p. 232, Arctic Sea.

Scrupocellaria elliptica (Reuss, fossil) = *inermis* (Norman), Hebrides and Shetland, 40–50 fath.; Hincks, Brit. Polyz. p. 46, pl. xlvi. figs. 5 & 6.

Scrupocellaria. Cellularia reptans (Pall., &c.) is provided with minute lateral avicularia, and belongs therefore to *Scrupocellaria*; id. *l. c.* pp. 52 & 53, pl. vii. figs. 1–7.

Scrupocellaria scabra (Busk), Busk, J. L. S. xv. p. 231, Arctic Sea.

Scrupocellaria clypeata and *obtecta*, spp. nn., Haswell, P. Linn. Soc. N. S. W. v. p. 37, Queensland, the former pl. i. fig. 6.

Bicellariidæ.

Bugula gracilis (Busk) var. n. *cuspidata*, British and North American, Hincks, *l. c.* p. 86, pl. xv. figs. 1–4, pl. xii. figs. 6 & 7. *B. purpureo-tincta* (Norman) = *fastigiata* (Dalyell, Alder, *nec* Fabr.); *id. l. c.* p. 89, pl. xii. figs. 8–12.

Bugula fruticosa (Packard, as *Menipea*) = *B. murrayana* var. *quadridentata* (Smitt); Busk, J. L. S. xv. p. 233, pl. xiii. fig. 1, Arctic Sea.

Cellariidæ.

Cellaria sinuosa (Hassall, as *Farcimia*) distinct from *fistulosa* (L.), British; Hincks, *l. c.* p. 109, pl. xiii. figs. 5–8.

[*Cellaria*] *Salicornaria tenuirostris* (Busk) from Queensland, without avicularia, Haswell, P. Linn. Soc. N. S. W. v. p. 36.

Onchopora ventricosa, immersa, and *granulosa*, spp. nn., *id. ibid.*, the two former pl. i. figs. 3, 4, & 5, Queensland.

Vinculariidæ.

Vincularia novæ-hollandiæ, sp, n., *id. l. c.* p. 41, pl. iii. fig. 3, Queensland.

Flustridæ.

Flustra serrulata sp. n., Busk, J. L. S. xv. p. 234, pl. xiii. figs. 2–4, Smith's Sound.

Flustra solida (Stimps.) = *Eschara palmata* (Sars) from Barents' Sea, systematic place uncertain; Hincks, Ann. N. H. (5) vi. pp. 282 & 283, pl. xv. figs. 2 & 3.

Flustramorpha (Gray). Genus untenable; *id. l. c.* p. 283.

Carbasea cribriformis (Busk), ? from Queensland; Haswell, *l. c.* p. 37.

Membraniporidæ.

Membranipora catenularia (Jameson, as *Tubipora*; Johnst., as *Hippothoa*), Hincks, Brit. Polyz. p. 134, pl. xvii. figs. 1 & 2. *M. flustroides, solidula, aurita, nodulosa* (Hincks), *l. c.* p. 151, pl. xix. fig. 2, p. 158,

pl. xx. figs. 7 & 8, p. 159, pl. xxi. figs. 5 & 6, p. 170, pl. xx. fig. 9, all British.

Membranipora tenuirostris = *flemingi* (Waters, *nec* Busk), *nodulifera*, *crassimarginata*, and *granulifera*, spp. nn., all from Madeira, the first also from Naples, and *sceletos* (Busk, as *Lepralia*), Madeira; Hincks, Ann. N. H. (5) vi. pp. 70–73, the four former, pl. ix. figs. 1–4.

Membranipora albida, sp. n., Singapore, *plana*, sp. n., Australia, *armifera*, Gulf of St. Lawrence, *horrida*, California, *carteri*, Australia, *pura*, Australia or New Zealand, *villosa*, California, *distorta*, Ceylon, *nitens*, and *transversa*, Australia, all spp. nn.; *id. l. c.* pp. 81–89, pl. x. figs. 5–8, & pl. xi. figs. 2–9.

Membranipora minax (Smitt) = *princeps* (Hincks) with fixed avicularium, *delicatula* (Busk), Florida, *trifolium* (S. Wood) var. n. *minor*, Bahia, *antiqua* (Busk) with very remarkable avicularia, not prehensile, probably defensive, and *mamillaris* (Lamx.), Australia; *id. l. c.* pp. 83–88, the latter four, pl. x. fig. 9, pl. xi. figs. 1, 6, & 7.

Membranipora tenella, Florida, *polita* and *corbula*, Australia, spp. nn. *flemingi* (Busk) var. n., locality unknown, and *pedunculata* (Manzoni, foss.), recent from Ceylon; *id. l. c.* pp. 376–378, pl. xvi. figs. 7 & 8, pl. xvii. figs. 1, 2, & 6.

Membranipora cervicornis, sp. n., Haswell, P. Linn. Soc. N. S. W. v. p. 38, Australia ?.

Biflustra armata and *crassa*, spp. nn., *id. l. c.* p. 38, pl. i. figs. 7 & 8, Queensland.

Siphonoporella, g. n. Zoœcia with raised margins, front depressed, in part membranaceous; a small calcareous tube with wide mouth placed at one side of the lamina below the aperture and opening into the cavity of the cell; zoarium incrusting. *S. nodosa*, sp. n., locality unknown. Hincks, Ann. N. H. (5) vi. p. 91, pl. xi. fig. 10.

Microporidæ.

Micropora coriacea (Esp., as *Flustra*) and *complanata* (Norman, as *Lepralia*), the latter = *Membranipora smithi* (Manzoni); Hincks, Brit. Polyz. pp. 174 & 175, pl. xxiii. figs. 5–7, & 8, 9, British.

Micropora coriacea (Esp.) var., Mediterranean or Red Sea; *id.* Ann. N. H. (5) vi. p. 378, pl. xvi. fig. 6.

Steganoporella smitti, new name for *Membranipora andegavensis* (Busk), probably not *Eschara andegavensis* (Michelin), recent off the Cornish Coast; *id.* Brit. Polyz. p. 178, pl. xxiv. figs. 5 & 6.

Steganoporella rozieri (Audouin) with varr. nn. *gothica*, Mazatlan and California, *indica*, India, and *falcifera*, Australia, *S. elongata*, sp. n., Africa, and *jervoisi*, sp. n., Adelaide; *id.* Ann. N. H. (5) vi. pp. 379–381, pl. xvi. figs. 1–5. Some more foreign species of this genus enumerated, p. 381.

Setosella vulnerata (Busk) from Madeira, *id. l. c.* p. 73, pl. ix. fig. 5.

Cribrilinidæ.

Cribrilina radiata (Moll., as *Eschara*), *punctata* (Hassall, as *Lepralia*),

annulata (Fabr., as *Cellepora*), *figularis* (Johnst, as *Lepralia*), and *gattii* (Busk, as *Lepralia*), the last = *steindachneri* (Heller), British; Hincks, Brit. Polyz. pp. 184–198, pls. xxv. & xxvi. & pl. xxiv. fig. 3.

Cribrilina radiata (Moll.) var. from Madeira; *id.* Ann. N. H. (5) vi. p. 74,; pl. x. fig. 1. The other known species of this genus are enumerated.

Membraniporella nitida (M. Edw., Johnst.) and *melolontha* (Busk, as *Lepralia*) = *nitida* var. Johnston; *id.* Brit. Polyz. pp. 200–203, pl. xxvii. figs. 1–8 & 9, 10.

Microporellidæ.

Microporella ciliata (Pallas, Linn., &c.), protean and nearly cosmopolitan, *malusii* (Audouin), also widely spread, *impressa* (Audouin) = *Lepralia granifera* (Johnst.), *violacea* (Johnst., as *Lepralia*), British; Hincks, Brit. Polyz. pp. 206–219, pls. xxviii., xxix., & xxx.

Microporella decorata (Reuss, as *Lepralia*), recent from Madeira; *id.* Ann. N. H. (5) vi. p. 74. Some other foreign species mentioned.

Microporella fissa, sp. n., *id. l. c.* p. 381, pl. xvii. fig. 4, Indian Ocean.

Diporula verrucosa (Peach, as *Eschara*), id. Brit. Polyz. p. 220, pl. xxxi. figs. 1 & 2, Cornwall and Naples.

Chorizopora brongniarti (Audouin, as *Flustra*), id. *l. c.* p. 224, pl. xxxii. figs. 1–4, British.

Porinidæ.

Porina borealis (Busk, as *Onchopora*) = *Pustulopora gracilis* (Sars), and *P. tubulosa* (Norman, as *Lepralia*), British; Hincks, Brit. Polyz. pp. 227–231, pl. xxxi. figs. 4–6, & pl. xxxi. figs. 6–9.

Lagenipora socialis (Hincks), Hastings; *id. l. c.* p. 235, pl. xxxiv. figs. 7 & 8.

Myriozoidæ.

Escharina (M. Edw.) restricted to the type *E. vulgaris* (Moll.), characterized by the well-marked median sinus of the apertures of the zoœcia, together with the lateral avicularia near one or both sides of the apertures; Verrill, Bull. U. S. Nat. Mus. No. 15, p. 149 [= *Schizoporella*, Hincks].

Schizoporella unicornis (Johnst., as *Lepralia*) = *ansata* (Johnst.) = *variabilis* (Leidy), *spinifera* (Johnst.), *alderi* (Busk, as *Alysidota*) = *barleei* (Busk), *vulgaris* (Moll.), *simplex* (Johnst.), *linearis* (Hassall), *sanguinea* (Norm.), *cristata* (Hincks), *bi-aperta* (Mich.), *armata* (Hincks), *auriculata* (Hass.), *umbonata* (Busk), *discoidea* (Busk), *sinuosa* (Busk), *cecilii* (Aud.), *cruenta* (Norm.), *hyalina* (L.), and *venusta* (Norm.), most of them placed formerly in *Lepralia*, British; Hincks, Brit. Polyz. pp. 237–278, pls. xxxv.–xlii., pl. xviii. figs. 8–10, pl. xxiv. figs. 1 & 2, & pl. xxx. figs. 5–9.

Schizoporella sanguinea (Norm.), British, Mediterranean, Madeira, and Florida, and *bi-aperta* (Mich.), British, Mediterranean, Madeira, Florida,

and Arctic Sea; *id.* Ann. N. H. (5) vi. p. 76, the former, new var. also p. 382, pl. xvii. fig. 3.

Lepralia (*Schizoporella*) *quadlingi*, *assimilis*, *gandii*, spp. nn., and a species not named, all from Queensland, Haswell, P. Linn. Soc. N. S. W. v. pp. 39 & 40, the first pl. ii. fig. 2. *L. spinifera* (Johnst.) var. ? from Queensland; *id. l. c.* p. 39.

Mastigophora dutertrii (Aud., as *Flustra*) = *Lepralia woodiana* (Busk), and *hyndmanni* (Johnst., as *Lepralia*), British; Hincks, Brit. Polyz. pp. 279–281, pl. xxxvii. figs. 1, 2, & 3–6.

Schizotheca fissa (Busk, as *Lepralia*) and *divisa* (Norm., as *Lepr.*), British; *id. l. c.* pp. 284 & 285, pl. xli. figs. 1–3 & 4–6.

Rhynchopora bispinosa (Johnst., as *Lepralia*); id. *l. c.* p. 385, pl. xl. figs. 1–5, and introduction, p. cxxxviii.

Myriozoum coarctatum (Sars, as *Cellepora*) from Smith Sound; Busk, J. L. S. xv. p. 235.

Myriozoum australiense, sp. n., Haswell, P. Linn. Soc. N. S. W. v. p. 43, pl. iii. figs. 9–11, Queensland.

Hippothoa divaricata (Lamx.) = *patagonica* (Busk) = *longicauda* (Fischer), widely distributed in the cold and temperate seas, *expansa* (Dawson), and *flagellum* (Manzoni), British; Hincks, *l. c.* pp. 288–294, pl. xliv. figs. 1–4, 5–7, & pl. l. figs. 1 & 2. *H. cassiterides* (Conch) perhaps belongs to *Eucratea chelata*, p. 295.

Norodonia, g. n., near *Hippothoa*. Polyparium horn-like, creeping, adhering firmly to stones or shells; zoœcia arising from one another laterally nearer the distal end, on one or both sides, forming linear rows; walls thick; aperture within a thin membranaceous area near the distal end. *N. cambodgensis*, Cambodia, fixed on *Unio* or small stones in freshwater, and *sinensis*, Province Ngan-hoei, on *Anodonta securiformis*, spp. nn. Jullien, Bull. Soc. Z. Fr. 1880, pp. 77–79, with woodcuts.

Terebripora fischeri, sp. n., Cape Verde Islands, perforating the shell of a *Buccinum* within its aperture; *id. l. c.* pp. 142–144, with woodcut.

Escharidæ.

Eschara perpusilla, sp. n., Busk, J. L. S. xv. p. 236, pl. xiii. fig. 5, Smith Sound. *E. sarsi* (Smitt), one single avicularium on one side, same locality; *id. ibid.*

Eschara glabra, sp. n., Hincks, Ann. N. H. (5) vi. p. 281, pl. xv. fig. 6, Barents' Sea.

Eschara flabellaris (Busk) is perhaps only an erect foliaceous variety of *Microporella ciliata* (Pall.); *id. l. c.* p. 283.

Eschara hexagonalis and *umbonata*, spp. nn., Haswell, P. Linn. Soc. N. S. W. v. p. 41, pl. iii. figs. 1 & 2, & pl. ii. figs. 5 & 6, Queensland.

Hemeschara sincera (Smitt), specimens from Spitzbergen without avicularia; Busk, J. L. S. xv. p. 235.

Hemeschara australis, sp. n., Haswell, *l. c.* p. 41, pl. ii. figs. 7 & 8, Queensland.

Lepralia (Johnst.) restricted to the following British species:—*pallasiana* (Moll.) = *pedilostoma* (Hassall, Johnst.), *canthariformis* (Busk),

foliacea (Ellis & Solander, as *Millepora* ; Lamarck, as *Eschara*), including as varieties, *fascialis* (Ell. & Sol.) and *bidentata* (M.Edw., as *Eschara*), also *pertusa* (Esp.), *adpressa* (Busk) = *lata* (Busk), *hippopus* (Smith), *edax* (Busk, as *Cellepora*) and *polita* (Norman) ; Hincks, *l. c.* pp. 297–315, pls. xxiv., xxxiii., xliii., & xlvii.

Lepralia pallasiana (Moll.), zoœcia described, and *kirchenpaueri* (Heller), both from Madeira, and several other foreign species mentioned; *id.* Ann. N. H. (5) vi. p. 78.

Lepralia irregularis, mortoni, and *lunifera,* spp. nn., Haswell, P. Linn. Soc. N. S. W. v. pp. 39 & 40, Queensland, the first, pl. ii. fig. 1.

Umbonella, g. n. Primary orifice of the zoœcium suborbicular or subquadrangular, lower margin slightly curved inwards ; peristome not elevated; no secondary orifice ; a prominent umbo (avicularian cell ?) immediately below the mouth, supporting an avicularium. *U. verrucosa* (? Esper, as *Cellepora,* Thompson, Johnst., &c.), British ; Hincks, Brit. Polyz. p. 317, pl. xxxix. figs. 1 & 2. Name pre-occupied and changed into *Umbonula* ; introduction, p. cxxxviii.

Porella (Gray) restricted to *P. concinna* (Busk, as *Lepralia*), *minuta* (Norman), *struma* (Norman, as *Hemeschara*), *compressa* (Sow., as *Millepora*) = *cervicornis* (Flem., as *Cellepora*), and *lævis* (Fleming, Sars), British; *id. l. c.* pp. 320–335, pls. xxxvi., xxxix., xlv., xlvi., & xlvii.

Porella nitidissima, p. 78, Madeira, *rostrata,* p. 382, pl. xvii. fig. 5, Australia, spp. nn., Hincks, Ann. N. H. (5) vi.

Escharopsis (Verrill) = *Escharoides,* Smitt [and Hincks], lateral avicularia within the borders of the aperture by the side of the sinus. *E. lobata* (Lam.) = *sarsi* (Smitt), and *E. rosacea* (Busk) ; Verrill, Bull. U. S. Nat. Mus. No. 15, pp. 149 & 150.

[*Escharopsis*] *Escharoides rosacea* (Busk, as *Eschara*) and *quincuncialis* (Norman, as *Eschara*), British ; Hincks, Brit. Polyz. pp. 336–339, pl. xlvii. figs. 5–9, & pl. xv. fig. 7.

Smittia landsborovii (Johnst., as *Lepralia*), *reticulata* (Macq., as *Lepralia*), *affinis* (Hincks), *chilostoma* (Manzoni), *marmorea* (Hincks), *bella* (Busk), and *trispinata* (Johnst.), British ; *id. l. c.* pp. 340–353, pls. xxxvi., xlii., xlviii., & xlix.

Smittia marmorea (Hincks) = ? *Lepralia arrogata* (Waters), Madeira ; *id.* Ann. N. H. (5) vi. p. 79.

Phylactella labrosa (Busk, as *Lepralia*), *collaris* (Norman), and *eximia* (Hincks), British ; *id.* Brit. Polyz. pp. 356–359, pl. xliii. figs. 1–3, & pl. xlix. fig. 11.

Phylactella lucida, sp. n., *id.* Ann. N. H. (5) vi. p. 79, pl. x. fig. 4, Madeira.

Phylactella ? *grandis,* sp. n., *id. l. c.* p. 280, pl. xv. figs. 4 & 5, Barents' Sea.

Escharoides (M.-Edw.) restricted to the original species, *E. coccinea* (Abildg.) equivalent, in part, to *Discopora* (Smitt) ; Verrill, Bull. U. S. Nat. Mus. No. 15, pp. 149 & 150 [= *Mucronella,* Hincks].

Mucronella peachi (Johnst., as *Lepralia*), *ventricosa* (Hassall), *variolosa* (Johnst.), *laqueata* (Norman), *abyssicola* (Norm.), *microstoma* (Norm.), *coccinea* (Abildg.) = *appensa* (Hassall, Smitt) = *mamillata* (S. Wood)

= *peregrina* and *fulgurans* (Manzoni), and *pavonella* (Alder), British; Hincks, Brit. Polyz. pp. 360–376, pls. xxxiv., xxxviii., xxxix., l. & li.

Mucronella simplex, sp. n., *id.* Ann. N. H. (5) vi. p. 280, pl. xv. fig. 7, Barents' Sea.

Mucronella (?) *tubulosa*, sp. n., *id. l. c.* p. 383, pl. xvii. fig. 7, Australia.

Discopora (Lam.), restricted, with median avicularia, type *verrucosa* (Lam., *nec* Esper), closely related to *skenii* (Ell. & Sol., as *Millepora*); Verrill, Bull. U. S. Nat. Mus. No. 15, p. 150 [= *Palmicellaria*, Hincks].

Palmicellaria elegans (Alder) = *Pustulipora proboscidea* (Johnst.), *P. skenii* (Ell. & Sol., as *Millepora*), and *lorea* (Alder, as *Eschara*), British; Hincks, Brit. Polyz. pp. 378–383, pl. xxxi. figs. 7–9, pl. lii. figs. 1–6.

Retepora cellulosa (L.), from Queensland; Haswell, P. Linn. Soc. N. S. W. v. p. 41.

Adeona (Lamx.). Leaf-like expansion of the polyzoarium composed of two laminæ, in which the zoœcia are placed in an oblique direction; zoœcia similar to those of *Eschara*, their mouth rounded or lunate, sometimes a small accessory pore beneath it; near the mouth an avicularium, the lower claw of which is immersed in the wall of the zoœcium; the external calcareous stratum of the zoœcium perforated by numerous pores, which, however, do not penetrate through the whole thickness of its wall. Stem and branches without zoœcia or crust; they contain in their interior the same two rows of zoœcia as the blades, but these are covered by the calcareous deposit which forms the branch, and their mouths are obsolete; the formation of the branches is therefore posterior to that of the zoœcia, and the branches are wanting in *A. cellulosa*. Basal stalk and root-like prolongations flexible, composed of alternating calcareous swollen rings and a tubular chitinous substance. *A. foliacea* (Lamx.) = *foliifera* (Lam.), Australia, with var. n. *fasciatis*, N.W. Australia; *A. intermedia*, sp. n., Southern Africa, 50 fath.; *macrothyris*, sp. n., Australia; *arborescens*, sp. n., Dirk Hartog, N.W. Australia; *grisea* (Lamx.) = *cribriformis* (Lam.), Bass' Straits and Meermaidstreet, N.W. Australia, 17–90 fath.; *cellulosa* (Macgillivray, as *Dictyophora*), with var. n. *ochracea*, Australia; *albida*, sp. n., Meermaidstreet, 45–60 fath. Kirchenpauer, Abh. Ver. Hamb. vii. pp. 1–24, pls. i.–iii.; abstract concerning the structure of the polyzoarium in J. R. Micr. Soc. iii. p. 773.

Celleporidæ.

Cellepora avicularis (Hincks), *tubigera* (Busk), and *costazii* (Audouin, as *Cellepora*) = *hassalli* (Johnst.), recent, British; Hincks, Brit. Polyz. pp. 406, 409, & 411, pl. liv. figs. 4–6 & 7–9, pl. lv. figs. 11–14.

Cellepora cervicornis (Busk), Arctic Sea, distinct from *incrassata* (Lam.), in the Mediterranean; Busk, J. L. S. xv. p. 238, pl. xiii. figs. 6–8.

Cellepora, sp. n.?, from Novaya Zemlya, Hincks, Ann. N. H. (5) vi. p. 282.

Cellepora lævis and *granulosa*, spp. nn., Haswell, P. Linn. Soc. N. S. W. v. p. 40, Queensland, the former pl. ii. figs. 3 & 4.

Selenariidæ.

Conescharellina? *depressa* and *conica*, spp. nn., Haswell, *l. c.* pp. 41 & 42, pl. iii. figs. 4, 7, & 8, Queensland.

Lunulites, including *Cupularia* (Busk) and *Selenaria* : new Australian species described and figured by J. E. T. Woods, Tr. Phil. Soc. Adelaide, 1880 [not seen by the Recorder].

Sphæropora, g. n. Zoœcium subspherical, slightly depressed, with a circular pit at the upper pole ; whole surface occupied by cells. Cells and vibracular pits very irregularly arranged ; cells ventricose, granular ; mouth semicircular ; a secondary aperture, larger than the mouth, and of similar form, occupied by a membrane. *S. fossa*, sp. n., Queensland. Haswell, *l. c.* p. 42, pl. iii. figs. 5 & 6.

Euctimenaria (Woods [Zool. Rec. xv. *Moll.* p. 94]) is probably no Polyzoon, but the disk of an unknown species of *Comatulidæ* ; J. E. T. Woods, P. Linn. Soc. N. S. W. iv. p. 310.

CYCLOSTOMATA.

Crisiidæ.

Crisia terræ-reginæ, sp. n., Haswell, *l. c.* p. 55, pl. i. fig. 1, Queensland.

Tubuliporidæ.

Stomatopora (Bronn, pt.) *granulata* (M.-Edw., as *Alecto*), *major* (Johnst.), *dilatans* (Johnst.), *johnstoni* (Heller, as *Criserpia*), *expansa*, sp. n., very near *Proboscina ramosa* (Orb.), *incurvata* (Hincks, as *Tubulipora*), *diastoporoides* (Norman), *compacta* (Norman), *incrassata* (Smith, as *Tubulipora*) = *retiformis* (Hincks), *deflexa* (Couch, Johnst.), *fungia* (Couch) = *penicillata* (Johnst., as *Tubulipora*), and *fasciculata*, sp. n., British ; Hincks, Brit. Polyz. pp. 424–441, pls. lvii.–lxiii.

Tubulipora lobulata (Hassall), *flabellaris* (Fabr.) = *phalangea* (Couch), and *fimbria* (Lam.) = *flabellaris* (Johnst.), British ; *id. l. c.* pp. 444–459, pl. lxi. figs. 4 & 5, pl. lxiv. figs. 1–3, pl. lx. fig. 3.

Idmonea atlantica (Forbes) and *serpens* (L.) = *Tubulipora transversa* (Lam.), British ; *id. l. c.* pp. 451-454, pls. lxv. lxi. & lx.

Entalophora clavata (Busk, as *Pustulipora*), British ; *id. l. c.* p. 456, pl. lxv. figs. 5–8.

Pustulipora fragilis, sp. n., Haswell, P. Linn. Soc. N. S. W. v. p. 35, pl. i. fig. 2, Queensland.

Diastopora suborbicularis, new name for *D. simplex* (Busk, *nec* Orbigny), British ; Hincks, *l. c.* p. 464, pl. lxvi. fig. 11.

Mesenteripora meandrina (S. Wood), recent in Smith Sound ; Busk, J. L. S. xv. p. 239.

Lichenoporidæ.

Lichenopora hispida (Fleming, as *Discopora*), *radiata* (Sav , as *Melo-*

besia, Busk, as *Discoporella*), = *Discoporella flosculus* (Hincks), and *regularis* (Orb., as *Actinopora*), British; Hincks, Brit. Polyz. pp. 473–480, pls. lxviii & lxiv. figs. 4 & 5.

Domopora stellata (Goldf., as *Ceriopora*) = *Tubulipora truncata* (Flem., Johnst.), and *truncata* (Jameson, as *Millepora*, Peach), British; *id. l. c.* pp. 481–486, pl. lxiii. figs. 5–14.

Cerioporidæ.

Heteropora (Blainv., *nec* Ehrenb.): note on the history of this genus, and deceptive appearance of transverse dissepiments; A. W. Waters, Ann. N. H. (5) vi. pp. 156 & 157.

Heteropora neozealanica (Busk): its minute structure described by H. A. Nicholson, Ann. N. H. (5) vi. pp. 328–339, with several woodcuts. The tubes in the central portion are crossed by transverse calcareous plates or tabulæ, the "septa" of Busk and Waters; in the peripheral part, the thickened walls of the tubes are traversed by an exceedingly well-developed series of transverse canaliculi, which open into the cavities of the tubes by definite pores, and the tubes are intersected by numerous delicate spinules, which are arranged in a radiating manner, and reach a considerable distance into the body chamber, sometimes nearly to its centre. The author (pp. 414–423) compares this structure with that of the Silurian *Monticulipora*, and comes to the conclusion that there is no real relationship between them. Abstract in J. R. Micr. Soc. (2) i. p. 233.

CTENOSTOMATA.

Alcyonidiidæ.

Alcyonidium mamillatum (Alder), *disjunctum* (Hincks), and *mytili* (Dalyell) = *hexagonum* (Hincks), British; Hincks, Brit. Polyz. pp. 495–499, pl. lxix. figs. 7 & 8, pl. lxx. figs. 1 & 2, 3.

Alcyonidium excavatum, sp. n., *id.* Ann. N. H. (5) vi. p. 284, pl. xv. figs. 8 & 9, Barents' Sea.

Arachnidiidæ.

Arachnidium hippothooides and *clavatum* (Hincks), and *fibrosum*, sp. n., British; Hincks, Brit. Polyz. pp. 508–511, pl. lxxi.

Arachnidium simplex, sp. n., *id.* Ann. N. H. (5) vi. p. 284, pl. xv. figs. 10 & 11, Barents' Sea.

Flustrellidæ.

Flustrella hispida (Fabr., as *Flustra*; Johnst., as *Alcyonidium*), British; Hincks, Brit. Polyz. p. 506, pl. lxxii. figs. 1–5.

Vesiculariidæ.

Amathia tortuosa, sp. n., J. E. T. Woods, Tr. Soc. Vict. xvi., with figure, Australia; perhaps identical with *semiconvoluta* (Heller), from the Mediterranean.

Bowerbankia caudata, *citrina*, and *gracillima* (Hincks); Hincks, Brit. Polyz. pp. 521, 524, & 525, pl. lxxv. figs. 6–8, pl. lxxvi. figs. 6–8. *Valkeria pustulosa* (Ellis & Sol., Johnst.) belongs also to this genus, p. 522.

Avenella fusca (Dalyell, *nec* Busk, Alder, Smitt) = *dalyelli* (Wyville Thomson); *id. l. c.* p. 527, pl. lxxvii. figs. 6 & 7.

Farrella, sp. n., not named, from the Arctic Sea; Busk, J. L. S. xv. p. 240, pl. xiii. fig. 9.

Hypophorella expansa (Ehlers, 1876). Abstract of Ehlers' paper by Allman, J. L. S. xv. pp. 6–8.

Buskiidæ.

New family of the *Ctenostomata*; zoœcia contracted below, not continuous with the creeping stolon, with an aperture on the ventral surface. Only 1 genus and species: *Buskia nitens* (Alder, 1857). Hincks, Brit. Polyz. p. 531, pl. lxvii. figs. 6 & 7.

Cylindrœciidæ.

New family of *Ctenostomata*; zoœcia not contracted below, closely united to the stem at the base, not deciduous, destitute of a membranous area. Only one genus. Hincks, *l. c.* p. 534.

Cylindrœcium, g. n.; zoœcia elongate, cylindrical, crowded together or scattered, rising from a creeping stolon; polypid, without a gizzard. *C. giganteum* (Busk, as *Farrella*), *dilatatum* (Hincks, as *Farrella*) = *F. fusca* (Busk, Alder, Smitt), and *pusillum*, sp. n., British. Hincks, *l. c.* pp. 535–538, pls. lxxvii., lxxix. & lxxx. fig. 8, woodcut, p. 538.

Anguinella palmata (Beneden, 1844), British; *id. l. c.* p. 539, pl. lxxvii. fig. 5.

Victorellidæ.

Victorella pavida (Kent, 1870), some observations on its development; Hincks, *l. c.* p. 560, pl. lxxix. figs. 4–7.

LOPHOPODA.

Plumatella, allied to *repens*, Petane Valley, Napier, New Zealand, A. Hamilton, Tr. N. Z. Inst. xii. p. 302.

Fredericella, very large in the lake of Silvaplana, Engadine; Asper, Zool. Anz. iii. p. 206, woodcut.

A freshwater Polyzoon, in which the two branches of the lophophore do not form a horseshoe figure, but are more entirely separated, from the river Humber, Canada, near Lake Ontario, not yet named; Hincks, Ann. N. H. (5) v. pp. 239–241, with woodcut.

ENDOPROCTA.

Pedicellinidæ.

Pedicellina cernua (Pallas, as *Brachionus*) = *echinata* (Sars) = *belgica* (Gosse), *P. nutans* (Dalyell), and *gracilis* (Sars), British; Hincks, Brit. Polyz. pp. 565–570, with woodcuts, & pl. lxxxi.

Barentsia, g. n. Polypides with a cup-shaped body supported on a long peduncle, having a muscular enlargement at the base, the upper part fleshy and naked, the rest chitinous; peduncles borne on an erect chitinous stem, bulbous at the base; the stems united by a creeping stolon, with a chitinous investment. *B. bulbosa*, sp. n., Hincks, Ann. N. H. (5) vi. p. 285, pl. xv. figs. 12 & 14, Barents' Sea, 160 fath.

Loxosomatidæ.

Loxosoma singulare (Kieferstein), *phascolosomatum* (Vogt), and *claviforme*, sp. n., British; Hincks, Brit. Polyz. pp. 573-576, with woodcuts, & pl. lxxxi. figs. 7–12.

PTEROBRANCHIA.

Rhabdopleuridæ.

Rhabdopleura compacta, sp. n., Hincks, *l. c.* p. 581, pl. lxxii. figs. 8 & 9, Antrim, on shells from deep water.

CRUSTACEA.

BY

Prof. Eduard von Martens, M.D., C.M.Z.S.

List of Publications.

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Beneden, E. van. De l'existence d'un appareil vasculaire à sang rouge chez quelques Crustacés. Bull. Ac. Belg. (2) xlix. p. 5, and Zool. Anz. iii. pp. 35–39, 55–60.

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Brandt, A. Über mediterrane Crustaceen aus den Gattungen *Stenorhynchus*, *Achæus*, *Inachus*, *Herbstia*, and *Pisa*. Bull. Pétersb. xxvi. pp. 395–420, and Mél. biol. x. pp. 529–565.

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F. Richters gives a short general account of the organization of the *Crustacea*, with special regard to the different actual uses of the homologous pairs of extremities; Ber. Senck. Ges. 1879–80, pp. 241–257.

C. S. Bate has given a report on the present state of our knowledge of *Crustacea*, with regard to fecundation, incubation, respiration, and some anatomical questions, in Rep. Brit. Ass. 1880, pp. 230-241.

Some observations concerning the general morphology of the *Crustacea* by Yung, J. Anat. Physiol. xiv. p. 348; abstract, J. R. Micr. Soc. iii. p. 629.

Anatomy and Physiology.

1. *Nervous System.*

The microscopical structure of the supra-pharyngeal and ventral ganglions and their connecting string in *Astacus fluviatilis*, with special regard to the topographical distribution of the histological elements, and with comparative observations on the lobster and *Porcellio scaber*, is described by K. R. Krieger, Z. wiss. Zool. xxxiv. pp. 527–594, pls. xxxi.–xxxiii.; abstract in J. R. Micr. Soc. iii. p. 627.

G. Bellonci has examined the supra-pharyngeal ganglion of *Nephrops*

norwegicus, and found small round bodies, according to him, identical with the olfactory glomeruli of the Vertebrates, in the hinder fibroso-reticulated masses of this ganglion. He equalizes, therefore, these masses with the olfactory lobes, and the anterior fibroso-reticulated masses of the same with the cerebral and cerebellar hemispheres. Mem. Acc. Bologn. (4) i. pp. 429 & 430, pl.

E. Brandt gives some notes on the nervous system of *Idotea entomon* (L.). He states the presence of 14 ganglia, 3 of which belong to the head, 7 to the trunk, and 4 to the tail; and comes to the conclusion that the antennæ, labium, maxillæ, mandibles, and labrum are homologous to those of the *Insecta*, but that the maxillipeds (gnathopods) are innervated by the third ganglion of the head, which is not present in the *Insecta*, and belong therefore rather to the trunk; also that the whole head of *Idotea*, and probably of all *Arthrostræa* [*Tetradecapoda*], is not merely a head, but an abbreviated cephalothorax. He also states the existence of an unpaired sympathetic string. Hor. Ent. Ross. xv., & Zool. Anz. iii. pp. 187 & 188; C. R. xc. pp. 712–714; Ann. N. H. (5) vi. pp. 98 & 99.

Notes on the nervous system of the *Copepoda*, by M. Hartog, in Brady's Mon. Brit. Copepods, iii. pp. 16 & 17.

The structure of the brain or supra-œsophageal ganglion of *Limulus polyphemus* has been examined by A. S. Packard; it is somewhat asymmetrical, the tract of large nerve-fibres with scattered ganglionic cells on the left side being very much more extensive than on the right; it has similar large ganglion-cells to those of the brain of other Arthropods, but the smaller ganglion-cells, so abundant in the brains of *Insecta* and *Crustacea*, are wanting; there are no "Ballensubstanz-masses" nor any "mushroom" bodies; topographically, the internal structure is on a wholly different type from that of any other Arthropod; the dynamic part is confined to the upper third. Am. Nat. xiv. pp. 445–448; Ann. N. H. (5) vi. pp. 29–33; Zool. Anz. 1880, pp. 306–310.

L. Frédericq & G. Vandevelde have ascertained by a series of experiments, that the quickness of transmission of the motorial excitation in the nerves of the lobster is 11–12 metres in a second. Arch. Z. expér. viii. pp. 513–520, and C. R. xci. pp. 239 & 240.

Camphor considerably diminishes muscular power and irritability in the crayfish; Krukenberg, Vergleichend-physiologische Studien, i. p. 95.

Strychnine does not cause tetanus in the crayfish, but increasing faintness and finally death; *id. l. c.* p. 97. A solution of chloride of potassium of one per cent. kills the crayfish after 22 hours; *id. l. c.* p. 109.

Action of acids and alkalies on the crayfish observed by Richet, C. R. xc. p. 1166; abstract in J. R. Micr. Soc. iii. p. 628.

2. *Organs of Sense.*

The eye of *Limulus* and, for comparison, that of some Trilobites, especially *Asaphus*, described by A. S. Packard; both are organized on he same plan, and totally different from those of other Arthropods;

there are no cones, no rods, and no facets in the eye of *Limulus*, but a series of solid, chitinous, conical bodies, resembling Minié-rifle balls, their ends free, projecting into the interior of the body and enveloped by black pigment; these are the "conical lenses" of Grenacher. Am. Nat. xiv. pp. 212, 213, & 503–508; Ann. N. H. (5) v. p. 435; J. R. Micr. iii. pp. 947 & 948.

S. F. Smith states that two apparently cornea-like areas are to be found on the ophthalmic lobe of *Polycheles sculptus*, but he was not able to detect any evidence of facets; the green gland opens into a tubular process on the oral side of the proximal segment of the antenna. Ann. N. H. (5) v. pp. 269–273.

The hollow "phymacerite" or osseous tubercle on the first joint of the antennæ in the *Decapoda*, the opening of which is closed by a thin membrane, is probably an organ for hearing; C. S. Bate, Rep. Brit. Ass. 1880, pp. 239 & 240.

Jourdain describes the sensory rods in the inner antennæ of the *Crustacea* (*Decapoda* and *Amphipoda*). C. R. xci. pp. 1091–1093; abstract in J. R. Micr. Soc. (2) i. p. 241.

Bellonci has found olfactory glomerules in the brain of *Nephrops norwegicus*, and thinks that the external appendage of the antennulæ is the olfactory organ; Mem. Acc. Bologn. (4) i. pp. 429 & 430.

3. *Circulation and Respiration.*

The physiology of the heart in the *Decapoda* is the subject of a paper by F. Plateau, Arch. Biol. i. pp. 595–695, 2 pls. (not seen by the Recorder). Abstract in J. R. Micr. Soc. (2) i. p. 41.

C. Claus has examined the vascular system in the larvæ of *Squilla* (*Alima*) and states that it is more developed than hitherto known for the *Stomapoda* generally; the vas dorsale has a distinct enlargement in front corresponding to the heart of the Decapods, it is provided with a pair of large openings and sends a median cephalic aorta to the eyes and a pair of lateral arteries to the brain, and feelers, &c.; the rest of the vas dorsale has twelve pairs of clefts, and sends off thirteen pairs of lateral arteries and a single hinder aorta; the existence of a median ventral aorta is stated, it has its origin from the left or right cardiac artery; the author also states the presence of a sympathetic nerve on the dorsal side of the vas dorsale. Zool. Anz. iii. pp. 611–617.

Incidental observations upon the pulsations of the heart in the crayfish and in *Eriphia spinifrons* are made by Krukenberg in Vergleichend-physiologische Studien, iii. pp. 164, 167, & 168. The number of the pulsations in one minute is very variable, 20–100; if the heart is cut across, the movements continue in the hinder part, but they cease instantaneously if this hinder part is cut longitudinally into two symmetrical parts; atropine renders the pulsations slower, veratrine causes a diastolic paralysis of the heart, but the pulsations recommence on the application of digitaline.

E. von Beneden states that he observed in 1868, and published in 1873, the peculiar system of closed vessels with red blood without

globules, described by HELDER [Zool. Rec. xvi. *Crust.* p. 6] in two species of *Lernanthropus*, in *Congericola* and *Clavella*; the lateral appendages (gills) are rhythmically contracted; the existence of two sorts of fluids, a colourless with white globules (leucocyts) in the cavity of the body, and of red blood without globules in closed vessels, is the same as in the higher Annelids; the author calls the first plasmatic, and the second hæmatic fluid. Bull. Ac. Belg. (2) xlix. p. 5; Zool. Anz. iii. pp. 35–39 & 55–60.

JOBERT'S statements concerning the respiration of *Uca* [Zool. Rec. xiv. *Crust.* p. 15] reported and discussed by C. S. Bate, Rep. Brit. Ass. 1880, p. 235.

M. HARTOG has observed anal respiration in *Cyclops*, *Canthocamptus*, and *Diaptomus*: at regular intervals, after the backward sway of the intestine, the anal valves open for an instant and then close, giving just time for a slight indraught of water during the opening, and a slight expulsion at its close; an anal respiration is found widely among *Crustacea*, in *Phyllopoda*, *Cladocera*, and even in *Astacus*; it occurs also in the *Rotifera* and in some other *Vermes*, in the *Holothuriæ*, in most aquatic larvæ of *Insecta*, and in *Dentalium* among the *Mollusca*; it appears therefore to be rather primitive. Q. J. Micr. Sci. xx. pp. 244 & 245; abstract in J. R. Micr. Soc. iii. p. 632. The same anal respiration observed in the Zoea of *Cancer* and of some prawns; *id. l. c.* p. 485, J. R. Micr. Soc. iii. p. 944.

4. *Digestion.*

M. WEBER has examined histologically and chemically, and described the so-called liver of terrestrial, freshwater, subterraneous, littoral, and truly marine species of different orders, viz.:—several *Oniscidæ*, including the blind *Typhloniscus steini*, *Asellus aquaticus*, and the subterraneous *A. cavaticus*, *Gammarus pulex*, *fluviatilis*, *puteanus*, *marinus*, and *locusta*, *Talitrus* and *Orchestia*, and *Astacus fluviatilis*. He comes to the conclusion that in the *Decapoda*, *Amphipoda*, and *Isopoda*, this gland is tubular and contains at least two sorts of cells, one of which secretes a fluid acting as a ferment (enzyme) on albuminous substances, and the other a pigment allied with a fatty substance and cholestearin, serving for the emulsion for fat. He calls the first ferment-cells, the second liver-cells, and the whole organ "hepato-pancreas," as it combines the function of the liver and that of the true digestive glands of the Vertebrates. During the embryonal stage, the liver is developed and active in the *Crustacea*, as in the *Vertebrata*, which proves that its function is not only digestion, but also excretion. In some Amphipods and Decapods, there is a third sort of cells, probably reserve-cells, which are destined to supply, if necessary, the others. Arch. mikr. Anat. xvii. pp. 385–457, pls. xxxvi.–xxxviii.; abstract in J. R. Micr. Soc. iii. p. 424.

Spectroscopical observations on the pigments in the liver of several Decapods by C. FR. KRUKENBERG Vergleichend. physiologische Studien, iii. pp. 185, 187, & 188, with a table.

The solid parts in the stomach of the *Brachyura* have been the object of special research by E. NAUCK, who gives a general sketch of them, with

a comparative table of the terms used by previous authors in their description. He describes accurately and uniformly those of 64 species, mostly belonging to different genera, and representing almost all the higher systematic divisions; 18 of them are figured. As a whole, the structure of these parts exhibits the same type in all *Brachyura* examined. The conclusions which the author draws from his researches with regard to classification, will be mentioned in the special part. Z. wiss. Zool. xxxiv. pp. 1–69, pl. i.; abstract in J. R. Micr. Soc. iii. p. 425.

5. *Secretion and Excretion.*

C. Grobben has published a paper on the antennal gland of the *Crustacea*, describing the rather simple forms of it in the larvæ of *Estheria* and *Branchipus*, consisting of a terminal saccule and a looped and coiled excretory canal, and those of the Nauplius-form of *Cetochilus* and *Cyclops* which are of similar conformation. In *Gammarus marinus*, the terminal saccule is reniform. In *Palæmon*, the saccule is also reniform and supplied by a large blood-vessel; it consists of a large number of cœcal sacs, between which is a thick network of connective tissue and lacunæ filled with blood; the excretory canal makes numerous loops. In *Astacus fluviatilis*, both parts form a compact mass, lying largely in the thorax, known as "green gland"; the saccule is rounded and of a yellowish-green colour, the canal is delicate, provided with diverticula, and very extended in part. The author has no doubt that this organ has the function of a kidney; he even compares the saccules with the Malpighian capsules and the canal with the tubuli contorti of the human kidney, and observes that both in *Vermes* and *Mollusca* the urinary canals are formed by a few cells. Abstract in J. R. Micr. Soc. iii. pp. 785 & 786.

C. S. Bate, on the contrary, has considerable doubt whether the green gland performs the function of a kidney; Rep. Brit. Ass. 1880, pp. 238 & 239.

W. Müller maintains that the organ of the *Ostracoda* described by Zenker as a mucous gland, is such, and not an ejaculating apparatus, as Weismann supposes; *l. c.* pp. 231 & 245.

Note on the occurrence of uric acid in the several organs and in the excreta of some *Crustacea*, by C. Fr. Krukenberg, Vergleichend. physiologische Studien, pp. 20 & 28. Tyrosine, but not leucine, occurs in the muscles of the lobster; *id. l. c.* p. 35. Chemical notes on the muscular substance of the lobster; *id. op. cit.* ii. pp. 10, 11, & 13.

The lobster contains 74, and *Squilla mantis* 81 per cent. of water; *id. l. c.* p. 104.

6. *Generation.*

Observations on copulation and oviposition of *Maia*, and on the season (April–June) in which several Decapods propagate, by Schnitzlein & P. Mayer, MT. zool. Stat. Neap. ii. pp. 165, 166, & 172; abstract in J. R. Micr. Soc. (2) i. p. 20.

The latest observations on fecundation, incubation, and moulting of

the common crayfish, by CHANTRANS and others, are reported by C. S. Bate, Rep. Brit. Ass. 1880, pp. 230–232.

Abstract of SCHÖBL'S observations on the reproduction and breeding of the terrestrial *Isopoda* [Zool. Rec. xvi. *Crust.* p. 38], in J. R. Micr. Soc. iii. p. 425.

For interesting observations concerning parthenogenesis and the relative number of males in several species of *Cypris*, *Candona*, and *Notodromus* by WEISSMANN & W. MÜLLER, see infrà, *Ostracoda*.

Laterally hermaphrodite specimen of *Cyclops agilis* (Koch), normally female on the left side and resembling a male on the right, observed by H. REIBERG, Abh. Ver. Bremen, vi. p. 536.

7. *Development.*

T. BALFOUR, in his Treatise on Comparative Embryology, (1880), refers to the *Crustacea* at pp. 380–447.

Polar globules in the egg of *Asellus aquaticus* stated to exist by L. F. HENNEGUY, Bull. Soc. Philom. 1880 (Apr.); abstract in Ann. N. H. (5) vi. p. 465, and in J. R. Micr. Soc. (2) i. p. 42.

Note on the formation of the blastoderm and the germinal layers in *Orchestia montagui* and *mediterranea*, by W. ULIANIN, Zool. Anz. iii. pp. 163–165; abstract, J. R. Micr. Soc. iii. p. 946.

P. MAYER thinks, in opposition to Balfour, that the Zoea does not represent the ancestral form of the *Decapoda*, but is a later acquired stage of development, cænogenetic, not palingenetic. MT. zool. Stat. Neap. ii. pp. 217–220.

W. FAXON describes the hatching of *Carcinus mœnas* (L.), the structure of its Zoea and its first moult (pointing out several errors in Spence Bate's paper on its development), and also the Zoea of *Panopeus sayi*. Bull. Mus. C. Z. vi. No. 10, pp. 159–166, pls. 1 & 2.

J. E. V. BOAS describes the larvæ of *Palæmonetes varians* (Leach), and their metamorphosis to the adult animal, as well as the mature embryos of *Pandalus*, *Hippolyte polaris*, *Alpheus*, *Caridina*, and *Pasiphae*. Dan. Selsk. Skr. (6) i. 2, pp. 50–53, 56, 58, 59, 171, & 172, pl. i. fig. 4, pl. ii. figs. 41, & 79 & 80, pl. v. figs. 158–160.

The development of *Palæmonetes varians* (Leach) is described by P. MAYER; it is essentially an abbreviation of that of *Palæmon*. MT. z. Stat. Neap. ii. pp. 196–221, pl. x.; abstract in J. R. Micr. Soc. (2) i. p. 41.

F. MÜLLER has observed that in some freshwater *Macrura*, living in the navigable part of the river Itajahy, in Southern Brazil., viz., *Atya*, sp., *Leander potitinga*, and *Palæmon*, spp., the young are hatched in the stage of Zoea, like the marine *Macrura*; but that in *Crustacea* living in rivulets, viz., *Trichodactylus*, *Æglea*, and *Palæmon potiuna*, the development is abbreviated, the young being hatched in a much more advanced state; the eggs in the last *Palæmon* are much less numerous, 20 instead of 1200 in the river species; the young, when first hatched, are 5 millim. long, they moult thrice within four days, and before they take food, have the habits and movements of the adult, and become mature for generation

when they are 25 millim. long. Zool. Anz. iii. pp. 152–157; some additions, *ibid.* p. 233; abstract in J. R. Micr. Soc. iii. p. 630.

W. K. Brooks has observed the embryology and metamorphoses of *Leucifer*, and recapitulates it as follows: — The egg undergoes total regular segmentation, and the lines of division extend to its centre, where a segmentation cavity is formed. There is an invaginate Gastrula stage. The larva leaves the egg as a Nauplius. There is a Protozoea-stage, but no Elaphocharis-stage and no Acanthosoma-stage; the Protozoea changing into a Schizopod which has the same general form as the adult *Leucifer*. The fifth thoracic segment is entirely wanting in all stages of development; there is at no time any trace of it or of its appendages. Zool. Anz. iii. pp. 563-567; abstract in J. R. Micr. Soc. (2) i. p. 42.

Geographical Distribution.

1. *Terrestrial and Freshwater Crustacea.*

F. Müller states the occurrence of an *Entomostracon*, *Elpidium bromeliarum*, fam. *Cytheridæ*, in the tops of trees in Brazil; Kosmos, vii. pp. 386–388, with woodcut; abstract in Nature, xxii. pp. 55 & 56, see special part.

List of 14 species of *Cladocera*, 1 Ostracode and 11 Copepods found in lakes of Lapland by F. Trybom, in the Catalogue of the Swedish section of the International Exhibition of Fishery at Berlin, 1880, pp. 7–9.

Three Phyllopods from Finland enumerated by J. Sahlberg, Not. Fenn. xiv. p. 317.

List of 41 fresh and brackish water *Ostracoda* found in Scotland, chiefly Clydesdale and the western district, by D. Robertson, with special hints for collecting them. *Cypris salina*, *Cypridopsis aculeata*, and *Cytheridia torosa* belong exclusively to the brackish water; *Cypris incongrua* and *Cypridopsis obesa* as well in brackish as fresh water. P. N. H. Soc. Glasg. iv.; abstract concerning the mode of collecting in J. R. Micr. Soc. iii. pp. 788 & 789.

27 species of free freshwater Copepods, viz., 21 species of *Cyclops*, 3 of *Canthocamptus*, 2 of *Diaptomus*, and 1 *Temora*, observed near Bremen, Northern Germany, and described, some figured, by H. Reinberg, Abh. Ver. Brem. vi. pp. 533–554, pl. vi.

Observations on the *Crustacea* in the depths of several lakes of Switzerland, by Asper, in the Catalogue of the Swiss section of the International Exhibition of Fishery at Berlin, 1880, pp. 131–140, & Zool. Anz. iii. pp. 132–134 & 200–206. Observations of those in 21 lakes of Italy, by Pavesi Zool. [Rec. xvi. *Crust.* p. 9], abstracted in Nature, xxi. p. 525, & J. R. Micr. Soc. iii. p. 413.

Russian Armenia, Lake Tschaldyr-göl. *Asellus* sp., *Gammarus* sp., *Daphnia hyalina*, *Leptodora hyalina*, and *Bythotrephes longimanus*, near the surface at noon; A. Brandt, Zool. Anz. iii. p. 114.

Lake of Tiberias. A small shrimp and *Telphusa fluviatilis*; Lortet, C. R. xci. p. 500.

North America. *Apus* found only in the Central provinces, not in

the Mississippi Valley or in California; A. S. Packard, Am. Nat. xii. [1878], p. 516. Note on Phyllopods from Florida, Long Island, and Colorado ; *id. op. cit.* xiv. p. 53.

Mauritius and Seychelles. 2 species of *Palæmon* and 4 of *Caridina* in freshwater collected by Möbius, Richter's Decap. Maur. pp. 162, 163, & 166.

Abbreviated larval stage of freshwater Decapods ; see observations by F. Müller and P. Mayer, *suprà*, under "Development."

P. Mayer has tried to accustom *Palæmonetes varians* (Leach) to sea-water, bringing it first for some time in half-salted water ; several specimens lived for about three months in sea-water, but their eggs did not become mature. MT. z. Stat. Neap. ii. p. 196.

2. *Arctic Seas.*

Barents' Sea, Novaya Zemlya. 7 species of *Podophthalma* (including no Brachyure), 10 spp. of *Edriophthalma*, and 2 of *Cirripedia*, collected by W. J. A. Grant, enumerated by W. S. M. D'Urban, Ann. N. H. (5) vi. pp. 262 & 263, all known.

Davis' Straits. 3 species of macrurous Decapods, 4 Amphipods, and 2 Cirripeds, collected in Cumberland Gulf, by the Howgate Polar Expedition, 1877–78, enumerated by S. F. Smith, Bull. U. S. Nat. Mus. No. 15, pp. 139 & 140.

Greenland. 1 Brachyure, 5 Macrures, 1 Schizopod, 1 Cumacean, 2 Isopeds, 12 Amphipods (including Læmodipods), Phyllopods, and 3 parasitical Copepods, collected by E. Whymper, chiefly at Hare Island, North of Disco, discussed by Edw. J. Miers, J. L. S. xv. pp. 50–72. A few from Discovery Bay ; *id. l. c.* p. 73.

3. *Seas of Northern Europe.*

Baltic. Note on the *Crustacea* of the environs of Danzig; the only marine Decapods are *Crangon vulgaris*, common, and *Palæmon squilla*, rather rare ; among the Isopods, *Idotea tricuspidata* and *I. entomon* are the more remarkable. Bail, in "Danzig in naturwissenschaftlicher und medizinischer Beziehung," 1880, pp. 92 & 93. 5 species of *Cythere*, including *C. lutea* (Müll.) and *reniformis* (Baird), not before known from thence ; W. Müller, Z. ges. Naturw. (3) v. p. 237.

Danish Shores. F. Meinert gives a supplement to a former list of Danish marine *Crustacea*, enumerating 14 species of *Isopoda*, 46 of *Amphipoda*, and 37 of *Cumacea*, *Schizopoda*, and *Decapoda*, from about 14 localities of the western and northern shores of Jütland and the Danish Islands.

Kattegat. List of 148 species of *Crustacea*, mostly marine, found near Göteborg (Sweden), with indication of the depth in which they live, by A. W. Malm, Gothenburgs naturhistorisches Museum, I. Catalog über die in der internationalen Fischerei-Ausstellung in Berlin ausgestellte Sammlung, 1880, pp. 17–20.

North Sea. List of 70 species of Dutch *Crustacea* which have some

relation to fishery, in the General Catalogue of the International Exhibition of Fishery at Berlin, 1880, pp. 157 & 158.

Bay of Biscay. Notes on some deep sea *Crustacea* dredged by the French Expedition of the 'Travailleur,' by A. MILNE-EDWARDS, C. R. xci. p. 355, and by A. M. NORMAN, Ann. N. H. (5) vi. p. 433, & Rep. Brit. Ass. 1880, p. 387. See also *Geryon* and *Gnathophausia*, in the special part.

4. *Mediterranean.*

General remarks on the *Crustacea* exhibited in the aquarium of the zoological station at Naples, by DOHRN & SCHMIDTLEIN, Leitfaden für die Aquarien der zoologischen Station zu Neapel, 1880, pp. 27–39.

Some observations on the appearance of pelagic *Crustacea*, *Phronima*, and *Lepas fascicularis* at Naples, by SCHNITZLEIN, MT. z. Stat. Neap. ii. p. 165.

List of Mediterranean Decapods, Stomapods, and some Isopods, with regard to fishery, by TARGIONI-TOZZETTI, Catalogo della Sezione Italiana dell' Esposizione internazionale di Pesca in Berlino, 1880, pp. 120–126, & p. lxxxviii. List of the chief edible *Crustacea* from Venice, by A. NINNI, *l. c.* p. 172. Edible *Crustacea* from the lagoons of Venice, TARGIONI-TOZZETTI, *l. c.* p. cxvi. (German edition, pp. 16 & 40).

List of 130 species of parasitical *Crustacea* of Italy (some new, but not described), by S. RICHIARDI, Catalogo della Sezione Italiana dell' Esposizione internazionale di Pesca in Berlino, 1880, pp. 147–152 (German edition, pp. 29–34).

Adriatic Sea. M. STOSSICH enumerates 49 species of *Brachyura*, 17 *Anomura*, 45 *Macrura*, 6 *Stomapoda*, 50 *Isopoda*, 102 *Amphipoda*, 1 Cumacean (*Nebalia*), 2 *Ostracoda*, 6 thoracic and 4 parasitical Cirripeds, 76 parasitical and only 2 free Copepods. Boll. Soc. Adr. vi. pp. 178–271.

Caspian Sea. Several new species of *Gammarus*, *Pandora*, *Iphigenia*, *Gammaracanthus*, *Amathilinella*, *Onesimus*, *Pontoporia*, and *Niphargus*, mentioned, but not described, by O. GRIMM, Arch. f. Nat. xlvi. p. 119.

5. *East Coast of North America.*

New England. Several tropical or sub-tropical species of Decapods, as *Ocypode quadrata* (F.), *Grapsus pictus* (Lam.), *Pachygrapsus transversus* (Gibbes), *Nautilograpsus minutus* (L.), *Neptunus sayi* (Gibbes), *Calappa marmorata* (F.), *Polyonyx macrocheles* (Gibbes), *Petrolisthes ornatus* (Gibbes), *Latreutes ensiferus* (M.-Edw.), and *Penæus brasiliensis* (Latr.), are found occasionally on the coast of New England, especially young specimens; some of them are regular inhabitants of the Gulf Stream, others drift north in the free-swimming early stages. Tr. Conn. Ac. iv. pp. 254–267.

The marine (and littoral) *Isopoda* of *New England* are monographically treated by OSCAR HARGER in the Sixth Rep. U. S. Comm. Fish and Fisheries, pp. 297–462, 13 pls. The former consist of 46 species, belonging to 14 families; 6 species of them are also British, 9 arctic (including Greenland).

5 species of *Bopyridæ* known from New England enumerated, but not described, by S. F. Smith, in Harger's Rep. Isopod. pp. 311 & 312.

Virginia, North Carolina, and Florida. About 100 species of Decapods, excluding *Paguroidea*, enumerated, and 9 new species described, by S. F. Kingsley, P. Ac. Philad. 1879, pp. 383–427, pl. xiv. Critical notes on them by S. F. Smith, Am. J. Sci. (3) xix. pp. 423 & 424.

6. *West Indies.*

A. Milne-Edwards enumerates 214 species of Decapods dredged at various depths to 1940 fath., in the Gulf of Mexico and Caribbean Sea, 1877–79, under the supervision of A. Agassiz, by the U. S. Coast Survey Steamer 'Blake.' There are many new genera and species described, several of which are highly interesting as intermediate links between distinct families, especially among the *Carcinoplacidæ*, *Dorippidæ*, *Paguridæ* (some lodged in wood or between sand), and *Galateidæ*. Bull. Mus. C. Z. viii. 1, pp. 1–68, pls. i. & ii.

Vera Cruz. 3 species of *Brachyura* collected by P. Geddes, discussed by E. J. Miers, J. L. S. xv. pp. 85–87.

7. *Indian Ocean.*

Red Sea. R. Kossmann continues his descriptions of the *Crustacea* found by himself in the Red Sea, discussing the *Anomura, Macrura, Schizopoda, Stomatopoda, Isopoda*, and *Amphipoda*; Zool. Ergebnisse einer Reise &c., ii. pt. 2, pp. 67–140, pls. iv.–xv. The new species and those the knowledge of which is essentially improved, will be mentioned *infrà*.

26 species of *Decapoda*, collected by J. A. Kruyt at Jeddah, enumerated by J. G. de Man, Notes Leyd. Mus. ii. pp. 171–183.

Madagascar. List of 17 *Crustacea* by F. Pollen in the General Catalogue of the International Exhibition of Fishery at Berlin, 1880, p. 160.

Mauritius and Seychelles. 136 species of *Decapoda* enumerated by F. Richters in Möbius's, Beitr. Mauritius, pp. 139–169, 41 plates; with 21 of them are common to both, 13 only found in the Seychelles, 102 only in Mauritius.

Malayan Archipelago. 117 species of Decapods, 15 Isopods, 1 *Succulina*, and 2 *Limulus* enumerated, many of them discussed, and several new described, by E. J. Miers, Ann. N. H. (5) v. pp. 226–239, 304–317, 370–384, & 457–472, pls. xiii.–xv. Notes on species of *Sesarma, Cardisoma, Macrophthalmus*, and *Gelasimus*, from the Malayan Archipelago, by De Man, *l. c.* pp. 21–36 & 67–72; on some *Cancridæ* incidentally, *id. l. c.* pp. 172–178. Also some notes by the same in Veth's Midden-Sumatra, iv. pt. 11, with 2 plates.

8. *Northern Pacific.*

Vancouver and Queen Charlotte Islands. 25 species of Decapods, 1 new genus of *Cumacea*, 4 species of Isopods, and 2 Cirripeds enumerated;

Nectocrangon lar and 4 species of *Hippolyte* are common with the Arctic region of the Atlantic. S. Smith, Rep. Geol. Surv. Canada, 1878–79 [1880], pp. 206 B–216 B.

9. *Australian Seas.*

E. J. Miers hesitates to admit the occurrence of several northern or Arctic species of marine *Crustacea* at New Zealand, as stated by Kirk; they may be closely allied, but not identical. Ann. N. H. (5) v. p. 125.

58 species of Australian *Oxyrrhyncha* enumerated, and many new described. Those of northern Australia are very near those of the Malayan and Melanesian seas; those of the southern extra-tropical part of Australia have remarkable analogies with the forms of New Zealand, Japan, and indirectly of Europe. The greater number of the northern species belongs to the families *Pericerida* and *Parthenopidæ*; the southern species belong almost exclusively to the *Inachidæ* and *Maiidæ*. W. A. Haswell, P. Linn. Soc. N.S.W. iv. [1879] pp. 431–458, pls. xxv.–xxvii.; abstract in Ann. N. H. (5) v. pp. 145–147.

New localities for some Australian *Leucosiidæ*; Haswell, *l. c.* pp. 403 & 404.

Notes on Australian *Amphipoda*; id. Ann. N. H. (5) v. pp. 30–34. Those of Port Jackson and tropical Queensland are remarkably different. Most of these have been already described and figured in P. Linn. Soc. N. S. W. iv. [1879] pp. 319–349, pls. xviii.–xxiv. [Zool. Rec. xvi.]. Some additions by the same; *op. cit.* v. pp. 97–105, pls. v.–vii.

New Zealand. A new Mysid, a new Tanaid, and 7 new or little-known Amphipods described by G. M. Thomson, Ann. N. H. (5) vi. pp. 1–6, pl. i. A new *Palinurus* by Kirk, *tom. cit.* p. 14.

Abyssal and Cavernicole Crustacea.

O. Grimm enumerates several instances of Amphipods which live in depths from 35–250 fath. in the Caspian Sea, and which nevertheless are provided with eyes in different degrees of perfection, some with red pigment, some without pigment. *Niphargus caspius* has very small eyes with dark pigment, and much developed cylindrical organs for smelling and touching (scarcely for hearing) on its upper antennæ; *Onesimus caspius* has eyes without pigment, and much developed cylindrical organs for touching, hidden in the external plates of the maxillipeds, &c. He comes to the conclusion that in depths of 100 metres and upwards, there is no absolute darkness, and that in such depths some animals are provided with very large eyes, others with imperfect eyes, but in compensation with other highly developed sensitive organs on various parts of their body. Arch. f. Nat. xlvi. pp. 116–126; translated, Ann. N. H. (5) v. pp. 82–92.

Gammarus (*Niphargus*) *puteanus* (Koch). Specimens of pale bluish-grey colour found in a pond at the entrance of the cavern of Falkenstein, other specimens in wells at various localities; S. Fries, Württ. nat. J. H. xxxvi. pp. 105–109 & 117.

Niphargus puteanus var. and a new species of *Titanethes* found in the cavern of Monte Fenere, Val Sesia, Italy; PARONA, Atti Soc. Ital. xxiii. pp. 42–60.

Cambarus typhlobius in caverns of Carniola; Joseph, JB. schles. Ges. 1880, p. 202.

Many new genera of Decapods from the depths of the West Indies, chiefly *Carcinoplacidæ*, *Paguridæ*, and *Galateidæ*, dredged by A. Agassiz, described by A. MILNE-EDWARDS, Bull. Mus. C. Z. viii. No. 1, 68 pp., pl. i. Two of the new genera are blind, *Bathyplax*, family *Carcinoplacidæ*, 423–451 fath., and *Cymonomus*, family *Dorippidæ*, 175–450 fath. A new blind *Nephropsis*; *id.* Ann. Sci. Nat. (6) ix. Art. 2.

PALÆONTOLOGICAL RELATIONS.

Fossil crayfish from tertiary beds in Wyoming, which do not differ generically from *Cambarus*, though with some external resemblance to *Astacus*, indicated by A. S. PACKARD, Am. Nat. xiv. p. 222. A new *Estheria* from the quaternary clays of Canada; *id. l. c.* p. 496.

USE BY MAN.

Several lists of edible *Crustacea* in the Catalogues of the International Fishery Exhibition at Berlin, 1880; *vide suprà*, Geographical Distribution.

DECAPODA.

J. E. V. BOAS has published a very interesting and elaborate treatise on the natural (and phylogenetic) affinities of the Decapods. He describes comparatively the principal families and genera, beginning with the lower forms, treating the *Macrura* and *Anomura* more in detail because they contain the primitive types and important degrees of improvement, and going over the *Brachyura* more generally as a whole. His chief attention is of course given to the oral parts and legs, and he figures on the plates side by side the corresponding parts of the whole series of families, beginning with *Thysanopoda* or with the larva of *Peneidæ*, and ending with typical *Brachyura*. The composition of the cephalothorax, its persisting or transitory sutures and ridges, the chitinous plates of the pleon, and the number and structure of the gills, are also the objects of his descriptions and comparisons; and he gives on a synoptic table (p. 162) the number of the gills and their chief components for 36 genera, chosen from the principal families. From these considerations, the author comes to the following systematic (or rather phylogenetic) arrangement of the Decapods:—

Suborder I. NATANTIA.
- Fam. 1. *Penæidæ*.
- Fam. 2. *Eucyphota* (all the rest of the *Carides*).

Suborder II. Reptantia.
- Fam. 1. *Homaridæ* (*Astacus* is intermediate between them and the *Thalassinidæ*).
- Fam, 2. *Eryonidæ*.
- Fam. 3. *Loricata* (*Palinurus*, *Scyllarus*).
- Fam. 4. *Thalassinidæ*.
- Fam. 5. *Anomala* (De Haan).
  - (*a*) *Paguroidea*, incl. *Lithodes*.
  - (*b*) *Galateidæ*, incl. *Porcellana*.
  - (*c*) *Hippidæ*.
- Fam. 6. *Brachyura*.
  - (*a*) *Dromiacea*.
  - (*b*) *Genuina*.

The differences between the *Natantia* and *Reptantia* are rather numerous. The more important of them are:—the articulation of the fifth and sixth joint of the legs being moveable only in one direction, a ginglymus, in the former, and turning round its axis in the latter; the situation of the male orifice in the articular membrane between the thorax and fifth leg in the former, in the basal joint of the fifth leg in the latter; the antennal scale being very large in the former, and small in the latter; the body being compressed and horny in the former, depressed and calcified in the latter, &c. The extinct genera *Udora*, *Udorella*, and *Hefriga* are, on account of the structure of the pleon, placed among the *Eucyphota*, although the two former are provided with exopodites in the adult state; *Hoploparia*, *Eryma*, *Glyphæa*, *Pemphix*, and *Clytia* among the *Homaridæ*. The whole is written in Danish, but a general synopsis of the families, indicating their full characters, is given in Latin at pp. 155–160, and a detailed recapitulation of the whole in French, pp. 163–207. Dan. Selsk. Skr. (6) i. 2, pp. 25–210, 6 pls.

The organs employed for keeping the gills clean are in *Palæmon* the first pair of thoracic feet; in *Alpheus* and *Hippolyte*, probably the second; in the *Paguridæ*, in *Æglea* and *Hippa*, the last. These are all remarkably slender and moveable, but not rudimentary, as was supposed. In the *Brachyura*, internal appendages of the maxillipeds do the same service, their hairs are finely serrate, and are even as it were combed in *Trichodactylus* by a row of pointed tubercles in the middle line of the gills. Fritz Müller, Kosmos, vii. pp. 148–152, with woodcuts representing the hairs and tubercles; abstract in J. R. Micr. Soc. iii. p. 631.

BRACHYURA.

Boas describes at length the oral parts and legs of *Carcinus mænas*, as typical for the whole Sub-order, and points out some differences regarding them in the types of other families, as *Ocypode*, *Cardisoma*, *Grapsus* *Pseudocorystes*, *Dorippe*, *Calappa*, *Hepatus*, *Persephone*, and *Ranilia*; Dan. Selsk. Skr. (6) i. 2, pp. 141–147, pl. i. figs. 16–20 & 36, pl. ii. figs. 66–68, pl. iii. figs. 96, 97, & 125–128; recapitul., pp. 201 & 202. He

rejects the division *Oxystomata* of M.-Edwards, because it comprises too different types; pp. 146 & 202.

E. NAUCK, having examined the solid plates in the stomach of many genera of *Brachyura*, proposes with regard to them the following classification :—

I. HETERODONTA. The middle supero-median very broad, with high lateral edges; its middle tooth not composed of lamellæ the anterior supero-laterals situated before the anterior supero-median. Families *Gelasimidæ* and *Pinnoteridæ*.

II. CYCLODONTA. The middle tooth consisting of circular lamellæ; the anterior supero-laterals situated by the side of the anterior supero-median.

A. *Cœlostylidea*. The middle supero-median narrow and elongated, with elevated lateral edges.

1. *Catometopa* (M.-Edw.). *Pinnoteridæ* and *Gelasimidæ* excluded.
2. *Oxyrrhyncha* (M.-Edw.).

B. *Platystylidea*. The middle supero-median broad, its lateral edges not or scarcely elevated.

1. *Oxystomata* (M.-Edw.).
2. *Cyclometopa* (M.-Edw.).

Eriphia belongs in this respect to the *Cyclometopa*; *Trapezia* is quite peculiar, and constitutes a connecting link with the *Heterodonta*. Z. wiss. Zool. xxxiv. pp. 1–69, pl. i.

INACHIDÆ.

Leptopodia sagittaria (Leach) = *ornata* (Guilding) = *lanceolata* (Brullé), Florida, West Indies, Brazil, Madeira, Canaries, Senegal, perhaps also west coast of America; Kingsley, P. Ac. Philad. 1879, pp. 383 & 384.

Stenorrhynchus czernjawskii, sp. n., A. Brandt, Bull. Pétersb. xxvi. pp. 396–399, Black Sea; compared with *S. longirostris* (F.) and *phalangium* (Penn.).

Achæus cranchi (Leach). Description of Mediterranean specimens by R. A. Philippi, published by A. Brandt, *l. c.* pp. 399–401.

Achæus breviceps, sp. n., Haswell, P. Linn. Soc. N. S. W. iv. [1879] p. 433, Port Jackson.

Cory [*r*] *rhynchus*, new name for *Podochela* and *Podonema* (Stimps.), both pre-occupied; *C. ruesi* (Stimps.), Florida. Kingsley, Am. Nat. xiii. [1879] p. 585, and P. Z. S. 1879, p. 384.

Euprognatha acuta, sp. n., A. Milne-Edwards, Bull. Mus. C. Z. viii. p. 7, West Indies, 84–208 fath.

Lispognathus, g. n. Cephalothorax pear-shaped, eyes not retractile, rostrum bifid; exognath of the outer maxillipeds very long, its merognath much narrower than the ischiognath, contracted at its base and rounded at its extremity; ambulatory legs long and slender. Between *Euprognatha* and *Anisonotus*. *L. furcatus*, sp. n., A. Milne-Edwards, *l. c.* pp. 8 & 9, Grenada, W. Indies, 291 fath.

Inachus scorpio (F.) var. *lata* (Czerniawski, MS.) = *I. latus* (Philippi, MS.) = *mauritanicus* (Lucas), *I. dorynchus* (Leach) and *I. thoracicus* (Roux), Mediterranean specimens described by A. Brandt, Bull. Pétersb. xxvi. pp. 401–404.

Oncinopus angulatus, sp. n., Haswell, P. Linn. Soc. N. S. W. iv. [1879] p. 433, Port Jackson and Cape Grenville.

Oregonia longimana (Bate) ? = *gracilis* (Dana), of which *O. hirta* (Dana) is the female; S. Smith, Rep. Geol. Surv. Canad. 1878–79, p. 209 B.

Halimus lævis, sp. n. ?, Haswell, P. Linn. Soc. N. S. W. iv. [1879] p. 435, Tasmania and King George's Sound.

Microhalimus, subg. n. of *Halimus*. No conspicuous spines on the lateral borders of the carapace; size small. *H.* (*M.*) *deflexifrons*, sp. n., Port Jackson. Haswell, *l. c.* p. 435, pl. xxv. fig. 2, and Ann. N. H. (5) v. p. 146.

Trachymaia, g. n. Cephalothorax short, broad; rostrum small with slightly divergent horns; orbits very open above and below, the eye can be retracted into a groove at the base of the postorbital spine; basilar joint of the antennæ very narrow. Fingers pointed; legs diminishing gradually in length. Near *Halimus* and *Amathia*. *T. cornuta*, sp. n., Barbadoes and Santa Cruz, 82–248 fath. A. M.-Edwards, Bull. Mus. C. Z. viii. p. 3.

Scyramathia, g. n. Proposed for *Amathia carpenteri* and *Scyra umbonata*, found in the Bay of Biscay. *Id.* C. R. xcii. p. 355.

Chlorinoides, g. n. Distinct from *Chlorinus* [*Chorinus*, M.-Edw.] by a spine on the basal joint of the antennæ, and by the greater relative length and slenderness of the feet. *C. tenuirostris*, sp. n., Torres Straits. Haswell, P. Linn. Soc. N. S. W. iv. [1879] p. 443, pl. xxvi. fig. 1, and Ann. N. H. (5) v. p. 146. The author places this genus in the *Maiidæ*, between *Naxia* and *Micippoides*.

Micippoides longimanus, sp. n., *id.* P. Linn. Soc. N. S. W. iv. p. 444, pl. xxvi. fig. 5, Port Jackson.

Menœthius monoceros (Latr.). Sexual difference; De Man, Notes Leyd. Mus. ii. p. 171.

Anasimus, g. n. Cephalothorax pear-shaped, vaulted; interorbital region very narrow; rostrum pointed, directed upward and forward; eyes large, not retractile. External antennæ with large flagellum, internal antennæ long, replied longitudinally, frontal septum between them as in *Pyromaia* and *Anisonotus*. First and second pairs of ambulatory legs equally long; tarsi elongate, feeble, not claw-like. *A. fugax*, sp. n., Santa Cruz and Barbadoes, 56–115 fath. A. Milne-Edwards, Bull. Mus. C. Z. viii. p. 9,

Maiidæ.

Herbstia condyliata (Hbst.). Description by R. A. Philippi, published by A. Brandt, Bull. Pétersb. xxvi. pp. 404–410, with woodcuts.

Leptomithrax spinulosus, sp. n., Haswell, *l. c.* p. 441, pl. xxv. fig. 3, Tasmania.

Gonator [*r*] *hynchus*, g. n. Carapace subtriangular, rounded behind, with a few minute spines on the lateral margins; rostrum slightly deflexed

with triangular cornua; eyes non-retractile; orbits protected above and behind by two converging spines; epistome transverse; third joint of external maxillipeds expanded at the external angle. Anterior limbs in the male resembling those of *Paramithrax*. *G. tumidus*, sp. n., Port Jackson. Haswell, *l. c.* p. 437, pl. xxv. fig. 4, and Ann. N. H. (5) v. p. 145.

Pisa. Table of Mediterranean species, *P. armata* (Latr., M.-Edw.), *nodipes* (Leach) = ? *armata* (Risso), *tetraodon* (Leach), *corallina* (Risso), *convexa* and *quadricornis*, spp. nn. (Philippi, MS.), published with some additions by A. Brandt, Bull. Pétersb. xxvi. pp. 410–420, with woodcuts of the three last species.

Hyastenus diacanthus (De Haan). Variability of Australian specimens; Haswell, P. Linn. Soc. N. S. W. iv. p. 442.

Nibilia armata, sp. n., A. M.-Edwards, *l. c.* p. 4, St. Vincent and Barbadoes, 88–180 fath.

Micippe philyra (Hbst.) var. n. *latifrons*, Richters, Decap. Maurit. p. 142, pl. xv. fig. 1–5, Mauritius. Note on *M. thalia* (Herbst, De Haan), *ibid.*

Micippe inermis, Queensland, *superciliosa*, Torres Straits, and *curtispina*, Port Dennison, spp. nn., Haswell, *l. c.* pp. 445 & 446, pl. x x figs. 3 & 2, & pl. xxv. fig. 1.

Pericerida.

Libinia dubia (M.-Edw.) = *distincta* (Guerin), and *L. emarginata* (Leach) = *canaliculata* (Say) = *affinis* (Randall), both from Cape Cod to Key West, Kingsley, P. Ac. Philad. 1879, p. 386.

Scyra acutifrons (Dana). Variability; S. Smith, Rep. Geol. Surv. Canad. 1878–79, pp. 210 B & 211 B.

Tiarinia cornigera (Latr. ?, Dana), from Java, Miers, Ann. N. H. (5) v. p. 228.

Tiarinia mamillata, sp. n., Port Darwin and Woodlark Islands, Australia, and a new species, not named, from Cape Grenville and Torres Straits; Haswell, *l. c.* pp. 448 & 449.

Microphys bicornuta (Latr., as *Pericera*) = *bicornis* (M.-Edw.) = *Milnia bicornis* (Stimps.) = *Pisa galbica* and *purpurea* (Desbonne) = *Homalacantha hirsuta* (Streets), Florida; Kingsley, *l. c.* p. 387.

Othonia aculeata (Gibbes) = *lherminieri* (Desbonne) = *anisodon* (Martens), Florida and West Indies; *id. l. c.* p. 388.

Cyclocœloma, g. n.; distinct from *Othonia* by the more elongated carapace, which is not armed with lateral spines, the more distinct rostral spines, less dilated third antennal joints, and non-dilated anterior legs of the male. *C. tuberculatum*, sp. n., Amboina. Miers, Ann. N. H. (5) v. p. 229, pl. xiii. figs. 1 & 2.

Mithrax (*Schizophrys*) *triangularis*, var. *indica* (Kossmann), Richters, Decap. Maurit. p. 143, pl. xv. figs. 8–14, Mauritius; two distinct forms of females, one perhaps sterile.

Mithraculus hirsutipes (Kingsley, 1879), figured by the author, P. Ac. Philad. 1879, p. 389, pl. xiv. fig. 1, Sarasota Bay, Florida.

Parthenopidæ.

Lambrus spinifer, sp. n., Haswell, P. Linn. Soc. N. S. W. iv. [1879], p. 451, pl. xxvii. fig. 1, Torres Straits and Port Denison, with notes on other Australian species.

Lambrus (*Parthenope*) *sandrocki*, sp. n., *id. l. c.* p. 452, pl. xxvii. fig. 2, Queensland.

Mesorrhœa cristatipes, sp. n., A. Milne-Edwards, Bull. Mus. C. Z. viii. p. 5, St. Vincent, 124 fath.

Zebrida longispina, sp. n. ?, Haswell, *l. c.* p. 454, pl. xxvii. fig. 3, Torres Straits.

Gonatonotus crassimanus, sp. n., *id. l. c.* p. 455, pl. xxvi. fig. 4, Port Jackson.

Harrovia tuberculata, sp. n., *id. ibid.* pl. xxvii. fig. 1, Torres Straits.

Cancridæ.

Cancer irroratus (Say, pt.) = *sayi* (Gould) = *borealis* (Packard), young specimen from Virginia, described by Kingsley, *l. c.* p. 391.

Liomera rodgersi (Stimps.), Miers, Ann. N. H. (5) v. p. 231, pl. xiii. fig. 3, Malayan Archipelago.

Liomera pallida, var. *obscura* (Bell) = ? *moresbiensis* (Haswell), *id. ibid.*, Indian Seas.

Actæa spinifera, sp. n., Kingsley, *l. c.* p. 392, Plantation Key, S. Florida.

Actæa nodipes (Heller) and *rufo-punctata* (M.-Edw.), specimens from Jeddah described by De Man, Notes Leyd. Mus. ii. p. 172.

Eudora impressa (Lam., as *Xantha*), Richters, Decap. Maurit. p. 146, pl. xv. figs. 15 & 16, Mauritius.

Xanthodes bidentatus, sp. n., A. Milne-Edwards, Bull. Mus. C. Z. viii. p. 12, Grenada, W. Indies, 92 fath.

Etisus maculatus (Heller) perhaps = *lævimanus* (Rand.), young specimens from Jeddah described; De Man, *l. c.* p. 173.

Chlorodius niger (Forsk.) = *denticulatus* (De H.), descriptive note; *id. l. c.* p. 174.

Chlorodius dispar (Stimps.), from Key West, rather variable, described by Kingsley, P. Ac. Philad. 1879, p. 395.

Leptodius sanguineus (M.-E.), 60 specimens from Mauritius, differently coloured, probably identical with *Xantho quinque-dentatus* (Krauss), but distinct from *L. exaratus* (M.-Edw.), Richters, Decapod. Maurit. p. 147.

Phymodius obscurus (Lucas), specimen from Jeddah described by De Man, *l. c.* pp. 174 & 175.

Menippe (*Myomenippe*) *panope* (Hbst.) = *hardwicki* (Gray) = *granulosa* (Strahl.) = *duplicidens* (Hilgend.) [?], Java and Amboina, Miers, Ann. N. H. (5) v. p. 233.

Panopeus texanus (Stimps.) = *sayi* (Smith), from Massachusetts to Florida, Kingsley, *l. c.* p. 394. Zoea of the latter; Faxon, Bull. Mus. C. Z. vi. No. 10, p. 165, pl. ii. figs. 4–10.

Panopeus xanthiformis, sp. n., A. M.-Edwards, *l. c.* p. 13, Dominica, Grenada, and Barbadoes, 73–118 fath.

Pilumnopeus granulosus, sp. n., Miers, Ann. N. H. (5) v. p. 236, Indo-Malayan region.

Eriphiidæ.

Pilumnus bleekeri, sp. n., New Guinea, and note on *vespertilio* (F.) = *ursulus* (Ad. & Wh.) = *mus* (Dana), Java; Miers, Ann. N. H. (5) v. p. 235.

Eupilumnus ‖, g. n. Cephalothorax depressed; basal joints of the antennæ as in *Pilumnus*; external maxillipeds with the meral joint short and narrow, it being only about two-thirds as wide as the ischial joint, which is short and broad. *E. websteri*, sp. n., Key West, Florida. Kingsley, P. Ac. Philad. 1879, p. 397. S. F. Smith thinks it may be a young specimen of *Domœcia hispida*; Am. J. Sci. (3) xix. p. 424. The name *Eupilumnus* is pre-occupied by Kossman in 1877.

Heteractœa (Lockington). Form, antennæ and external maxillipeds as in *Pilumnus*, but no palatal ridge; meral joints of the ambulatory feet with naked crests. *H. lunata* (M.-Edw. & Lucas, as *Pilumnus*) = *pilosa* (Lockington), California to Chili: and *H. ceratopus* (Stimps., as *Pilumnus*), Key West and Guadeloupe. Kingsley, P. Ac. Philad. 1879, p. 396.

Actumnus integer (Haan), external corner of the orbit closed by the basal joint of the outer antenna, tips of the hands excavated. Richters, Decap. Maurit. p. 148, pl. xvi. figs. 17 & 18, Mauritius.

Geryon tridens (Krøyer), with phosphorescent eyes, abundant in the Bay of Biscay in depths of 700–1300 metres, but greatly dwarfed as compared with Norwegian specimens; Norman, Ann. N. H. (5) vi. p. 433, & A. Milne-Edwards, C. R. xci. p. 355.

Eriphia lævimana, var. *smithi* (M. Leay), Miers, Ann. N. H. (5) v. p. 237, New Guinea.

Trapezia rufo-punctata (Rüpp., Heller, *nec* Hbst.), *cymodoce* (Hbst.) = *cærulea* (Rüpp., Hell.), and *ferruginea* (Latr.); descriptive notes by De Man, Notes Leyd. Mus. ii. p. 176–179.

Trapezia speciosa (Dana), presence of lateral spine variable, shape of the front different according to the age, and *T.* sp. ?, not named; Richters, Decap. Maur. pp. 152 & 153, Mauritius.

Melia tessellata (Latr.), abdomen of the male 6-jointed; *id. l. c.* p. 150, pl. xvi. figs. 19 & 20, Mauritius.

Polydectus cupulifer (Latr.), bearing small *Actiniæ* on its hands; *id. l. c.* p. 149, pl. xv. figs. 17-20, Mauritius.

Portunidæ.

Carcinus mœnas (L.): generic characters described at length, as typical for the whole sub-order, by Boas, *l. c.* pp. 141–144. Its Zoea; Faxon, Bull. Mus. C. Z. vi. No. 10, pp. 159–164, pls. i. & ii. figs. 1–3.

Carcinus mœnas (L.) = *granulatus* (Say), southward to Northampton co., Virginia: Kingsley, P. Ac. Philad. 1879, p. 399.

Thalamita prymna (Hbst.), *savignii* (M.-Edw.), and *poissoni* (Aud.), specimens from Jeddah described by De Man, Notes Leyd. Mus. ii.

pp. 180–183. *T. stimpsoni*, *sima*, and *danæ*, from N.E. Australia, J. E. T. Woods, P. Linn. Soc. N. S. W. v. p. 118.

Achelous orbicularis, sp. n., Richters, Decap. Maurit. p. 153, pl. xvi. figs. 14 & 15, Seychelle Islands.

Lupocyclus philippinensis, sp. n. (Semper), Nauck, Z. wiss. Zool. xxxiv. p. 68, Philippines.

Caphyra alata and *tricostata*, spp. nn., and *C.* (*Camptonyx*) *rotundifrons* (M.-Edw.), var. n. *tridens*, Richters, Decap. Maurit. p. 154, the two former pl. xvi. figs. 25–28, Mauritius.

Lissocarcinus boholensis, sp. n. (Semper), Nauck, *l. c.* p. 67, Philippines.

Hedrophthalmus, g. n. Near *Podophthalmus*. Cephalothorax broadest in front, between the orbits ; eye-stalks short. *H. thalamithoides*[*-toides*], Philippines, sp. n., Nauck, *l. c.* p. 67.

Telphusidæ.

Telphusa. 45 species enumerated, with their localities, and *I. emarginata*, West Africa and Port Natal, and *enodis* Ceylon, spp. nn. ; Kingsley, P. Ac. Philad. 1880, pp. 35–37.

Telphusa sumatrensis, sp. n., Sumatra, and *sinuatifrons* (M.-Edw. ?), Borneo, Miers, Ann. N. H. (5) v. pp. 304 & 305, the former pl. xiv. figs. 1 & 2.

Paratelphusa latifrons (Randall, as *Potamia*) and *sinuatifrons* (M.-E.), the latter from San Domingo ; Kingsley, *l. c.* p. 34.

Trichodactylus : maxillipeds, and their gill-cleaning internal appendages described and figured by F. Müller, Kosmos, vii. pp. 151 & 152.

Dilocarcinus spinifrons. sp. n., Upper Amazon, and *pardalinus* (Gerstäcker), from the same locality ; Kingsley, *l. c.* p. 35.

Gecarcinidæ.

Cardisoma carnifex (Hbst), from Madagascar, Java, and Xulla-Bessy, *armatum* (Herkl.), W. Africa, *urvillii* (M.-Edw.), and *hirtipes* (Dana), from the Moluccas, *obesum* (Dana), from Sumatra, and sp. indet. from Morotai, Moluccas ; descriptive notes by De Man, Notes Leyd. Mus. ii. pp. 31–36.

Ocypodidæ.

Ocypode : revision of the genus by J. S. Kingsley, P. Ac. Philad. 1880, pp. 179–186. 11 species, with synonymy and localities, enumerated.

Ocypode quadrata (F.) = *arenaria* (Say, M.-Edw.) = *rhombea* (M.-Edw.) : its Megalops-stage is *Monolepis inermis* (Say), and occurs on the coast of New England and Long Island ; S. I. Smith, Tr. Conn. Ac. iv. pp. 255 & 256.

Ocypode ryderi, sp. n., Kingsley, *l. c.* p. 183, Natal.

Gelasimus reviewed ; *id. l. c.* pp. 135–152. 41 species enumerated, with synonymy and localities, and the larger hand of 35 of them figured, pls. ix. & x.

Gelasimus vocans (Rumph), *marionis* (Desm.), *dussumieri* and *annulipes*

(M.-E.), notes on their differences and occurrences in the Oriental seas; J. G. De Man, Notes Leyd. Mus. ii. pp. 67–69.

Gelasimus longidigitum[*-us*], sp. n., Moreton Bay, Australia, and *smithi*, sp. n., Natal, Kingsley, *l. c.* p. 144, pl. ix. figs. 13 & 14.

Gelasimus. Notes on several species from the Malayan Archipelago; Miers, Ann. N. H. (5) v. pp. 308–310.

Gelasimus coarctatus (M.-E.) : note on its mode of life in the mangrove swamps of N.E. Australia ; J. E. T. Woods, P. Linn. Soc. N. S. W. v. p. 119.

Gonoplacidæ.

Macrophthalmus carinimanus (Latr.), and *brevis* (Herbst), described by J. G. De Man, Notes Leyd. Mus. ii. pp. 67–71 ; the former and *convexus* (Stimps.), by Miers, Ann. N. H. (5) v. pp. 306 & 307.

Macrophthalmus verreauxi (M.-Edw.), from Jeddah, described by De Man, *l. c.* p. 184.

Euplax bosci (Aud.), from Celebes and Amboina ; *id. l. c.* pp. 71 & 72.

Xenophthalmodes, g. n. Orbits distinct, but plainly closed by a cement-like mass, probably the degenerated eyes themselves, without any pigment; in other regards very like *Xenophthalmus*. *X. mœbii*, sp. n., male only known, Mauritius. Richters, Decap. Maurit. p. 155, pl. xvi. fig. 29, pl. xvii. figs. 1–5.

Carcinoplacidæ.

Frevillea, g. n. Frontal region resembling that of *Gonoplax*, but first abdominal segment large, completely covering the last sternal segment. Hands nearly equal, fingers pointed ; ambulatory legs long and slender. *F. barbata, rosaea* [sic !], *sigsbe*[*e*]*i*, and *tridentata*, spp. nn., West Indies, 50–92 fath. A. Milne-Edwards, Bull. Mus. C. Z. viii. p. 16.

Bathyplax, g. n. No eyes; eye-stalks very small, immoveable, orbits rudimentary. *B. typhlus*, sp. n., St. Croix and St. Lucia, 423–451 fath. *Id. l. c.* p. 16.

Eucratoplax, g. n. Cephalothorax, orbital and buccal region resembling those of *Panopeus*, but the fifth abdominal segment of the male not covering a large part of the last sternal segment. *E. guttata* and *elata*, spp. nn., *id. l. c.* pp. 17 & 18, Sombrero and Western Florida.

Euryplax nitida (Stimps.), Florida and New Orleans, note on it by Kingsley, P. Ac. Philad. 1879, p. 399.

Pinnoteridæ.

Pinnotheres[*-teres*] *angelicus* (Lockington), from Vera Cruz, perhaps a distinct species, *geddesi*; Miers, J. L. S. xv. p. 86.

Pinnotheres[*-teres*] *flavus*, sp. n., Nauck, Z. wiss. Zool. xxxiv. p. 66, Philippines.

Pinnotheres obesus (Dana ?), Miers, Ann. N. H. (5) v. p. 314, pl. xiv. fig. 4, Indo-Malayan Seas.

Pinnixa chætopterana (Stimps., 1860) = *cylindrica* (Stimps., 1869, *nec*

Say), and *sayana* (Stimps., 1860) = *cylindrica* (Smith, 1874, *nec* Say), comparatively described; the short-spined Zoea described by Faxon & Smith belongs to the former, and the long-spined Zoea of both probably to the latter. S. F. Smith, Tr. Conn. Ac. iv. pp. 247–253.

Holothuriophilus, g. n. Cephalothorax broader than long, front arcuated, lateral and hinder edges straight; merognath dilated inwards, carpognath greater than prognath, dactylognath club-shaped at the tip. *H. trapeziformis*, sp. n., parasitical in *Holothuria maxima* (Semp.). Nauck, Z. wiss. Zool. xxxiv. p. 66.

Grapsidæ.

Kingsley, P. Ac. Philad. 1880, pp. 187–224, gives an analytical key of the 34 known genera, and arranges them as follows, enumerating the known species of each of them with synonymy and localities :—

Subfamily Grapsinæ.

Tribe Grapsini: *Goniopsis* 1 species, *Metopograpsus* 3, *Epigrapsus* 1, *Grapsus* 6, *Geograpsus* 4, *Leptograpsus* 1, *Grapsodes* 1, *Cyclograpsus* 2, *Pachygrapsus* 11, *Nectograpsus* 1, *Brachygrapsus* 1, *Ptychognathus* 4, *Acmæopleura* 1, *Pseudograpsus* 3, *Varuna* 1, *Utica* 3, *Glyptograpsus* 1, *Heterograpsus* 13, *Eriochir* 3, *Paragrapsus* 1, *Platygrapsus* 1 species.

Tribe Sesarmini: *Metasesarma* 3 species, *Sarmatium* 6, *Rhaconotus* 1, *Sesarma* 61, *Aratus* 1, *Clistocœloma* 1, *Helice* 9, *Cyclograpsus* 5, *Chasmagnathus* (*Paragrapsus*) 7 species.

Subfamily Plagusiinæ. *Plagusia* and *Liolophus*.

Grapsus pictus (Lam.) = *maculatus*, *pharaonis*, *ornatus*, and *webbi* (M.-E.) = *altifrons* (Stimps.), widely distributed in the Atlantic and Pacific, an immature specimen taken alive in Cape Cod Bay ; S. F. Smith, Tr. Conn. Ac. iv. pp. 257–259. Note on its mode of life on the rocks of Port Douglas, N.E. Australia, J. E. T. Woods, P. Linn. Soc. N. S. W. v. p. 117.

Grapsus hilli, sp. n., Kingsley, P. Ac. Philad. 1880, p. 194, West Indies.

Metopograpsus messor, var. n. *frontalis*, Miers, Ann. N. H. (5) v. p. 311, Celebes.

Pachygrapsus transversus (Gibbes) = *innotatus* (Dana) = *rugulosus* (M.-E.) = *miniatus*, and *dubius* (Saussure) = *intermedius* (Heller) = *socius* (Stimps.), widely distributed in the Atlantic and Pacific, 4 specimens taken alive in Cape Cod Bay; S. F. Smith, *l. c.* pp. 260–262.

Pachygrapsus socius (Stimps.) is probably a variety of *transversus* (Gibbes); Miers, J. L. S. xv. p. 86.

Euchirograpsus americanus, sp. n., A. Milne-Edwards, Bull. Mus. C. Z. viii. p. 18, Barbadoes, 69 fath.

Sesarma gracilipes (M.-E.), *picta* (De H.), *affinis* (De H.) distinct from the preceding, *eydouxi* (M.-E.), *rotundifrons* (Alph. M.-E.), *tæniolata* (White), *bocourti* (Alph. M.-E.), *bidens* (De H.), *smithi* (M.-E.), all from the Malayan Archipelago, *rotundifrons* and *smithi*, also from Madagascar,

intermedia (De H.), and *sinensis* (M.-E. ?), from Japan, *africana* (M.-E.) and *violacea* (Herkl.), from Western Africa, the last = *Metagrapsus curvatus* (M.-E.) ; descriptive notes by De Man, Notes Leyd. Mus. ii. pp. 21–31.

Sesarma granosimana, sp. n., Miers, Ann. N. H. (5) v. p. 312, pl. xiv. fig. 3, Indo-Malayan seas.

Sesarma (*Holometopus*) *aubrii* (M.-E.), Amboina; De Man, *l. c.* p. 30.

Metagrapsus punctatus (Alph. M.-Edw.) from Sumatra ; *id. l. c.* p. 31.

Cœlochirus, g. n. Front advanced, oral parts not gaping, ischiognath narrowed beneath, longer than merognath, scaphognath very thick; fingers very excavated at the tips; feet as in *Pseudograpsus*. *C. crinipes*, sp. n., Philippines, in freshwater. Nauck, Z. wiss. Zool. xxxiv. p. 66.

Pachystomum, g. n. Front slightly inclined, oral parts somewhat gaping, ischiognath longer than merognath, this last auriculated; jugal region finely and regularly granulated; feet as in *Pseudograpsus*. *P. philippinense*, sp. n., Philippines. *Id. l. c.* p. 67.

Brachygrapsus, g. n., Kingsley, P. Ac. Philad. 1880, p. 203. Of uncertain position, apparently combining the characters of the *Cyclometopa* and *Catometopa*. Allied to the *Grapsidæ* in its male genital appendages. For *B. lævis*, sp. n., *id. ibid.*, New Zealand.

Calappidæ.

Calappa marmorata (F.). Young stage found on the coast of New England, and described by S. F. Smith, Tr. Conn. Ac. iv. pp. 263–265.

Calappa angusta, sp. n., A. Milne-Edwards, Bull. Mus. C. Z. viii. p. 18, Barbadoes, &c. 54–115 fath.

Acanthocarpus bispinosus, sp. n., and *alexandri* (Stimps.), *id. l. c.* pl. i. figs. 1 & 2, Grenadines, W. Indies, 127–140 fath.

Matuta circulifera, Miers, Ann. N. H. (5) v. p. 315, pl. xiv. fig. 5, Indo-Malayan Seas.

Leucosiidæ.

Arcania novem-spinosa (White) var. n. *aspersa*, Miers, *l. c.* p. 317, Indo-Malayan Seas.

Lyropsis constricta and *goliath*, spp. nn., A. Milne-Edwards, *l. c.* p. 21, Barbadoes and Cariacou, 100-163 fath.

Ebalia stimpsoni, sp. n., *id. l. c.* p. 22, Barbadoes, 7–50 fath.

Lithadia lacunosa, sp. n., Kingsley, P. Ac. Philad. 1879, p. 403, Sarasota Bay, Florida.

Lithadia rotundata Patagonia, 41° S., and *granulosa*, St. Cruz, W. Indies, 110 fath., spp. nn., A. Milne-Edwards, *l. c.* p. 22.

Speleophoru striangulus, sp. n., *id. l. c.* p. 23, Florida, 11–125 fath.

Corystidæ.

Trichocarcinus oregonensis (Dana, as *Trichocera*). Note on young specimen and on an allied species not yet named ; S. Smith, Rep. Geol. Surv. Canad. 1878–79, p. 207 B.

Telmessus serratus (White). Differences of sex and age; *id. l. c.* p. 208 B.

Corystoides abbreviatus, sp. n., A. Milne-Edwards, *l. c.* p. 20, Rio de la Plata above Monte Video.

Trichopeltarion, g. n. Distinct from *Peltarion* by the very vaulted hairy cephalothorax and the unequal hands. *T. nobile*, sp. n., *id. l. c.* pp. 19 & 20, pl. ii. St. Lucia, 151 fath.

Dorippidæ.

Corycodus [*-des*], g. n. Cephalothorax subpentagonal, very thick in front, truncate behind, a large interval between the insertion of the first and second pair of legs; the abdomen of the female covering only the last three sternal segments. *C. bullatus*, sp. n., A. Milne-Edwards, Bull. Mus. C. Z. viii. p. 23, Morro Lighthouse, W. Indies, 175–250 fath.

Cyclodorippe, g. n. Cephalothorax narrowed in front and behind, sides regularly rounded; no pterygostomial notch; abdomen six-articulated in both sexes; ambulatory legs as in *Dorippe*. *C. nitida*, *antennaria*, and *agassizi*, spp. nn., *id. l. c.* pp. 24–26, W. Indies, 88-287 fath.

Cymopolia obesa, *dilatata*, *dentata*, *cristatipes*, *cursor*, *gracilipes*, *sica*, and *acutifrons*, spp. nn., *id. l. c.* pp. 27–30, W. Indies, 56–298 fath.

Cymonomus, g. n. No eyes, eye-stalks slender, rostrum pointed; ambulatory legs as in *Dorippe*, but fourth and fifth pair not subcheliform. *C. quadratus*, sp. n., *id. l. c.* p. 27, Havanna, &c., 175–450 fath.

Cymopolus, g. n. Cephalothorax broader in front than behind, rostrum pointed; eyes normal; female orifice in the basilar article of the third pair of legs. *C. asper*, sp. n., *id. l. c.* p. 27, Montserrat and Sand Key, 75–148 fath.

Ethusa americana, sp. n., *id. l. c.* p. 30, Western Florida, 13-20 fath.

ANOMURA.

F. E. V. Boas discusses the characters and affinities of the *Anomura*, especially of *Lithodes* and the *Paguridæ*; he distinguishes among the latter three groups: —(1) *Paguristes*, (2) *Eupagurus-Bernhardus*, (3) the rest of *Paguridæ*, which he calls "*Pagurus*, &c.," these three are essentially distinct by the arrangement of the chitinous plates on the back of the pleon and the number of gills, also by some differences in the oral parts and thoracic feet. *Paguristes* represents the original form, *Eupagurus* and the third group are differentiated from it in different ways, and *Lithodes*, again, agrees in the plates of the pleon and the gills essentially with *Eupagurus*, and is to be regarded as *Eupagurus* modified for existence without a protecting shell. *Birgus* is a similarly modified *Cœnobita*; Dan. Selsk. Skr. (6) i. 2, pp. 110–124, pl. i. figs. 9–11, pl. ii. figs. 56–60, pl. iii. figs. 89, 90, & 114–118, pl. iv. figs. 141–143, pl. v. figs. 161 & 178–180, pl. vi. figs. 186–200. Recapitulated, pp. 189–195, and in Zool. Anz. iii. pp. 349–352. The development of the *Paguridæ* discussed

p. 137 *et seq.*; recapitulated, pp. 197 & 198, *Glaucothoe* is their natant-stage. Description of the newly-hatched larva of *Lithodes*, very similar to that of *Pagurus*, p. 137, pl. v. fig. 185, pl. vi. figs. 204 & 205, recapitulated, p. 198.

Dromiidæ.

Boas gives particular attention to this family, as the most primitive among the *Brachyura*, discussing the generic characters of *Dromia* and *Homola*, l. c. pp. 147–152, pl. ii. fig. 65, pl. iii. figs. 95 & 124, pl. v. fig. 183, recapitulated p. 203, and describing a Zoea of *Dromia* and two slightly differing larval stages of *Homola*, pp. 151–153, pl. vii. figs. 209 *a–f*–212, recapitulated, pp. 203–205.

Dromia rumphi (F.), juv. ? ; Miers, Ann. N. H. (5) v. p. 370.

Dromia (*Dromidia*) *orientalis*, sp. n., *id. ibid.* pl. xv. figs. 1 & 2, Indo-Malayan Seas.

Acanthodromia, g. n. Fronto-orbital region and maxillipeds as in *Dromia*, ambulatory legs as in *Dynomene*, cephalothorax narrowly ovate. *A. erinacea*, sp. n., Guadeloupe, 150 fath. A. Milne-Edwards, Bull. Mus. C. Z. viii. p. 31.

Dicranodromia, g. n. Cephalothorax narrow, ovoid, scarcely hairy, epistom touching the front, sternal furrows in the female scarcely marked, short; legs long, slender. *D. ovata*, sp. n., Havana, Barbadoes, Guadeloupe, 150–229 fath. *Id. l. c.* pp. 31 & 32.

Dromidia unidentata (Rüppell), Kossmann, Zool. Reis. ii. p. 67, Red Sea.

Epidromia, g. n. Antero-lateral edge continued unto the anterior angle of the mouth; endostomial ridge present; legs as in *Cryptodromia*. *E. granulata*, sp. n., Red Sea. *Id. l. c.* p. 69.

Domœcia: see anteà *Eupilumnus* (*Eriphiidæ*).

Ascidiophilus, g. n. No separate lateral pieces between the penultimate and the last abdominal segment; the fourth pair of feet like the preceding only the fifth dorsal, but elongated. *A. caphyræformis* [*-rif-*], sp. n., found in the common cloaca of a compound Ascidian, only the front and tips of the claws and feet exserted, Mauritius. Richter, Decap. Maur. p. 158, pl. xvii. figs. 6–10.

Homolidæ.

Homola vigil, sp. n., A. Milne-Edwards, Bull. Mus. C. Z. viii. p. 33 Martinique and Guadeloupe, 169–250 fath.

Homolodromia, g. n. Cephalothorax narrow, broader behind; external antennæ very long, eyes very small, without distinct orbit, epistome distinct; fourth and fifth pair of feet on the back as in *Dorippe*. *H. paradoxa*, sp. n., Nevis Island, W. Indies, 356 fath. *Id. ibid.*

Homolopsis, g. n. Distinct from *Homola* by the rounded ovate shape of the cephalothorax, the large rostrum, very small eyes and feeble legs. *H. rostratus* [*-a*], sp. n., St. Thomas, W. Indies, 580 fath. *Id. l. c.* p. 34.

Paratymolus bituberculatus and *latipes*, spp. nn., Haswell, Ann. N. H. (5) v. pp. 303 & 304, pl. xvi. Port Denison, Queensland, 5 fath., and Port Jackson.

Lithodidæ.

Lithodes (see also Anomura). Notes on the differences of the known species by Boas, *l. c.* pp. 119–121.

Hapalogaster cavicauda (Stimps.) = *Lomis* (De H., *nec* M.-E.), described by Boas, *l. c.* p. 122, pl. v. figs. 200 *a-b*, recapitulated, p. 194. It is, according to Boas, really an intermediate link between *Pagurus* and *Lithodes*.

Paguridæ.

Eupagurus macrocheles, discoidalis, bartletti, erosus, gibbosimanus, jacobi, pilimanus, bicristatus, sericeus, and *spinipes*, spp. nn., A. Milne-Edwards, Bull. Mus. C. Z. viii. pp. 40–44, West Indies.

Eupagurus japonicus (Stimps.) ?, Miers, Ann. N. H. (5) v. p. 375, pl. xiv. fig. 6 & 7, Malayan Sea.

Pagurus pedunculatus (Hbst.) and *gemmatus* (M.-Edw.). Notes on them by Miers, *l. c.* p. 374.

Pagurus varipes (Heller). Differences from *deformis* (M.-Edw.); De Man, Notes Leyd. Mus. ii. p. 184.

Pagurus depressus (Heller) = *Dardanus helleri* (Paulson), Red Sea, described; Kossmann, Zool. Reis. ii. p. 77.

Spiropagurus iris, sp. n., A. Milne-Edwards, *l. c.* p. 44, Barbadoes, 82–140 fath.

Mixtopagurus, g. n. Intermediate between *Pagurus* and *Pylocheles*. Cephalothorax like that of the former, abdomen crustaceous, formed by 7 distinct segments, the sixth large, completely calcified, very hard, the last a flexible plate. *M. parodoxus*, sp. n., Barbadoes, 84 fath. *Id. l. c.* p. 39.

Pylocheles, g. n. Distinct from *Pomatocheles* (Miers) by the absence of a rostral point, by the cephalothorax dilated behind, and by two spines on the second joint of the external antennæ. Penultimate segment of the abdomen with rough appendages. *P. agassizi*, sp. n., Barbadoes, 200 fath., in a cell formed of agglutinated sand. *Id. l. c.* p. 38.

Xylopagurus, g. n. Abdomen not twisted, terminating in a special symmetrical shield formed by the penultimate segment, which is sloping and plane. *X. rectus*, sp. n., Dominica and St. Vincent, in pieces of wood or reed with two openings, of which the terminal shield of the Crustacean closes the hinder one. *Id. ibid.*

Ostraconotus, g. n. Cephalothorax quite coriaceous, short, rounded; abdomen rudimentary, soft, scarcely annulated, appendages of the penultimate segment symmetrical; legs of the second pair much shorter than those of the third, their finger dilated into a pointed ciliated pallet, which can be folded back, those of the fourth and fifth pair monodactyle. *O. spatulipes*, sp. n., Sand Key, 128 fath., mode of life not known. *Id. l. c.* p. 45.

Catopagurus, g. n. Cephalothorax coriaceous before and membranaceous behind the transverse suture; abdomen twisted, very small; legs of the second and third pair very long, compressed, fingers flat and pointed. *C. sharreri*, sp. n., Barbadoes, 140–221 fath., the abdomen

lodged in small shells, cephalothorax and legs remaining always outside. *Id. l. c.* p. 46.

Diogenes miles (F.), and notes on some doubtful species; Miers, Ann. N. H. (5). v. p. 373.

Cœnobita rugosus (M.-Ed.). Form of the hand and the third pair of legs variable by adaptation to the shell in which it lives. Richters, Decap. Maurit. p. 160, pl. xvii. figs. 14–17.

Cœnobita compressa (M.-Ed.) ? and *perlata* ? var. *affinis*, ? sp. n., Indo-Malayan Seas, Miers, *l. c.* pp. 371 & 372.

Cœnobita rugosa (M.-Ed.) inhabits very different shells; De Man, Notes Leyd. Mus. ii. p. 185.

Raninidæ.

Raninops, g. n. Shape of cephalothorax like that of *Notopus*; eye-stalks long, lodged in orbital furrows beneath the edge of the cephalothorax; sternum linear between the legs of the second pair. *R. constrictus* and *stimpsoni*, spp. nn. A. Milne-Edwards, Bull. Mus. C. Z. viii. pp. 34 & 35, Western Florida.

Raninoides nitidus, sp. n., *id. l. c.* p. 34, Grenada, W. Indies, 159 fath.

"Cryptochiridæ."

Cryptochirus coralliodytes (Heller) = *Lithoscaptus paradoxus* (M.-E.), Mauritius: the above new family proposed for it, but not characterized: F. Richters, Decap. Maur. p. 159.

Hippidæ.

Albunea, *Albun*[*eo*]*hippa*, *Hippa*, and *Remipes*. Generic characters discussed by Boas, *l. c.* pp. 129–135, pl. i. figs. 12 & 34, pl. ii. fig. 61, pl. iii. figs. 91, 92, & 119–121, pl. iv. fig. 144, pl. v. figs. 153 & 154; recapitulated, pp. 136 & 196. The two last are very near each other, and the most modified of the family. Description of the young larva, and of a more advanced "natant-stage" of the same, pp. 139 & 140, pl. vi. figs. 206 *a–d*; recapitulated, p. 199.

Albunea paretii (Guerin) = *oxyophthalma* (Leach, Miers), Florida; Kingsley, P. Ac. Philad. 1879, p. 409.

Remipes. Critical remarks and analytical table for distinguishing the known species, by Kossmann, Zool. Reis. ii. p. 71.

Porcellanidæ.

Porcellana is very nearly allied to *Galatea* in its essential characters, according to Boas, *l. c.* pp. 126 & 127, pl. i. fig. 12, pl. ii. figs. 62 & 63, pl. iii. figs. 93 & 122; recapitulated, pp. 195 & 196. Description of the larva, *ibid.*; recapitulated, p. 198.

Porcellana stimpsoni and *sigsbeiana* [*-beana*], spp. nn., A. Milne-Edwards, Bull. Mus. C. Z. viii. p. 35, Florida and West Indies.

Porcellana pilosa (M.-E.), Florida, described, *sayana* (Leach), ex. typ., = *ocellata* (Gibbes), and *sociata* (Say), all from Florida; Kingsley, P. Ac. Philad. 1879, p. 407.

Porcellana villosa, sp. n., and *asiatica* (Leach)?; Richters, Decap. Maur. pp. 159 & 160, pl. xvii. figs. 11–13, both from Mauritius.

Pachycheles ackleianus and *rugimanus*, spp. nn., A. Milne-Edwards, *l. c.* pp. 36 & 37, Florida, 13–37 fath.

Petrolisthes sexspinosus (Gibbes) = *Porcellana galathina* (Say, *nec* Bosc), *Petr. jugosus* (Stimps.) and *armatus* (Gibbes), from Florida, *danae* (Gibbes) = *bosci* (Dana, *nec* Sav.) = *brasiliensis* (Smith), Brazil, and *helleri*, new name for *danae* (Heller, *nec* Gibbes); Kingsley, P. Ac. Philad. 1879, p. 405. The latter = *Porcellana spinuligera* (Dana, explanation of plates); S. F. Smith, Am. J. Sci. (3) xix. p. 424.

Petrolisthes rufescens (Heller) and *bosci* (Aud.), Red Sea. Description and critical observations by Kossmann, Zool. Reis. ii. pp. 73–75.

Pisosoma glabra [*-brum*], sp. n., Kingsley, P. Ac. Philad. 1879, p. 406, pl. xiv. fig. 2, Key West.

Polyonyx macrocheles (Gibbes), North Carolina to Florida. Sexual difference pointed out; *id. l. c.* p. 408.

Euceramus prælongus (Stimps.), North Carolina and Florida, described; ~~Stimpson~~, P. Ac. Philad. 1879, p. 408, pl. xiv. fig. 4.

MACRURA.

Galateidæ.

Galatea. Generic characters discussed by Boas, *l. c.* pp. 124–126, pl. i. figs. 14 & 35, pl. ii. fig. 64, pl. iii. figs. 94 & 123, pl. iv. fig. 145, pl. v. figs. 181 & 182; recapitulated, p. 195. Newly hatched larva and a more advanced Zoea described, p. 138, pl. vi. fig. 208, & pl. vii. fig. 208 *c–e*, recap. p. 198.

Galathea agassizi and *rostrata*, sp. n., A. Milne-Edwards, Bull. Mus. C. Z. viii. p. 47, West Indies, 164 and 14 fath.

Munida stimpsoni, *affinis*, *robusta*, *iris*, *irrasa*, *forceps*, *longipes*, *miles*, *microphthalma*, and *constricta*, spp. nn., *id. l. c.* pp. 47–52, West Indies, 37–1105 fath.

Munida tenuimana (sp. n. ?) with phosphorescent eyes, Bay of Biscay; *id.* C. R. xci. p. 355.

Galacantha, g. n. Cephalothorax dilated, with strong lateral and dorsal spines, rostrum large, raised; epimeral lines covered by the lateral border; first pair of legs shorter than the following. *G. rostrata* and *spinosa*, spp. nn., Beguia and Dominica, 1591 and 333 fath. *Id.* Bull. Mus. C. Z. viii. pp. 52 & 53.

Galathodes, g. n. Cephalothorax narrow, very solid; no supra-orbital spine; maxillipeds short, feeble; internal antennæ small; eyes small with incomplete cornea. *G. erinaceus*, *spinifer*, *robustus*, *serratifrons*, *abbreviatus*, *reynoldsi*, *simplex*, *sigsbei*, *latifrons*, and *tridens*, spp. nn., *id. l. c.* pp. 53–57, West Indies, 151–2376 fath.

Oropho [*r*] *rhynchus*, g. n. Rostrum triangular, covering partly the eyes; maxillipeds very small; first pair of legs thick and short. *O. aries*, *spinosus*, *squamosus*, *sharreri*, *nitidus*, and *spinoculatus*, spp. nn., *id. l. c.* pp. 58 & 59, West Indies, 191–1591 fath.

Elasmonotus, g. n. Cephalothorax nearly flat, without spines, orbito-antennal region very narrow; first abdominal segments keeled above. *E. longimanus*, *brevimanus*, *armatus*, and *abdominalis*, spp. nn., *id. l. c.* pp. 60 & 61, West Indies, 200–625 fath.

Diptychus, g. n. Rostrum simple, external antennæ very small, maxillipeds long and slender; the caudal fin can be completely folded under the last abdominal segments. *D. nitidus*, *uncifer*, *armatus*, *rugosus*, and *intermedius*, spp. nn., *id. l. c.* pp. 62 & 63, West Indies, 88–734 fath.

Ptychogaster, g. n. Distinct from the former by the narrower cephalothorax, longer antennæ, and very long legs. *P. spinifer*, sp. n., *id. l. c.* p. 64, West Indies, 123–180 fath.

Palinuridæ.

A stage of development of *Palinurus*, *Scyllarus*, and *Paribacus*, intermediate between *Phyllosoma* and the adult form, described by Boas, *l. c.* pp. 83 & 182, pl. v. fig. 184. It is of the general appearance of the adult, but exopodites are present, and the lateral parts of the cephalothorax are separated from the dorsal by a low crest, the same as in *Palinurellus* and *Scyllarus*, but which disappears in the adult *Palinurus*; he calls it "Natant-stage." *Phyllamphion elegans* (Reinh.) is again an intermediate stage between this and *Phyllosoma*.

Palinurus. Generic characters discussed, and some specific distinctions (for instance, the relative length of the thoracic legs), pointed out by Boas, *l. c.* pp. 78-82 & 90–92, pl. i. fig. 7, pl. iii. figs. 84 & 108, pl. iv. fig. 135, pl. v. figs. 148, 149, & 171; recapitulated, pp. 179–181. Among all species observed by the author, *P. lalandii* (M.-E.) approaches nearest to *Scyllarus*, pp. 89–93.

Notes on several Malayan species; Miers, Ann. N. H. (5) v. pp. 378 & 379.

Palinurus penicillatus (Oliv.) = *ehrenbergi* (Heller), tubercles not piliferous; De Man, Notes Leyd. Mus. ii. p. 185.

Palinurus tumidus, sp. n., Kirk, Tr. N. Z. Inst. xii. pp. 313 & 314, pl. xi., and Ann. N. H. (5) vi. p. 14; 24 inches long, the common crayfish at the Sydney market.

Palinustus, g. n. Distinct from *Palinurus* by the ophthalmic ring being quite uncovered, by the long internal antennæ with small multiarticulated flagellum, and by the flattened horizontal frontal horns. *P. truncatus*, sp. n., A. Milne-Edwards, Bull. Mus. C. Z. viii. p. 66, Cariacou, W. Indies, 163 fath.

Palinurellus. Generic characters discussed by Boas, *l. c.* p. 183. It is, according to him, the most primitive form of the *Palinuridæ*, and therefore nearer than any other to *Homarus*.

Scyllaridæ.

Scyllarus and *Arctus*. Generic characters discussed by Boas, *l. c.* pp. 85–87, pl. iv. fig. 136 ; recapitulated, p. 181.

Scyllarus haani (Sieb.), from the Aru Islands ; Miers, Ann. N. H. (5) v. p. 377.

Eryonidæ.

Polycheles. Generic characters discussed by Boas, *l. c.* pp. 94–96 ; recapitulated, p. 185. According to him, it is identical with the fossil *Eryon*, and *Amphion* is probably its larval form, pl. vi. figs. 201–203.

Double eye in *Pentacheles* ; vide *suprà*, "Organs of Sense."

Polycheles sculptus, sp. n., S. F. Smith, P. U. S. Nat. Mus. ii. pp. 345–353, pl. vii., off the coast of Nova Scotia, 250 fath.

Pentacheles validus, *agassizi*, and *spinosus*, spp. nn., A. Milne-Edwards, Bull. Mus. C Z. viii. pp. 65 & 66, West Indies, 118–1591 fath.

Willemoesia forceps, sp. n., *id. l. c.* p. 64, West Indies, 1940 fath.

Astacidæ.

Astacus (incl. *Cambarus*, *Astacoides*, &c.). Generic characters discussed by Boas, *l. c.* pp. 76 & 77, pl. ii. fig. 51, pl. iii. figs. 86 & 110, pl. v. fig. 173 ; recapitulated, p. 178.

Astacus. Huxley has published in French that part of his work, "The Cray-fish," which concerns the arrangement of the gills, the classification and the geographical distribution ; Arch. Z. expér. viii. pp. 79–102, woodcuts. A French translation of the whole book ; Paris : 1880. A German one : Leipzig : 1880, 8vo.

Astacus fluviatilis found in some rivulets near Madrid, but unknown in the Douro, Tagus, and Ebro ; Holdsworth, P. Z. S. 1880, pp. 421 & 422.

Astacus fluviatilis nearly extinct in the province of Pavia by the influence of the parasitic *Vaginicola* ; Maestri, Catalogo della Sezione Italiana dell' Esposizione internazionale di Pesca in Berlino, 1880, p. 10.

Cambarus typhlobius, sp. n., from caverns in Carniola, nearly allied to *pellucidus* (Tellk.), from North America, announced but not described by Joseph, JB. schles. Ges. lvii. p. 202.

A tertiary fossil, *Cambarus primævus*, sp. n., from the fish-beds of the western part of Wyoming, A. S. Packard, Am. Nat. xiv. p. 222, and Ann. N. H. (5) v. p. 435, may be mentioned, here on account of its near relation to the recent species,

Homarus : generic characters discussed by Boas, *l. c.* pp. 68–72, pl. i. fig. 28, pl. ii. fig. 50, pl. iii. figs. 85 & 109, pl. iv. fig. 132, pl. v. figs. 147, 164, & 172 ; recapitulated, pp. 174 & 175. *Nephrops* is very near it; *id. l. c.* pl. i. fig. 6, pl. iv. fig. 133. *Astacus* is regarded by the author as an intermediate link between *Homarus* and the *Thalassinidæ*. *Homarus* has nearer relations to the *Peneidæ* than to the rest of the *Caridea*, by the third pair of legs being also prehensile, and by the structure of the maxillipeds and maxillæ.

Notes on the capture of the lobster in Norway, by H. B. (Bars), Die Fischerei-Industrie Norwegens, Bergen: 1880, pp. 51–53, on the oceanic coast of Sweden, by G. v. Yhlen, in the Catalogue of the Swedish section of the International Exhibition of Fishery of Berlin [in German], pp. 50–52.

Enoplometopus pictus (M.-Edw.), Amboina, and *dentatus*, sp. n., St. Helena; in this genus, the branchial plume seems to be well developed, but its epipoditic portion absent. Miers, Ann. N. H. (5) xv. pp. 380 & 381, pl. xv. fig. 7.

Nephropsis agassizi, sp. n., A. Milne-Edwards, Ann. Sci. Nat. (6) ix. art. 2; blind, devoid of colour, 0·055 metres long, roadsteads of Florida, in a depth of 1500 metres.

Nephropsis cornubiensis, sp. n., C. S. Bate & J. B. Rowe, Rep. Brit. Ass. 1880, p. 160, with woodcut, off the Dudman, South Devon; possibly, but not probably, the young stage of *Nephrops*.

Thalassinidæ.

Axius, *Thalassina*, *Gebia*, and *Callianassa*, their generic characters discussed by Boas, *l. c.* pp. 98–110, pl. i. figs. 8 & 30–33, pl. ii. figs. 52–55, pl. iii. figs. 87 & 88, & 111–113, pl. iv. figs. 137–140, pl. v. figs. 165 & 166, & 174–177; recapitulated, pp. 185–188. *Axius* is, according to him, the most primitive form among them, issuing from the *Astacidæ*. Larval form of *Axius*, with small exopodites; pp. 108 & 188.

Axius princeps, sp. n., Boas, Dan. Selsk. Skr. (6) i. 2, p. 98, pl. vii. figs. 214–217, Wladiwostock, Manchuria.

Thalassina anomala (Hbst.) = *scorpionides* (Latr.), from Borneo; Miers, Ann. N. H. (5) v. p. 377.

Callianidea mucronata, sp. n., Kossmann, Zool. Reis. ii. p. 80, Red Sea.

Crangonidæ.

J. S. Kingsley (P. Ac. Philad. 1879, pp. 411–414) arranges the genera as follows, indicating the distinctive character and the typical species of each:—

1.—Subfam. Crangoninæ, hands subchelate: *Crangon*, *Pontophilus*, *Sabinea*, *Nectocrangon*, *Paracrangon*.
2.—Subfam. Lysmatinæ, first and second pair of hands chelate, carpus of the second annulate: *Nika*, *Lysmata*, *Hippolysmata*, *Tozeuma*, *Latreutes*, *Rhynchocyclus*, *Concordia*.
3.—Subfam. Gnathophyllinæ, external maxilliped broad, operculiform: *Gnathophyllum*.

Crangon (*vulgaris* and *boreas*): generic characters discussed by Boas, *l. c.* p. 63.

Crangon, subg. *Cheraphilus*: note on it by Miers, J. L. S. xv. p. 61.

Nectocrangon lar (Owen), differences between Vancouver and Atlantic specimens; S. Smith, Rep. Geol. Surv. Canada, 1878–79, p. 212 B.

Concordia, g. n. Dorsum of cephalothorax strongly protuberant,

rostrum very short, eyes free, antennulæ with two very short flagella, antennal scale very small, flagellum moderate, external maxillipeds short and stout, first pair of periopods shorter and stouter than the second, which, in turn, are shorter than the remaining pairs, the carpus 2-articulate. *C. gibberosus*[*-a*], sp. n., Fort Macon, North Carolina. Kingsley, P. Ac. Philad. 1879, p. 414.

Gnathophyllum zebra, sp. n., Richters, Decap. Maur. p. 161, pl. xvii. figs. 18-20, Mauritius.

Atyidæ.

Kingsley (P. Ac. Philad. 1879, pp. 414–416) arranges the known genera as follows :—

1.—Subfam. Atyina, periopods without exopodite : *Atya*, *Evatya*, *Atyoida*, *Caradina* [*Caridina*], *Atyephyra*, *Troglocaris*.

2.—Subfam. Ephyrinæ, periopods with an expodite : *Miersia*.

Atya moluccensis (Haan) = *armata* (M.-E.), Miers, Ann. N. H. (5) v. p. 382, pl. xv. figs. 3 & 4, Java, Bali, Macassar, Batchian.

Caridina desmaresti (M.-E.) : generic characters discussed by Boas, *l. c.* p. 60, pl. i. fig. 26, pl. ii. fig. 47, pl. iii. figs. 82 & 106, pl. v. figs. 151 & 163, among all "Eukyphota," it is nearest to the *Penæidæ*.

Caridina typus (M.-Edw.), Seychelle Islands and Mauritius, freshwater, *spathulirostris* and *serrata*, spp. nn., botanical gardens at Pamplemousses, Mauritius, *longirostris* (Roux), also from the Seychelles ; Richters, Decap. Maur. pp. 162 & 163, the three former pl. xvii. figs. 23–28.

Miersia, new name for *Ephyra* (Roux, M.-E.), pre-occupied ; Kingsley, P. Ac. Philad. 1879, p. 416.

Alpheidæ and Palæmonidæ.

Kingsley (P. Ac. Philad. 1879, pp. 416–426) unites these two families into one, *Palæmonidæ*, characterized by the deeply bipartite stout, incurved, mandibles, with narrow oblong apical process, and subdivides it as follows :—

1.—Subfam. Alpheinæ, first pair of feet the largest, chelate, second slender, filiform, generally chelate, carpus frequently annulate.

Sect. 1.—Mandibles with a palpus : *Alpheus*, *Alope*, *Arete*, *Athanas*, *Hippolyte*, *Caridion*, *Bythocaris*, *Cryptocheles*, *Rhynchocinetes*, *Ogyris*, *Pterocaris*.

Sect. 2.—Mandibles without a palpus : *Autonomea*, *Virbius*, with subg. *Thor*.

2.—Subfam. Pandalinæ, antennulæ biflagellate, mandibles with a palpus, anterior periopods very slender, not chelate, &c. : *Pandalus*.

3.—Subfam. Palæmoninæ, two anterior pairs of periopods chelate, carpus of none annulate, second pair larger than the first, periopods without palpi.

Sect. 1.—Mandibles without a palpus.

(a) Antennulæ biflagellate : *Typton*, *Pontonia*, *Coralliocaris*, *Harpilius*, *Anchistia*.

(B) Antennulæ triflagellate: *Euryrrhynchus*, *Palæmonetes*, *Urocaris*.

Sect. 2.—Mandibles with a palpus.

(A) Antennulæ biflagellate: *Palæmonella*, *Hymenocera*.

(B) Antennulæ triflagellate: *Palæmon*, including *Leander*, *Macrobrachium*, and *Bithynis*; *Cryphiops*.

4.—Subfam. [H]OPLOPHORINÆ, first pair of periopods either didactyle or vergiform, second stouter, chelate; antennulæ biflagellate. [*H*]*Oplophorus*, *Caulurus*, including *Xiphocaris*, and *Thalassiocaris* = *Regulus*.

Alpheus: generic characters discussed by Boas, *l. c.* pp. 58 & 59, pl. vi. fig. 194.

Alpheus websteri and *packardi*, spp. nn., Kingsley, *l. c.* pp. 416 & 417, Key West.

Alpheus macrochirus, sp. n., Richters, Decap. Maur. p. 164, pl. xvii. figs. 31–33, Mauritius.

Alpheoides lævis (Randall), and *crassimanus* (Heller), Red Sea; Kossmann, Zool. Reis. ii. p. 81.

Betæus utricola, sp. n., Richters, Decap. Maur. p. 164, pl. xvii. figs. 34 & 35, Mauritius, on *Mæandrina*, in bags built from *Oscillatoriæ*.

Athanas mascarenicus, sp. n., *id. ibid.*, third pair of maxillipeds rather long, Mauritius.

Hippolyte: generic characters discussed by Boas, *l. c.* p. 55, pl. ii. figs. 76 & 77.

Hippolyte spinus (Sow.), variability in the dorsal spines; Miers, J. L. S. xv. p. 61.

Hippolyte gaimardi (M.-Edw.), *spina* (Sow.), *phippsi* (Kröy.), and *grœnlandica* (F. C. Fabr.): specimens from Vancouver or Queen Charlotte Islands mentioned, the first and third partially described; S. Smith, Rep. Geol. Surv. Canada, 1878–79, pp. 212 B–214 B.

Hippolyte, sp. ?, from Mauritius, Richters, *l. c.* p. 165, pl. xvii. fig. 30.

Ogyris alphœirostris, sp. n., Kingsley, P. Ac. Philad. 1879, p. 420, pl. xiv. fig. 7, Virginia.

Thor floridanus (Kingsley), antennula and mandible figured: *id. l. c.* p. 421, pl. xiv. fig. 6.

Pandalus (*borealis*, Kröy.): generic characters discussed by Boas, *l. c.* p. 57, pl. ii. fig. 78.

Pandalus danæ (Stimps.) and *pubescentulus* (Dana): notes on Vancouver specimens, by S. Smith, *l. c.* p. 214 B.

Pontonia. Generic characters discussed by Boas, *l. c.* p. 54, pl. ii. fig. 46, pl. vi. fig. 193.

Pontonia unidens, sp. n., Kingsley, *l. c.* p. 422, pl. xiv. fig. 9, Key West.

Pontonia (*Harpilius*) *dentata*, sp. n., Richters, Decap. Maur. p. 165, pl. xvii. figs. 36–38, Mauritius.

Anchistia petitthouarsi (Audouin, as *Palæmon*) = *inæquimana* (Heller), Red Sea; Kossmann, Zool. Reis. ii. p. 83.

Palæmonetes varians (Leach) common in freshwater lakes and ditches near Naples; it lives in Southern Europe only in freshwater, but in

Northern Europe in brackish water; 8 specimens out of 50 survived for nearly three months in sea water; the eggs are very large; its development is abbreviated in comparison with the marine *Palæmonidæ*; at the moment of hatching, the young animal has already all cephalic and thoracic members and the greater part of the gills, the five anterior pairs of abdominal feet are present in the form of buds; the second and third pair of the future maxillipeds are still ambulatory. There is no stage after hatching which can be compared with a *Mysis*. P. Mayer, MT. z. Stat. Neap. ii. pp. 197–217, pl. x.

Urocaris longicaudata (Stimps.), North Carolina and Florida, described by Kingsley, P. Ac. Philad. 1879, pp. 424 & 425.

Palæmon. Generic characters discussed by Boas, *l. c.* pp. 47–50, pl. i. figs. 5 & 25, pl. ii. fig. 45, pl. iii. figs. 81 & 105.

Palæmon ornatus (Oliv.) = *vagus*, and *equidens* (Heller) = *reunionensis*, *mayottensis*, and *longimanus* (Hoffm.), *P. dispar*) Martens) = *alphonsianus* (Hoffm.), *P. lepi*[*do*]*dactylus* (Hoffm.), *P. rosenbergi* (Hoffm.), perhaps = *carcinus* (L.), all Malayan; Miers, Ann. N. H. (5) v. pp. 382–384.

Palæmon maillardi, sp. n., and *idæ* (Heller), Mauritius, freshwater, the latter also Seychelle Islands; Richters, Decap. Maur. p. 166, the former, pl. xviii. figs. 1-3.

Peneidæ.

J. E. V. Boas reviews the characters of this family, and more particularly those of *Peneus*, *Sicyonia*, which is very near the preceding, *Stenopus*, and *Sergestes*, and includes in this family also *Leucifer*, which is, according to him, an abnormal *Sergestes*. *Cerataspis longiremis* and *monstruosa* he thinks to be the larvæ of *Peneidæ* in a Mysis-like stage, but he cannot refer it to any known genus of this family. Dan. Selsk. Skr. (6) i. 2, pp. 28–46, pl. i. figs. 1, 37, & 38; abstract and recapitulation, pp. 155 & 164–170, pl. i. figs. 1–3 & 21–23, pl. ii. figs. 39–43 & 70–75, pl. iii. figs. 99–104, pl. iv. figs. 129–131, pl. v. figs. 146 & 162, pl. vi. figs. 187–191.

Peneus brevirostris (Kingsley, 1878), from the West Coast of Nicaragua, = *brasiliensis* (Latr.), North Carolina to Brazil; Kingsley, P. Ac. Philad. 1879, p. 427.

Peneus jeyneri, sp. n., Miers, Ann. N. H. (5) v. p. 456, footnote, Yokohama.

Stenopusculus, g. n. Near *Stenopus*, but basal joint of the outer antennæ provided with a scale as in *Peneus*; the last joints of the fourth and fifth pair of periopods with few or no articulations. *S. plumicornis*, *crassimanus*, and *scabricaudatus*, spp. nn., Mauritius. Richters, Decap. Maur, pp. 167 & 168, pl. xviii. figs. 16–32.

Pasiphae (*tarda*, Kr.); generic characters discussed by Boas, *l. c.* pp. 65 & 66, pl. i. fig. 27, pl. ii. fig. 48, pl. iii. figs. 83 & 107, pl. v. fig. 152.

Sergestidæ.

Lucifer reynaudi (M.-E.), Kossmann, Zool. Reis. ii. p. 84, pl. iv. figs. 1 & 2, Red Sea.

SCHIZOPODA.

W. Czernjawsky expatiates on the phylogeny of the *Mysidæ*, regarding them not as ancestors, but as collateral relations of the *Macrura*, and pointing out which of the generic and specific characters of the living *Mysidæ* may be regarded as original and which as secondary. Zool. Anz. iii. pp. 213 & 214 ; abstract, J. R. Micr. Soc. iii. p. 944.

Mysis denticulata, sp. n., Thomson, Ann. N. H. (5) vi. p. 1, New Zealand.

Gastrosaccus spiniferus (Goes) from Banff, described by T. R. Stebbing, Ann. N. H. (5) vi. pp. 113–117, pl. iii. It is distinct from *sanctus* (Sars) ; *id. l. c.* p. 328.

Chiromysis harpax (Hilgendorf), Kossmann, Zool. Reis, ii. p. 92, pl. v. figs. 2–15, Red Sea.

Haplostylus, g. n. Differs from *Gastrosaccus* by the absence of the peculiar flap at the posterior margin of the dorsal shield and by the absence of the natatory branch of the third pleopod. *H. erythræus*, sp. n., Kossmann, *l. c.* p. 94, pl. vi. figs. 1–8, Red Sea. *Gastrosaccus normanni* (Sars) is also referred to this genus.

Siriella paulsoni, sp. n., = *jaltensis* (Paulson, *nec* Czerniavsky) ; *id. l. c.* pp. 95–98, pl. vi. figs. 9–14, Red Sea.

Gnathophausia : Zoea (Will.-Suhm), Bay of Biscay, Alph. M.-Edwards, C. R. xci. p. 355, and Norman, Ann. N. H. (5) vi. p. 433.

STOMATOPODA.

E. J. Miers gives a monographic review of the adult forms of this family, admitting the following genera :—1. *Lysiosquilla* (Dana), including *Coronis* (Latr.), 10 species ; 2. *Leptosquilla*, g. n., 1 sp. ; 3. *Chloridella*, 4 spp., Australian and Indian Seas ; 4. *Squilla* (Fabr., pt.), 17 spp. ; 5. *Pseudosquilla* ; 6, *Gonodactylus*. One or two species of each genus are more fully described, of the others only the principal distinctive characters are indicated. Ann. N. H. (5) v. pp. 1–30, pls. i.–iii.

Lysiosquilla maculata (F.) described and the raptorial claws figured, *id. l. c.* p. 5, pl. i. figs. 1 & 2 ; *L. glabricauda* (Latr.) = ? *vittata* (M.-E.), *id. l. c.* p. 7.

Lysiosquilla inornata (Dana) from La Guajira, Venezuela ; Ernst, Ann. N. H. (5) v. p. 436.

Lysiosquilla (*Coronis*) *brazieri*, sp. n., Port Jackson, and *acanthocarpus* (Gray, name only), sp. n., Port Essington, Miers, *l. c.* p. 11, pl. xi. figs. 3–6 & 7–9. The inequality of the appendages of the three posterior pairs of legs is neither constant nor sexual in this subgenus, p. 125.

Leptosquilla, g. n. Ophthalmic segment greatly elongated, rostrum not reaching beyond half the length of this segment. *L. schmeltzi* (Alph. M.-E., as *Squilla*) ; Miers, *l. c.* pp. 2, 12, & 13, Upolu, Samoa Islands.

Chloridella, new name for *Chlorida* (Eyd. & Soul., pre-occupied). Type, *C. microphthalma* (M.-E), *C. rotundicauda*, sp. n., Formosa, both figured ; *id. l. c.* pp. 13–15, pl. ii. figs. 1–4, 5, & 6.

Squilla, 17 species described, and parts of *S. scorpio* (Latr.), *dufresnii* (Leach), *prasino-lineata* (Dana) ?, *mantis* (L.), *empusa* (Say), *nepa* (Latr.), figured ; Miers, *l. c.* pp. 16–30, pl. ii. figs. 7–13.

Squilla massavensis, sp. n., Kossmann, Zool. Reis. ii. p. 99, Red Sea.

Pseudosquilla ciliata (Fabr.) ? = *stylifera* (Lam.), *oculata* (Brullé), *monodactyla* (Alph. M.-E.). and *ornata* (Heller) ? ; *id. l. c.* pp. 108–111, pl. iii. figs. 1–8.

Gonodactylus. 13 species described, *G. edwardsi* (Berthold) = *japonicus* (Haan), Japan and China, *graphurus* (White), Indo-Pacific, *trispinosus* (White), Australia, with var. n. *pulchella*, Ceylon, *excavatus*, and *furcicaudatus*, spp. nn., localities unknown, *id. l. c.* pp. 115–124, the four last species, pl. iii. figs. 9–16.

Gonodactylus scyllarus (Fabr.), colours of the living animal ; its raptatorial claws cause wounds like a knife. Möbius, Beitr. Maur. p. 169.

Gonodactylus falcatus (Forskal) = *chiragra* (Fabr.) ; Kossmann, Zool. Reis. ii. p. 100, Red Sea.

CUMACEA.

G. O. Sars (Mediterranean Cumacea, 1878, pp. 5–7, 63, 74, 94, 111, 126, & 144) gives some general remarks on this group of *Crustacea*, and arranges them as follows :—

Fam. 1. *Cumidæ.* No natatory branch in the four hinder pairs of feet in both sexes ; in the males all segments of the pleon provided with two-branched pleopods. *Cuma*, *Stephanomma*, *Cyclaspis*, *Iphinoe*, *Cumopsis*.

Fam. 2. *Vaunthompsoniidæ.* A natatory branch (exognath) in the three anterior pairs of feet in the females, in all except the last in the males ; all segments of the pleon provided with pleopods. *Vaunthompsonia* and *Leptocuma*.

Fam. 3. *Lampropidæ.* A median appendage, telson, at the posterior extremity of the body. *Lamprops* and *Platyaspis*.

Fam. 4. *Leuconidæ.* Only the two first pairs of segments of the pleon provided with pleopods in the males ; maxillæ very peculiar ; natatory branch of the feet as in the *Vaunthompsoniidæ*. *Leucon* and *Eudorella*.

Fam. 5. *Diastylidæ.* Only two pairs of pleopods in the male ; telson present ; a natatory branch in two pairs of feet in the females, in four pairs of the males. *Diastylis* and *Leptostylis*.

Fam. 6. *Pseudocumidæ.* No spines or teeth on the dorsal shield ; only one pair of pleopods in the males ; telson distinct, but very short and without spines. *Pseudocuma* and *Petalopus*.

Fam. 7. *Campylaspidæ.* Integument very hard, of scaly or net-like structure ; body of the female short, of the male much more slender, &c. ; organs of the mouth very peculiar. Only genus, *Campylaspis* (*Cuma rubicunda*, Lilljeborg).

Fam. 8. *Cumellidæ.* No pleopods at all in the males, no telson. *Cumella* and *Nannastacus*.

R. Kossmann urges the union of this family with the *Schizopoda* ; Zool. Reis. p. 87.

Cuma (M.-Edw.) = *Bodotria* (Goodsir, male adult), *C. edwardsi* (Goodsir) = *audouini* (Bell), *gibba* and *pulchella*, spp. nn., Mediterranean, Sars, *l. c.* pp. 8–26 & 176, pls. i.–vi. & lx.

Cyclaspis cornigera, sp. n., Sars, *l. c.* pp. 28–33, pls. vii.–ix., Goletta, Mediterranean.

Cyclaspis sarsi, sp. n., Kossmann, Zool. Reis. p. 88, pl. iv. fig. 3, Red Sea.

Iphinoe (C. S. Bate) = *Halia* (Bate, *olim*), the adult male *Venilia* and *Cyrianassa* (Bate), *I. gracilis* (Bate) = *Cuma trispinosa* (Goodsir), var. *serrata* (Norm.), *I. tenella* and *inermis*, spp. nn., Mediterranean, Sars, *l. c.* pp. 34–50, pls. x.–xviii.

Cumopsis, g. n. Upper antennæ of the male dilated towards the tip, with very unequal flagella, under antennæ of the male as long as the body, of the female very short; basal joint of the third maxilliped large, but not prolonged on the external side. *C. goodsiri* (Beneden, as *Bodotria*) = *Cuma edwardsi* (Bate, *nec* Goodsir, *nec* Kröyer), and *C. lævis*, sp. n., Mediterranean ; Sars, *l. c.* pp. 51–62, pls. xix.–xxii.

Vaunthompsonia cristata (Bate), both sexes fully described ; *id. l. c.* pp. 64–75, pls. xxiii.–xxvi., Messina and Spezzia.

Leucon mediterraneus, sp. n. (male and female described), *id. l. c.* pp. 77–84, pls. xxvii.–xxix., Porto Venere.

Eudorella truncatula (Bate) = *inermis* (Meinert, adult male), and *E. nana*, sp. n., Mediterranean, *id. l. c.* pp. 85–94, pls. xxx.–xxxiii.

Diastylis (Say) = *Condylura* (Latr.), = *Alauna* (Goodsir), *D. rugosa* (Sars) = *strigata* (Norman), and *D. neapolitana*, sp. n., Mediterranean ; *id. l. c.* pp. 96–111, pls. xxxiv.–xxxix.

Diastylopsis, g. n. Closely allied to *Diastylis* in the structure of the appendages of the cephaloperion and in the structure of the pleon, but distinct by the tergal and epimeral portions of the third and fourth free segments of the perion, which form an arched shield-like plate nearly half as large as the carapax ; the basal segments of the second pair of gnathopods more expanded laterally ; cephaloperion very elongated and compressed. *D. dawsoni*, sp. n., Queen Charlotte Islands, 111 fath., S. Smith, Rep. Geol. Surv. Canada, 1878–79 [1880], pp. 215 B–217 B.

Pseudocuma cercaria (Beneden, as *Leucon*) = *bistriata* (G. O. Sars) = *bella* (Meinert), and *ciliata*, sp. n., Mediterranean, Sars, *l. c.* pp. 114–125, pls. xl.–xliii. ; the former also, Meinert, Nat. Tidskr. (3) xii. p. 497.

Campylaspis glabra and *macrophthalma*, spp. nn., Sars, *l. c.* pp. 129–143, pls. xliv.–xlix., Messina.

Cumella pygmæa (G. O. Sars) = *agilis* (Norman), and *C. limicola*, spp. nn., both from Spezzia and Messina ; *id. l. c.* pp. 146–160, pls. l.–liv.

Nannastacus (Bate) = *Diops* (Paulson), *N. unguiculatus* (Bate, as *Cuma*, female) = *binoculoides* (Bate, male), = *Diops parvulus* (Pauls.), and *N. longirostris*, sp. n., Spezzia, *id. l. c.* pp. 160–175, pls. lv.–lx.

Nannastacus sarsi, sp. n., Kossmann, Zool. Reis. p. 90, pl. iv. figs. 1–9, & pl. v. fig. 1, Red Sea.

AMPHIPODA.

A paper on the Adriatic *Amphipoda* by Nebeski, Arch. z. Inst. Wien, iii., has not been seen by the Recorder.

Descriptions of Haswell's new Tasmanian *Amphipoda* mentioned in the preceding Record from P. Linn. Soc. N. S. W. are also to be found in Ann. N. H. (5) v. pp. 30–34.

Orchestiidæ.

Orchestia fissispinosa, sp. n., Kossmann, Zool. Reis. ii. p. 129, pl. xiii. figs. 1–5, Red Sea.

Talitrus assimilis, sp. n., Haswell, P. Linn. Soc. N. S. W. v. p. 97, pl. v. fig. 1, Tasmania.

Talorchestia limicola, mangrove swamps, *terræ-reginæ*, sandy beach, both from Queensland, *marmorata* and *parvidactyla*, Tasmania, spp. nn., and *quadrimana* var. ?, Queensland, Haswell, *l. c.* pp. 98–100, pl. v. figs. 2–5, & pl. vi. fig. 1.

Aspidophoreia, g. n. Coxæ of the posterior gnathopods and of the first and second pair of periopods greatly expanded; telson squamiform, cleft to the base; in other regards like *Allorchestes*. *A. diemensis*, sp. n., Tasmania. Haswell, *l. c.* p. 101, pl. vi. fig. 2.

Gammaridæ.

Onesimus. 3 species in the Caspian Sea, at 40–250 fath; on their eyes and sensitive organs, see *suprà*, General Subject, Grimm, Arch. f. Nat. xlvi. pp. 119–123.

Glycera (Haswell), Ann. N. H. (5) v. p. 32.

Amaryllis (Haswell), *ibid.*

Cyproidea (Haswell), *l. c.* p. 31.

Panoplœa, g. n. Distinct from *Pleustes* in the well-developed squamiform plate on the ischium of the maxillipeds and in the gnathopods being slender and more or less chelate. *P. spinosa* and *debilis*, spp. nn. Thomson, Ann. N. H. (5) vi. pp. 2 & 3, pl. i. figs. 2 & 3, Dunedin Harbour, New Zealand, 4–5 fath.

Chloris, g. n. [name twice pre-occupied in *Aves* and once in Botany]. Antennæ well developed, the superior shorter than the inferior, with appendage; mandibles palpigerous; maxillipeds unguiculate, subpediform; gnathopods subchelate, the second pair very large; posterior pleopods biramous, with short conical rami; telson single, elongate. Haswell, Ann. N. H. (5) v. p. 33, Australia.

Amphilochus squamosus, sp. n., Thomson, Ann. N. H. (5) vi. p. 4, pl. i. fig. 4, New Zealand.

Lepidactylis (Say, 1818) = *Pterygocera* (Latr., 1826, Bovallius) = *Sulcator* (Bate, 1854), *L. arenarius* (Slabber, 1778, as *Oniscus*) = *L. dytiscus* (Say), Coast of Georgia and New England; S. Smith, Tr. Conn. Ac. iv. pp. 282–284.

Eusirus cuspidatus (Kröyer) var. n. *antarcticus*, Thomson, Ann. N. H. (5) vi. p. 4, New Zealand.

Macleayia, g. n. Superior antennæ appendiculate, shorter than the inferior; mandibles provided with an appendage; maxillipeds exunguiculate, with the squamiform processes rudimentary; gnathopods subchelate, the posterior very large; posterior pleopods having one large branch; telson small, undivided. Haswell, Ann. N. H. (5) xv. p. 32, Australia.

Leucothoe crassimana, sp. n., Kossmann, Zool. Reis. ii. p. 131, pl. xiii. figs. 9 & 10, Red Sea.

Leucothoe, spp. living in the interior of sponges or in the pharyngeal and atrial cavities of Ascidians. Haswell, *l. c.* p. 32.

Œdicerus (Kröyer): the genera *Krœyera*, *Monoculodes*, and *Westwoodilla* re-united with it; *Œ. œquimanus*, sp. n., Red Sea, Kossmann, Zool. Reis. ii. p. 130, pl. xiii. figs. 6–8.

Atylus microdeuteropus and *macrophthalmus*, spp. nn., Haswell, P. Linn. Soc. N. S. W. v. p. 102, pl. vi. figs. 3 & 4, Port Jackson.

Pherusa australis, sp. n., *id. l. c.* p. 103, pl. vii. fig. 1, Botany Bay.

Gammarus locusta (L.). Young specimens on seaweed in Davis Strait, 63° N. lat., "in freshwater as lively as in saltwater"; Miers, J. L. S. xv. p. 68.

Niphargus puteanus (Koch). Variety from a cavern in Monte Fenere, Val Sesia, Piedmont; Parona, Atti Soc. Ital. xxiii. pp. 42–50, with historical account of that species generally. A grey-coloured variety at the entrance of the cavern of Falkenstein, Suabia, by Fries, Württ. nat. J. H. xxxii. pp. 105–109 & 117.

Niphargus caspius (Grimm), in depths of 35–90 fath. On its eyes and other sensitive organs (see above); it is probably an old form, ancestor of *N. puteanus*; Grimm, Arch. f. Nat. xlvi. pp. 119–121.

Mœra erythræa and *massavensis*, spp. nn., Kossmann, *l. c.* pp. 132 & 133, pl. xiv. figs. 1–11, Red Sea.

Mœra crassipes, sp. n., Haswell, P. Linn. Soc. N. S. W. v. p. 103, pl. vii. fig. 2, Port Jackson.

Megamœra fasciculata, sp. n., first pair of gnathopods fringed with fascicles of serrated and barbed hairs, Thomson, Ann. N. H. (5) vi. p. 5, New Zealand.

Melita tenuicornis (Dana). Female with hook-like process on the coxal lamella of the fourth periopod; Thomson, Ann. N. H. (5) vi. p. 5.

Polycheria (Haswell), Ann. N. H. (5) v. p. 32.

Microdeutopus grandimanus (Smith). Tube-building from slender branches of algæ cemented by slime threads, observed by S. F. Smith, Tr. Conn. Ac. 1880; abstract in Nature, 1880, p. 595, and J. R. Micr. Soc. iii. p. 945.

Corophiidæ.

Amphithoe erythræa, sp. n., Kossmann, Zool. Reis. ii. p. 134, pl. xiv. figs. 12 & 13, Red Sea.

Amphithoides, g. n. Upper antennæ with an accessory flagellum. Outer

branch of the last pleopods with only one hooklet. Telson simple, flat, not armed. Epimera as in *Amphithoe*. Somewhat approaches *Gammarus*. *A. longicornis*, sp. n., *id. l. c.* p. 135, Red Sea.

Cerapus tubularius (Say) again found, and accurately described by S. F. Smith. It differs from the known *Podocerinæ* by having only three pairs of branchial lamellæ, borne on the third, fourth, and fifth segments of the perion, and only three pairs of ovigerous lamellæ, borne on the second, third, and fourth segments. The second and third pleopods are much smaller than the first, and their inner lamellæ are rudimentary or very small. The second and third uropods are uniramous and nearly alike, the distal segment in each being short and terminating in a hooked point. It inhabits unattached portable tubes, and has large cement-glands in the bases of the first and second periopods. S. F. Smith, Tr. Conn. Ac. iv. pp. 268–277, pl. ii.

Erichthonius difformis (M.-Edw.) = *Cerapus rubricornis* (Stimps.) = *C. punctatus*, *leachi*, and *hunteri* (Bate), common in New England, generically distinct from *Cerapus*, form of the second pair of gnathopods in the adult male variable; *id. l. c.* pp. 277–280.

Unciola irrorata (Say) = *Glauconome leucopsis* (Kröyer), abundant in New England, from the shallowest water down to, at least, 400 fath.; *id. l. c.* pp. 280–282.

Xenochira (Haswell), Ann. N. H. (5) v. p. 33.

Corophium contractum (Stimps.), New Zealand, described by Thomson, Ann. N. H. (5) vi. p. 6.

Cyrtophium ? *hystrix*, sp. n., Haswell, P. Linn. Soc. N. S. W. v. p. 104, pl. vii. fig. 3, Port Jackson.

Colomastix hamifer, sp. n., Kossmann, *l. c.* p. 136, pl. xv. figs. 1–10, Red Sea.

Hyperiidæ.

Synopia orientalis, sp. n., *id. l. c.* p. 137, pl. xv. figs. 11–13, Red Sea.

Caprellidæ.

Full abstract of Haller's observations and views [Zool. Rec, xvi. *Crust.* p. 35] in J. R. Micr. Soc. iii. pp. 426–430.

Caprella gigantea, German Sea, and *dentata*, Ischia, Naples, spp. nn., Haller, Z. ges. Naturw. (2) v. pp. 742–749, with woodcuts.

Protella danae and *subspinosa*, spp. nn., Kossmann, *l. c.* pp. 126–129, pl. xii. figs. 1–9, Red Sea.

ISOPODA.

R. Kossmann (*l. c.* pp. 107–112) arranges the true *Isopoda* (*Euisopoda*, Heller, as opposed to *Anisopoda*) in the following manner, according to the observations of Schiödte :—

Tribe 1. Asellidea. Mouth manducatory, caudal appendages styliform, body segmented. Fam. *Asellidæ* and *Oniscidæ*.

Tribe 2. SPHÆROMOIDEA. Mouth manducatory, pleon not fully segmented ; caudal appendages leaf-shaped. Fam. *Sphæromidæ*, *Idotheidæ*, and *Munnopsidæ*.

Tribe 3. CIROLANIDEA. Mouth suctory.

Mouth truly manducatory. Fam. *Cirolanidæ*.

Mouth biting. Fam. *Serolidæ*.

Mouth haustellatory. Fam. *Cymothoidæ*.

Oral appendages rudimentary. Fam. *Bopyridæ*.

Oral appendages wanting. Fam. *Cryptoniscidæ*.

TANAIDÆ.

Critical notes concerning the distinction of genera by Kossmann, *l. c.* p. 102.

Tanais vittatus (Rathke) = *tomentosus* (Kröy.) = *hirticaudatus* (Bate); Harger, Rep. Isopod. pp. 418 & 419, pl. xiii. figs. 81 & 82, Connecticut.

Leptochelia algicola (Harg.) = *edwardsi* (Bate & Westw.), *L. limicola* and *rapax* (Harg.), *filum* (Stimps.), and *cæca* (Harg.); *id. l. c.* pp. 421–428, pl. xii. fig. 80, & pl. xiii., New England.

Paratanais erythræa, Red Sea, and *krœyeri*, Mediterranean, spp. nn., Kossmann, *l. c.* pp. 103 & 105, the first pl. vii. figs. 1–4. *P. edwardsi* (Kröy.), figs. 5–8.

Paratanais tenuis, sp. n., Thomson, Ann. N. H. (5) vi. p. 2, pl. i. fig. 1, New Zealand.

ANTHURIDÆ.

Anthura polita (Stimps.) = *brunnea* (Harg.); Harger, *l. c.* pp. 398–402, pl. xi. figs. 68 & 69, New England.

Paranthura brachiata (Stimps.); *id. l. c.* pp. 402–405, pl. xi. fig. 70, Bay of Fundy, 59–115 fath.

Philanthura tenuis (Harger) ; *id. l. c.* pp. 406–408, pl. xi. figs. 71–73, & pl. xii. fig. 74, New England, 9–19 fath.

GNATHIIDÆ (PRANIZIDÆ).

Gnathia cerina (Stimps., as *Praniza*) = *Anceus americanus* (Stimps.); *id. l. c.* pp. 410–413, pl. xii. figs. 75–79, New England.

Anceus rhinobatis, sp. n., Kossmann, *l. c.* p. 105, pl. viii. figs. 1–6, Red Sea, in the nose and gill-holes of *Rhinobates halavi*.

ARCTURIDÆ.

Astacilla granulata (G. O. Sars, as *Leachia*) = *americana* (Harg., 1878); Harger, *l. c.* pp. 364–367, pl. viii. figs. 48–51, & pl. ix. fig. 52, George Bank and Nova Scotia.

Idoteidæ.

Idotea irrorata (Say) = *tricuspidata* (Desm.), *I. phosphorea* (Harg.) and *robusta* (Kröy.); Harger, *l. c.* pp. 343–350, pl. v. figs. 24–29, & pl. vi. figs. 30–32, New England.

Idotea sp. ?, young ?, not named, but described by Miers, J. L. S. xv. p. 64, North Atlantic, 57° N. lat.

Saussureana, g. n. Distinguished from *Idotea* by the three anterior pairs of feet being prehensile, and the shortness of both pairs of antennæ. Sp. n., not named, from Labrador, 71 millim. long, 22 broad. G. Haller, MT. schw. ent. Ges. v. p. 573, with a table. [Probably the long-known *Idotea entomon* (L.), genus *Chiridotea*, Harger, 1878.]

Chiridotea cæca (Say) and *tuftsi* (Stimps.); Harger, *l. c.* pp. 338–341, pl. iv., & pl. v. fig. 23, New England.

Synidotea nodulosa (Kröy.) and *bicuspida* (Owen) = *marmorata* (Pack.) = *pulchra* (Lock.); Harger, *l. c.* p. 351–353, the former figured, pl. vi. figs. 33-35, New England.

Erichsonia filiformis (Say) and *attenuata* (Harg.), *id. l. c.* pp. 355–357, pl. vi. fig. 36, pl. vii. figs. 37–41, New England.

Epelys triloba (Say) and *montosus* (Stimps.), *id. l. c.* pp. 358 & 359, pl. vii. figs. 42 & 43, pl. viii. figs. 44–47, New England.

Munnopsidæ.

Munnopsis typica (Sars), Harger, *l. c.* pp. 330 & 331, pl. ii. fig. 11, Bay of Fundy and Arctic Seas.

Eurycope robusta (Harg.), *id. l. c.* pp. 332 & 333, pl. iii. fig. 13, Gulf of St. Lawrence.

Asellidæ.

Asellus cavaticus (Schiödte) = *sieboldi* (Rougem.), found in various caverns and wells; it differs from *aquaticus* (L.), besides the want of eyes, chiefly by the more developed sensitive organs in the antennæ, and by the more elongate first pair of uropods; the number of joints in the lower antennæ is variable in both, but ordinarily larger in *aquaticus*. Fries, Württ. nat. J. H. xxxii. pp. 109–111 & 116.

Limnoria lignorum (Rathke) = *terebrans* (Leach); Harger, *l. c.* pp. 373–376, pl. ix. figs. 55–57, New England.

Limnoria terebrans (Leach). The ravages made by it in the port of Cherbourg, which necessitated a thorough restoration of some wooden constructions, described, and several observations on its mode of life given by M. Clavenad, Mém. Soc. Cherb. xxii. pp. 73–85, pl. vii. It attacks floating wood as well as fixed; but the latter only between the mean level of low-water at spring-tide, and that of high-water at neap-tide; it is most active during the hot season, and its gnawing can be heard from without; the young are hatched and grow in the holes, continuing the destructive work of their parents in geometrical progression in the interior, whereas the offspring of *Teredo* is cast loose in the sea,

and each individual commences for itself an entrance into the wood; *Limnoria* does not need clear water, as *Teredo* does, but even enters wood covered by a thick layer of extraneous matter; it attacks all sorts of wood, and saturation with creosote appears to be the best preservative against it.

Jæra albifrons (Leach) = *copiosa* (Stimps.) = *nivalis* (Pack.); North American specimens fully described by Harger, Rep. Isopod. pp. 315–319, pl. i. figs. 4–8, common on the whole coast of New England.

Janira alta (Stimps., as *Asellodes*), New England, north of Cape Cod and Fundy Bay, and *spinosa* (Harger), Banquerean, Nova Scotia, 300 fath.; *id. l. c.* pp. 321–324, pl. ii. figs. 9 & 10, pl. iii. figs. 12 & 13.

Munna fabricii (Kröy.); *id. l. c.* p. 325, pl. iii. fig. 14, Casco Bay and Bay of Fundy.

Oniscidæ.

Philoscia vittata (Say); Harger, *l. c.* p. 306, pl. i. fig. 1, New Jersey to Massachusetts.

Trichoniscus albidus, sp. n. (Budde-Lund, MS.), Meinert, Nat. Tidskr. (3) xii. p. 469, Copenhagen.

Titanethes feneriensis, sp. n., C. Parona, Atti Soc. Ital. xxiii. pp. 50–58, pls. i. & 2, from a cavern in Monte Fenere, Val. Sesia, Italy.

Platyarthrus hoffmannseggi (Brot) found in Belgium; J. MacLeod, CR. ent. Belg. xxiii. p. lxxv.

Actoniscus ellipticus (Harg.): Harger, *l. c.* p. 309, pl. i. fig 3, New Haven and Long Island Sound.

Haplophthalmus danicus (Budde-Lund), Denmark, distinct from *mengii* (Zaddach, as *Itea*) = *elegans* (Schöbl.), which has been found in Danzig, Bohemia, and Suabia; Meinert, Nat. Tidskr. (3) xii. pp. 467 & 468.

Scyphacella arenicola (Smith); Harger, *l. c.* p. 307, pl. i. fig. 2, New Jersey and Massachusetts.

Armadillidium sulcatum (M.-Edw.) = *opacum* (Koch), Denmark; Meinert, *l. c.* p. 467.

Sphæromidæ.

Sphæroma quadridentatum (Say); Harger, *l. c.* pp. 368–371, pl. ix. fig. 53, New England.

Sphæroma obtusum (Dana); Kossmann, Zool. Reis. ii. p. 112, pl. x. figs. 4–10, Red Sea.

Cirolanidæ.

Cirolana concharum and *polita* (Stimps.); Harger, *l. c.* pp. 378–382, the former pl. ix. fig. 58, pl. x. figs. 59–63, New England.

Cirolana arabica, sp. n., Kossmann, *l. c.* p. 114, pl. viii. figs. 7–12, & pl. ix. figs. 1–4, Red Sea.

Corilana, g. n.; distinct from *Cirolana* by a well-developed, many-toothed molar process, and rudimentary incisive process on the mandible;

first pair of periopods very short, its claw being the half of its whole length. *C. erythræa*, sp. n., *id. l. c.* p. 115, pl. ix. figs. 5–12, Red Sea.

Corallana macronema (Bleeker, as *Æga*); Miers, Ann. N. H. (5) v. p. 469, Malayan Archipelago.

Ægidæ.

Æga psora (L.) = *emarginata* (Leach); Harger, *l. c.* pp. 384–387, pl. x. fig. 64, New England, parasitic on cod, halibut, and skate.

Syscenna, g. n. Eyes wanting; palpus of maxillipeds two-jointed; sixth and seventh pair of legs elongated; pleon suddenly narrower than the thorax; pleopods naked, uropods ciliated. *S. infelix*, sp. n., N.E. of Cape Cod, 130 fath. Harger, *l. c.* pp. 387–390.

Cymothoidæ.

Nerocila munda (Harg.); Harger, *l. c.* p. 392, pl. x. fig. 65, Vineyard Sound, Massachusetts, on the dorsal fin of *Ceratacanthus*.

Nerocila lævinota, sp. n., W. Borneo, and *sundaica* (Bleeker ?) = *Emphylia ctenophora* (Kölbel), Miers, Ann. N. H. (5) v. pp. 467–469, the former pl. xv. figs. 15 & 16.

Anilocra acuminata, sp. n., Bourbon Island, and *mexicana* (Sauss.), West Indies, Haller, Arch. f. Nat. xlvi. pp. 388–390 & 393, pl. xviii. figs. 18-20.

Anilocra allocerœa (Kölbel) = ? *leptosoma* (Bleeker); Miers, Ann. N. H. (5) v. p. 463.

Renocila, g. n.; distinct from *Anilocra* by its broad non-inflexed front, the greatly produced postero-lateral angles of the 3 posterior thoracic segments, and the greatly dilated superior antennæ. *R. ovata*, sp. n., *id. l. c.* p. 464, pl. xv. figs. 11–14, Malayan Sea.

Livoneca ovalis (Say); Harger, *l. c.* pp. 395 & 396, pl. xi. fig. 67, Virginia and New England, parasitic on *Pomatomus*, *Stenotomus*, and *Micropogon*.

Livoneca plagulophora, Mauritius, *luneli*, Macassar (inside the operculum of *Hypeneus indicus*), *cumulus*, Guadeloupe, and *ellipsoidea*, locality unknown, spp. nn., Haller, Arch. f. Nat. xlvi. pp. 380–388, & 391–393, pl. xviii. figs. 8–17.

Livoneca: notes on several Malayan species, by Miers, *l. c.* pp. 465–467.

Ægathoa loliginea (Harg.); Harger, *l. c.* pp. 393 & 394, pl. x. fig. 66, New Haven, from the mouth of a squid, and Fort Macon, parasitic on young mullet.

Cymothoa eremita (Brünnich, 1783) = *mathæi* (Leach) = *stromatei* (Bleeker); Kossmann, Zool. Reis. ii. pp. 117 & 118, pl. x. figs. 1–3, Red Sea.

Cymothoa rotundifrons, Mauritius, and *paradoxa*, Indian Sea, in the mouth of *Caranx carangus*, spp. nn., Haller, Arch. f. Nat. xlvi. pp. 375–379 & 392, pl. xviii. figs. 1–4 & 5–7.

Cymothoa leschenaulti (Leach) = *stromatei*, and *edwardsi* (Bleeker), *irregularis* (Bleek.), *rhinoceros* (Bleek.), and *trigonocephala* (Leach): notes on them by Miers, *l. c.* pp. 461–463.

Bopyridæ.

Some observations by R. Kossmann, TB. Vers. Naturf. Danzig, pp. 211 & 212.

The known genera of the subfamily *Ioninæ* discussed, and a new one added, by Kossmann, Zool. Reis. ii. p. 119.

Cepon messoris, sp. n., *id. l. c.* p. 122, pl. xi. figs. 1–7, Red Sea, in the gill cavity of *Metopograpsus messor*.

Gigantione, g. n. Epimera of the four anterior periopods provided with adhesive cushions; pleopods hidden, when the animal is seen from above. In other respects like *Ione*. No species described. *Id. l. c.* p. 119.

Zeuxo longicollis, sp. n., *id. l. c.* p. 124, pl. xi. figs. 8 & 9, Red Sea, on the abdomen of *Chlorodius exaratus*.

PHYLLOPODA.

Branchipodidæ.

Branchipus grubii (Dyb.). A smaller and a larger variety observed near Würzburg, where it never had been observed before, by P. Fraisse, Zool. Anz. iii. pp. 284 & 285. Both varieties observed at Frankfurt since 1832; Richters, *tom. cit.* p. 359.

Branchinecta arcticus (Verrill). Variety ? from Godhavn, Greenland; Miers, J. L. S. xv. p. 70.

Artemia salina (L.) observed in salt-ponds at Salzburg, in Transylvania, with 5–15 per cent. of salt. Fully described, and its history given, viviparity. Nauplius-larva and moults observed, no male found. E. v. Friedenfels, Verh. siebenburg. Ver. xxx. pp. 112–161, plate.

Streptocephalus floridanus, sp. n., A. S. Packard, Am. Nat. xiv. p. 53, Florida.

Apodidæ.

Apus duckianus, sp. n., Day, P. Z. S. 1880, p. 392, with woodcut, Kelat, Afghanistan; abstract in J. R. Micr. Soc. iii. p. 948.

Lepidurus kirki plentiful during August in Petane Valley, near Napier; Hamilton, Tr. N. Z. Inst. xii. p. 303.

Limnadiidæ.

Estheria dawsoni, sp. n., quaternary clays of Canada; Packard, Am. Nat. xiv. p. 496.

CLADOCERA.

Lynceidæ.

Pleuroxus puteanus in wells of Northern Germany; Rehberg, Abh. Ver. Brem. vii. p. 63. Also in a well in Heligoland; id. Zool. Anz. iii. p. 301; abstract in J. R. Micr. Soc. iii. p. 635.

OSTRACODA.

G. S. Brady gives an analytic table of the known families, descriptive and critical notes on most of the known marine genera (3 new), and descriptions and figures of 141 new marine species, in Zoology of H.M.S. 'Challenger,' i. pt. 3, 184 pp., 44 pls. Interesting general remarks on the geographical and bathymetrical distribution of the marine *Ostracoda* are given, pp. 1–5. They are much scarcer in the greater depths than between tidemarks and in the Laminarian zone, and almost absent in the *Globigerina*-ooze and red clay; 19 (or rather 17) species were obtained from depths exceeding 1500 fath., most of them incapable of swimming, and therefore indigenous to the depth, not transported or subsided; 52 are enumerated from depths exceeding 500 fath. Three new genera are described, but none of them exhibits striking, unexpected, or remarkably palæontological features. Two natatory pelagic species, *Halocypris atlantica* (Lubbock) and *brevirostris* (Dana) are cosmopolitan. 6 British species have been found at Kerguelen, but not at intermediate stations. *Macrocypris*, *Bairdia*, and *Cytherella* are especially strongly represented in the Australasian province.

Parthenogenesis observed in *Cypris incongrua*, *fuscata*, *reptans*, and *vidua*, only females being found in the three former; sexual reproduction and parthenogenesis observed in *C. vidua* and in *Candona candida*. Weismann, Zool. Anz. iii. pp. 82–84; abstract in J. R. Micr. Soc. iii. p. 431.

Males are exceedingly rare and sporadic in *Cypris ornata*, *pubera*, *fasciata*, *fuscata*, *aurantia*, *aculeata*, *affinis*, and *bicolor*, whereas they are common at all seasons in *C. ovum*, *punctata*, *dispar*, *Notodromus monacha*, *Candona candida* and *fabiformis*, and probably in all species of *Cythere* and *Cypridina*. *Cypris ornata* is very prolific; it produces about 20 eggs every second day, or 200–300 in all. Several differences in the sexual organs, their mode of copulating and spawning, and the sexual differences of various species of *Cypris*, are described by W. Müller, Z. ges. Naturw. (3) v. pp. 221–235, pl. iv.

Observations on the sexual organs, sexual difference of the shells, occurrence of males, and viviparity of some *Cytheridæ*; id. *l. c.* pp. 237–245, pl. v.

Systematic table of the 7 recognized families of *Ostracoda* by Brady, *l. c.* p. 6.

Cypridæ.

Cypris bicolor, sp. n., W. Müller, *l. c.* p. 236, pls. iv. figs. 24–26, Thuringia, in slowly current or stagnant water.

Cypris granulata, sp. n. [not described], Robertson, P. N. H. Soc. Glasg. iv. p. 18, Scotland.

Candona. Variability in the male sexual organs in the same species, probably depending on maturity and age; Müller, *l. c.* p. 233.

Candona euplectella and *nitens*, spp. nn. [not described], Robertson, *l. c.* pp. 23 & 25, Scotland.

Phlyctenophora, g. n. Distinct from *Paracypris* by the absence of a branchial appendage to the mandibular palpus, and by the flexuous second foot; from *Macrocypris*, by the well-developed post-abdominal rami and in the characters of the mandibles and maxillæ; shell smooth, ornamented with dark-coloured blotches or striæ. *Ph. zealandica*, sp. n., New Zealand and Port Jackson, 2–10 fath., Humboldt Bay in New Guinea, 37 fath. Brady, *l. c.* pp. 32 & 33, pl. iii. fig. 1.

Aglaia clavata, New Zealand, and *A.* ? *pusilla*, Bass's Straits, 38–40 fath., *meridionalis*, Falkland Islands, 6 fath., and *obtusata*, Kerguelen Island, 20–50 fath., spp. nn., *id. l. c.* pp. 34 & 35, pl. vi. fig. 4, & pl. xxx. figs. 6–8.

Pontocypris faba (Reuss, from Antwerp Crag), recent in Bass's Straits and at Honolulu, 38–40 fath., *simplex*, sp. n., Ascension Island, 7 fath., and *P.* ? *subreniformis*, sp. n., Simons Bay, S. Africa, 15–20 fath., and Port Jackson, 2–10 fath.; *id. l. c.* pp. 37-39, pl. i. figs. 4–6.

Argillœcia (G. O. Sars). Generic characters somewhat widened; *A. eburnea*, Kerguelen Island, 20–120 fath., and 35° S. lat., 1900 fath., and *badia*, Port Jackson, 2–10 fath., spp. nn.: *id. l. c.* pp. 39 & 40, pl. iv. figs. 1–15, & pl. vi. fig. 3.

Macrocypris tenuicauda, West Indies, 390 fath., and North Brazil, 350 fath., *canariensis*, Canary Islands, 620 fath., *similis*, Southern Atlantic, 166–675 fath., *setigera*, Port Jackson, 2–10 fath., *tumida*, Kerguelen, 28 fath., and New Zealand, spp. nn.; *id. l. c.* pp. 41–43, pl. i. fig. 1, pl. ii. figs. 1–3, pl. iii. fig. 2, & pl. vi. fig. 2, with some other already described species, p. 44, pls. i. & vi.

Bythocypris, g. n. Valves unequal, thin, smooth, reniform; no tuft of swimming setæ on the second pair of the antennæ; branchial appendage of the mandibular palpus quite rudimentary. *B. reniformis*, sp. n., West Indies and North Brazil, 350–675 fath., off Prince Edward's Island, 50–150 fath., and Bass's Straits, 48–50 fath., *elongata*, sp. n., Tristan d'Acunha, 1425 fath., and *B.* ? *compressa*, sp. n., Tongatabu, 18 fath. Brady, *l. c.* pp. 45–47, pl. v. fig. 1, pl. vi. fig. 1, & pl. xxxv. fig. 5.

Bairdia villosa, sp. n., Tristan d'Acunha, Kerguelen, Prince Edward's Island, and Bass's Straits, 20–150 fath., *hirsuta*, red clay and *Globigerina*-ooze, 33° & 38° S. lat., 78° & 88° W. long., 1375 and 1825 fath., *simplex*, Heard Island, 75 fath., *exaltata*, Globigerina-ooze, 2° S. lat., 144° E. long., 1070 fath., *abyssicola* and *minima*, 36° N. lat., 178° E. long., 2050 fath., *globulus*, Admiralty Islands, 16-25 fath., *woodwardiana*, Tongatabu, 18 fath., *expansa*, Honolulu, 40 fath., *attenuata*, Torres Straits, 155 fath., and Honolulu, *fortificata*, Booby Island, 10° S. lat., 141° E. long., 6–8 fath., spp. nn., and some other already described species figured; *id. l. c.* pp. 47–61, pls. vii.–x.

Polycopidæ.

Polycope cingulata, locality unknown, and *P.* ? *favus*, Torres Straits, 155 fath., spp. nn., Brady, *l. c.* p. 168, pl. xxxv. fig. 7, & pl. xxxvi. fig. 4.

Cytheridæ.

Cythere dictyon and *dasyderma*, deep sea regions of the Atlantic, Indian, and Pacific Ocean, 150–2750 fath., *irpex*, Atlantic, 38° N. lat., 31° W. long., 1000 fath., and 32° S. lat., 13° W. long., 1425 fath., *serratula*, W. Indies, Canaries, and Tristan d'Acunha, 390–1425 fath., *pyriformis* and *sericea*, Pernambuco, 675 fath., *squalidentata*, 35° S. lat., 50° W. long., 1900 fath., *patagoniensis*, coast of Patagonia, 175 fath., *moseleyi*, *falklandi*, *fulvo-tincta*, and *impluta*, Falkland Islands, 6 fath., *scintillulata*, Straits of Magellan, 55 fath., *dorso-serrata*, Tristan d'Acunha, 1425 fath., *cytheropteroides*, Cape of Good Hope, 150 fath., *exilis*, *flabellicostata*, *craticula*, *stolonifera*, and *lepralioides*, Simon's Bay, S. Africa, 15–20 fath., *viminea*, 46° S. lat., 45° E. long., 1375 fath., *securifer*[-*a*] and *parallelogramma*, Prince Edward's Island, 50–150 fath., *foveolata*, *kerguelenensis*, *subrufa*, and *wyvillethomsoni*, Kerguelen Island, 20–120 fath., *papuensis*, Humboldt Bay, New Guinea, *ovalis*, *lubbockiana*, *sabulosa*, *curvicostata*, *lauta*, *packardi*, *cristatella*, and *tetrica*, Booby Island, near Torres Straits, 6–8 fath., *lagenella*, *torresi*, *inconspicua*, and *scalaris*, Torres Straits, 155–165 fath., *velivola*, 9° S. lat., 137° E. long., *irrorata*, Admiralty Islands, 16–25 fath., *suhmi*, 35° N. lat., 157° E. long., 2300 fath., *circumdentata*, 36° N. lat., 178° E. long., 2050 fath., and 13° S. lat., 149° W. long., 2350 fath., *acupunctata*, *bicarinata*, and *quadri-aculeata*, Inland Sea of Japan, 15 fath., *radula*, Ki Islands, 580 fath., *flos-cardui* and *rostro-marginata*, Honolulu, 40 fath., *vellicata*, *cumulus*, *clavigera* (new name for *subcoronata*, Brady, *nec* Speyer), and *tricristata*, Port Jackson, 2–10 fath., *obtusalata* and *scabro-cuneata*, Bass's Straits, 38–40 fath., *murrayana*, New Zealand, *arata*, 39° S. lat., 171 E. long., 150 fath., *fortificata*, Mid-Pacific, about 38° S. lat., 420 fath., and *sulcato-perforata*, 33° S. lat., 78° W. long., 1375 fath., all spp. nn., and many others already published, in all 86 species, described and figured by Brady, *l. c.* pp. 62–111, pls. xii.–xxvi.

Krithe (Brady, = *Ilyobates*, G. O. Sars, ‖) *producta*, Atlantic, Indian, and Pacific Ocean, 150–1825 fath., *hyalina*, Inland Sea of Japan, 15 fath., and *tumida*, 35° S. lat. 50° W. long., 1900 fath., spp. nn., Brady, *l. c.* pp. 114–116, pl. xxvii. figs. 1, 3, & 4.

Loxoconcha honoluliensis and *anomala*, Honolulu, 40 fath., *africana*, Cape Verde Islands, 1070–1150 fath., *pumicosa*, Booby Island, near Torres Straits, 6–8 fath., *australis*, Port Jackson, 2–10 fath., *subrhomboidea*, Simon's Bay, S. Africa, 15–20 fath., spp. nn., and some other already described, Brady, *l. c.* pp. 117–133, pls. xxvii.–xxix.

Xestoleberis setigera, Kerguelen Island, 120 fath, and Prince Edward's Island, 50–150 fath., *granulosa*, Bass's Strait, 38–40 fath., *nana*, Tongatabu, 18 fath., *africana*, Simon's Bay, 15–20 fath., *tumefacta*, Admiralty Islands, 16 fath., *variegata*, Cape Verde Islands, 1070–1150 fath., and Tongatabu, 18 fath., *expansa*, 35° S. lat., 50° W. long., 1900 fath., and *foveolata*, Booby Island, near Torres Straits, 6–8 fath., spp. nn., and some other already described, Brady, *l. c.* pp. 124–130, pls. xxx. & xxxi.

Cytherura curvistriata, Port Jackson, 2–10 fath., *obliqua*, *lilljeborgi*,

and *costellata*, Kerguelen Island, 20–50 fath., *cribrosa*, South-eastern Pacific, 160 fath., *clavata*, Falkland Islands, 6 fath., *mucronata* and *clausi*, Simon's Bay, S. Africa, 15–20 fath., and *cryptifera*, Bass's Strait, 38–40 fath., spp. nn., Brady, *l. c.* pp. 131–135, pl. xxxii. & pl. xxix. fig. 7.

Cytheropteron scaphoides, *angustatum*, *assimile*, and *fenestratum*, Kerguelen Island, 20–120 fath., *wellingtoniense*, New Zealand, *abyssorum*, 42° S. lat., 134° E. long., 2600 fath., *patagoniense*, Patagonia, 160 fath., and *mucronalatum*, Atlantic and Pacific, 1375–2050 fath., spp. nn., Brady, *l. c.* pp. 136–140, pls. xxxiii. & xxxiv.

Bythocythere arenacea, *velifera*, Torres Straits, 155 fath., *pumilio*, Kerguelen Island, 20–50 fath., and ? *exigua*, Straits of Magellan, 55 fath., spp. nn., Brady, *l. c.* pp. 142–144, pl. xxxiii. & pl. vi. fig. 7.

Pseudocythere fuegiensis, sp. n., *id. l. c.* p. 145, pl. i. fig. 7, 52° S. lat., 73° W. long., 245 fath.

Cytherideis larvata, sp. n., *id. l. c.* p. 146, pl. vi. fig. 5, pl. xxxv. fig. 6, Heard Island, Kerguelen, 75 fath.

Xiphichilus complanatus, sp. n., Kerguelen Island, 120 fath., and ? *arcuatus*, 19° S. lat., 178° E. long., 610 fath., sp. n., *id. l. c.* p. 148, pl. xxxv. figs. 4 & 2.

Elpidium, g. n.; shell more broad than high, ventral side flat, with a median longitudinal furrow, like a coffee-bean, somewhat like the Silurian *Elpe* (Barrande). *E. bromeliaram*, sp. n., about 1½ millim., very common between the leaves of *Bromelia*, at Itajahy, Southern Brazil. F. Müller, Kosmos, vi. pp. 386 & 387, with a woodcut, representing the antennæ, mandible, maxilla, and feet in enlarged size.

Cypridinidæ.

List of all known species, by Brady, Zoology of H.M.S. 'Challenger,' i. pt. 3, pp. 152-154.

Cypridina gracilis, 37° N. lat., 25° W. long., 1000 fath., and *danæ*, Kerguelen, 120 fath., spp. nn., *id. l. c.* pp. 156 & 157, pl. xxxvii. figs. 1–11, pl. xxxvi. fig. 2.

Crossophorus, g. n. Near *Bradycinetus* (Sars). Shell firm, calcareous; secondary branch of the posterior antennæ powerfully clawed; mandibular foot armed at the apex of the basal joint with a bifurcated hairy process; first pair of maxillæ consisting of one principal bi-articulate branch and several smaller segments, all abundantly setiferous; third maxilla composed of 3–4 digitiform segments, densely clothed with short stout setæ and a large subtriangular lamina, which bears along its outer margin several rows of plumose setæ. *C. imperator*, sp. n., 40° S. lat., 177° E. long., 1100 fath., 8.4 millim., the largest of the known *Cypridinidæ*. Brady, *l. c.* p. 158, pl. xxxviii. figs. 1–11.

Philomedes wyvillethomsoni, sp. n., *id. l. c.* p. 160, pl. xxxvi. fig. 1, Port Phillip, South Australia, 38 fath.

Halocyprid.æ.

Halocypris imbricata, sp. n., 35° N. lat., 137–167° E. long., & 36° S. lat. 46° W. long.; *H. atlantica* (Lubbock) and *brevirostris* (Dana) widely

distributed in the tropical and southern seas; Brady, *l. c.* pp. 164–167, pls. xxxix.-xlii.

Cytherellidæ.

Cytherella lata, Atlantic and Oriental Seas, 155–675 fath., *dromedaria*, Simon's Bay, S. Africa, 15–20 fath., *venusta*, Honolulu, 40 fath., *cribrosa*, Tongatabu, 18 fath., *irregularis*, Bermudas, 435 fath., and *latimarginata*, Torres Straits, 155 fath., spp. nn., and several other published species, Brady, *l. c.* pp. 172–178, pls. xxvi., xliii. & xliv.

COPEPODA.

G. H. Brady gives a general outline of the external and internal structure of the free and semiparasitic Copepods, chiefly from the works of Claus, Gegenbaur, and Huxley, in vol. iii. of his Monograph of the British *Copepoda*, pp. 1–22. He supports Thorell's division of the *Copepoda* into *Gnathostoma*, *Pœcilostoma*, and *Siphonostoma*, against Claus, but agrees with the latter in the interpretation of the mandibles, pp. 25–29. The same author, in vol. ii. of his Monograph, discusses the *Harpacticidæ*, 81 species of which are described and figured; the third, which concludes the work, contains some general considerations, and 19 lower semiparasitic species (*Corycæidæ*, *Lichomolgidæ*, *Artotrogidæ*).

C. Vogt has made some general remarks upon the adaptation of the *Copepoda* to parasitic life, coming to the result that the *Chondracanthidæ* may be derived from the *Ergasilidæ*. Act. Soc. Helv. lx. [1878] pp. 121–139.

A. della Valle enumerates 70 species of parasitical *Copepoda*, with full synonymy, and 66 species of fishes on which they have been observed, from the Adriatic Sea. Boll. Soc. Adr. vi. pp. 55–90.

Argulidæ.

Argulus schizostethii, sp. n., Kellicott, Am. J. Micr. v. p. 53, on the head of the blue pike, *Schizostethium salmoneum* (Jord.), in Niagara river.

Cyclopidæ.

Cyclops. 21 species observed near Bremen, and described, including *hyalinus*, *bisetosus*, *pygmæus*, *poppii*, spp. nn., and the synonymy of some others rectified; H. Rehberg, Abh. Ver. Brem. vi. pp. 538–550, pl. vi.

Cyclops helgolandicus, sp. n., *id.* Zool. Anz. iii. p. 302, Heligoland, in a well; abstract in J. R. Micr. Soc. iii. p. 635.

Cyclops fontinalis, sp. n., Göttingen; *helgolandicus* (Rehb.), from a well in Heligoland, very near *pulchellus* (Koch); *affinis* (Sars) in its development somewhat distinct from the other species; *C. fimbriatus* (Fischer), *poppii* (Rehberg), and *phaleratus* (Koch) are closely allied; *C. agilis* (Koch) = *longicornis* (Vernet); and some other notes on the

synonymy and differences of several species; *id.* Abh. Ver. Brem. vii. pp. 61–66, the two first figured, pl. iv. figs. 4 & 5.

Cyclopina? *ovalis* (Brady, as *Cyclops*, 1872), Brady, Brit. Copep. ii. p. 181, with woodcut, off Sunderland, on the surface.

Pterinopsyllus, new name for *Lophophorus* (Brady, 1878 ‖) ; *id. op. cit.* iii. p. 23.

Harpactcidæ.

Brady, *op. cit.* ii., discusses this family in a somewhat widely extended manner, subdividing it as follows :—

Posterior foot-jaw non-prehensile		1. *Longipediinæ*.
Posterior foot-jaw in the form of a prehensile clawed hand; anterior foot-jaw forming a powerful clawed hand		9. *Idyinæ*.
Anterior foot-jaw bearing marginal setiferous processes, but not forming an uncinated hand; inner branch of first foot not elongated or adapted for prehension .	1 jointed, broad .	8. *Porcellidiinæ*.
	1 jointed, slender .	3. *Amymoninæ*.
	2 jointed . .	6. *Nannopinæ*.
	3 jointed . .	2. *Tachidiinæ*.
elongated, 2 or 3 jointed, provided with strong uncinate terminal claws .		7. *Harpacticinæ*.
hinged, imperfectly clawed, mandible palpus	1 branched . .	5. *Canthocamptinæ*.
	2 branched . .	4. *Stenheliinæ*.

Subf. 1.—*Longipediinæ*: *Longipedia*, *Ectinosoma*, *Zosime*, *Bradya*.
Subf. 2.—*Tachidiinæ*: *Tachidius*, *Euterpe*, *Robertsonia*.
Subf. 3.—*Amymoninæ*: *Amymone*.
Subf. 4.—*Stenheliinæ*: *Stenhelia*, *Amira*, *Jonesiella*, *Delavalia*.
Subf. 5.—*Canthocamptinæ*: *Canthocamptus*, *Antheyella*, *Mesochra*, *Tetragoniceps*, *Diosaccus*, *Laophonte*, *Normanella*, *Cletodes*, *Enhydrosoma*.
Subf. 6.—*Nannopinæ*: *Nannopus*, *Platichelipus*.
Subf. 7.—*Harpacticinæ*: *Dactylopus*, *Thalestris*, *Westwoodia*, *Ilyopsyllus*, *Harpacticus*, *Zaus*, *Peltidium*.
Subf. 8.—*Porcellidiinæ*: *Porcellidium*.
Subf. 9.—*Idyinæ*: *Idya*, *Scutellidium*.

He describes and figures 81 British species, of which only those which have not been previously figured under the same generic and specific names by Claus, Böck, Brady, &c., will be mentioned *infrà*.

Ectinosoma spinipes, sp. n., distinct from *melaniceps* (Böck), round the British Islands from low water-mark to 40 fath., *erythrops*, sp. n., South Durham and North Yorkshire, 5–30 fath., and *atlanticum* (Brady &

Robertson, as *Microsetella*, 1873), open sea, S.W. of England, on the surface; *id. l. c.* pp. 9–14, pl. xxxvi. figs. 1–10, 11–17, pl. xxxviii. figs. 11–19, pl. xl. figs. 17–20.

Zosime typica (Böck), *id. l. c.* p. 15, pl. xxxix. figs. 1–12, off Sunderland and Hartlepool, 45 fath.

Bradya typica (Böck), *id. l. c.* ii. p. 17, pl. xxxviii. figs. 1–10, Scilly Islands and off Hartlepool, 20–25 fath.

Robertsonia, g. n. Near *Tachidius*, but the secondary branch of the posterior antennæ two-jointed. *R. tenuis* (Brady & Rob., as *Ectinosoma*, 1875), off Durham Coast, 27–37 fath.; *id. l. c.* pp. 24–27, pl. xli. figs. 1–14.

Stenhelia hispida (Norman, MS.), sp. n., Ireland, Durham, Ayrshire, 5–30 fath., and *ima* (Brady, as *Canthocamptus*), various British localities, 10–35 fath.; *id. l. c.* pp. 32–36, pl. xlii. figs. 1–14, & pl. xliii. figs. 1–14.

Amira longipes (Böck); *id. l. c.* p. 37, pl. liii. figs. 1–10, Ayrshire, Durham, Yorkshire, Ireland, 15–45 fath.

Jonesiella, g. n. Near *Delavalia*, but the inner branch of first pair of swimming feet longer than the outer branch. *J. fusiformis* and *spinulosa* (Brady & Rob., as *Zosime*, 1875), various British localities, 20–35 fath.; *id. l. c.* pp. 38–41, pl. xlviii. figs. 1–17, & pl. xlix. figs. 14 & 15.

Delavalia palustris (Brady); shallow brackish pools at the mouth of the Seaton Burn, Northumberland, *reflexa* and *robusta* (Brady & Rob.), the former off Hartlepool, the latter off the coasts of Durham and Yorkshire, 25–35 fath., *id. l. c.* pp. 43–46, pl. l. figs. 1–8, & pl. li. figs. 1–21.

Canthocamptus hibernicus, Mullingar Canal at Dublin, *palustris*, Scilly Islands, Suffolk and Skye in brackish water, *trispinosus*, River Nene at Peterborough, and *northumbricus*, lake at Bolam, spp. nn., pp. 52–57, pl. xxxix. figs. 13–23, pl. xlvi. figs. 1–12, & pl. xlv. figs. 1–22.

Canthocamptus minutus (O. F. Müll.), name and synonymy, *cryptorum* (Brady) well distinct from it, *lucidulus*, new name for *minutus* (Claus, not of other authors), and *gracilis* (Sars), the first, third, and fourth observed at Bremen; Rehberg, Abh. Ver. Brem. vi. pp. 550 & 551.

Canthocamptus trispinosus (Brady); *id. op. cit.* vii. pt. 1, p. 62, pl. iv. figs. 1–3 & 6–8, Germany.

Antheyella, g. n., like *Canthocamptus*, except that the inner branch of the first pair of feet is scarcely at all elongated, and is either two- or three-jointed, those of the second and third pairs are one or two-jointed, the first joint being very small, and that of the fourth pair consists of only one joint. *A. spinosa*, sp. n., in an old engine-pond at Murton Junction, near Sunderland, and *cryptorum* (Brady, as *Canthocamptus*, 1868), damp roof of the pit-workings of the low main, West Cramlington Colliery, near Newcastle. Brady, *l. c.* ii. pp. 58–61, pl. xliii. figs. 16–18, pl. xlvi. figs. 13–18, & pl. lii. figs. 1–18.

Mesochra (Böck, 1864) = *Paratachidius* (Brady & Rob., 1873), *M. lilljeborgi* (Böck) = *P. gracilis* (Br. & Rob.), Mayo, Galway, and Merionethshire, in tidal and brackish ponds, and *M. robertsoni*, sp. n., Connemara and Mayo, in brackish water; *id. l. c.* pp. 62–65, pl. xli. figs. 15–21, pl. xlvii. figs. 1–21.

Tetragoniceps, g. n. Posterior antenna very long, tri-articulate; a small

branch on the mandibular palpus ; inner branches of the swimming feet uniformly tri-articulate, outer ones bi-articulate, only the fifth pair one-branched. *T. malleolata*, sp. n., Scilly Islands, 12 fath., *id. l. c.* pp. 65–67, pl. lxxviii. figs. 1–11.

Diosaccus tenuicornis (Claus, as *Dactylopus*) = *Nitokra tenuicornis* (Br. & Rob.), various British localities, from the surface to 15 fath. ; *id. l. c.* p. 68, pl. xlix. figs. 12–16, pl. lx. figs. 14–18.

Laophonte (Philippi, 1840) = *Cleta* (Claus, 1863) = *Asellopsis* (Br. & Rob., 1873), *L. serrata* (Claus, as *Cleta*), *horrida* (Norman, do.) = *C. minuticornis* (Buchholz), *thoracica* (Böck) = *Tetragoniceps longiremis* (Br. & Rob.), *similis* (Claus, as *Cleta*) = ? *C. forcipata* (Norm.), *curticauda* (Böck), *longicaudata* (Böck, 1864)) = *hodgii* (Brady, 1872), *lamellifera* (Claus, as *Cleta*), and *hispida* (Br. & Rob., as *Asellopsis*) all British, from above high-water mark (*similis*) to 30 fath., Brady, *l. c.* pp. 70–86, pls. lxxiii., lxxiv., lxxv., lxxvi., lxxvii., & lxxxi.

Normanella, g. n. Distinct from *Laophonte* by the branched mandible palp and the want of a prehensile claw on the first foot ; and from *Cletodes* by the presence of a branch on the posterior antenna, the branched mandible palp, and the elongated inner branch of the first pair of feet. *N. dubia* (Br. & Rob., as *Laophonte*, 1873), various British localities, 10–30 fath., Brady, *l. c.* pp. 87 & 88, pl. lxxviii. figs. 12–22.

Cletodes (Brady, 1872) = *Lilljeborgia* (Claus, 1866) = *Orthopsyllus* (Br. & Rob., 1873), *C. limicola* (Brady) with var. *gracilis* = *pectinata* (Brady), *longicaudata* (Br. & Rob.) = ? *laticauda* (Böck), *propinqua* (Br. & Rob.), *linearis* (Clans, as *Lilljeborgia*), all British, 5–45 fath., Brady, *l. c.* pp. 92–97, pl. lxxix., pl. lxxvii. figs. 9–17, & pl. lxxx. figs. 1–14.

Enhydrosoma curvatum (Br. & Rob., as *Rhizothrix*), various British localities, 3–35 fath., Brady, *l. c.* pp. 98–100, pl. lxxxi. figs. 12–15, & pl. lxxxii. figs. 11–19.

Nannopus, g. n. Like *Tachidius* in general appearance ; head consolidated with the thorax, body-segments denticulated on the posterior margin ; outer branches of all the swimming-feet three-branched, inner branches of the first and second pairs 2-jointed, not prehensile, of the third and fourth pairs obsolete and reduced to a single seta. *N. palustris*, sp. n., brackish pools in a salt marsh at Seaton Sluice, Northumberland. Brady, *l. c.* pp. 101 & 102, pl. lxxvii. figs. 18–20.

Platychelipus, g. n. Distinct from *Nannopus* by the 2-jointed branches of the first foot. *P. littoralis*, sp. n., Lake Lothing, Suffolk, and Seaton Sluice, Northumberland, in brackish water. *Id. l. c.* pp. 102–104, pl. lxxix. figs. 20–23, pl. lxxx. figs. 15–19.

Dactylopus strœmi (Baird, as *Cyclops*, 1837) = *cinctus* (Claus), *tenuiremis* (B. & Rob.), and 5 other species, figured already by Claus, British, from surface to 45 fath., *tisboides* (Claus), very variable ; *id. l. c.* pp. 106–120, pls. liv.–lvi., pls. xlvii. figs. 12–14, pl. lvii. figs. 10–12, pl. lviii. fig. 14.

Thalestris rufo-cincta (Norman, MS.), sp. n., various British localities, 10–35 fath., *clausi* (Norman, 1868), *serrulata*, sp. n., Scilly Islands, 40 fath., *peltata* (Böck, as *Amenophia*), and 6 other species, already figured, British ; *id. l. c.* pp. 121–140, pls. l., liii., & lvii.–lxii.

Harpacticus fulvus (Fischer, 1860) = *crassicornis* (Brady) = *curticornis* (Böck) = *Tigriopus lilljeborgi* (Norman), uppermost margin of the littoral zone, shallow pools at or above high-water mark, everywhere round the British Islands, various places on the coasts of the Baltic and North Seas, and even at Kerguelen Island; *id. l. c.* pp. 149–151, pl. lxiv. figs. 1–11.

Idya (Philippi, 1843) = *Tisbe* (Lilljeborg, Claus), *I. furcata* (Baird, as *Cyclops*, 1837) = *T. ensifera* (Fischer), almost ubiquitous in the British seas, littoral and laminarian zone; *id. l. c.* pp. 171–174, pl. lvii. figs. 1–11.

? *Cylindropsyllus*, g. n. Body cylindrical, much elongated; head united with thorax, abdomen 4-jointed, as wide as thorax. Rostrum sharp; anterior antennæ short, 5-jointed, posterior 2-jointed, without secondary branch; posterior ? foot-jaw small, provided with an apical curved spine and several marginal setæ; rest of mouth-organs unknown. First four pairs of swimming feet 2-branched, outer branch 3-, inner 2-jointed; fifth pair rudimentary, 1-jointed, foliaceous. Systematic place doubtful; somewhat like *Idya*. *C. lævis*, sp. n., Hartlepool, 5 fath. Brady, *op. cit.* iii. pp. 23, 30 & 31, pl. lxxxiv. figs. 1–8 (*Cylindrosoma* on the plate, and in vol. i. p. 31).

Peltidiidæ.

Notes on this subfamily, and analytical table of the known genera and two new subgenera, by G. Haller, Arch. f. Nat. xlvi. pp. 55–57.

Scutellidium (Claus) = *Aspidiscus* (Norman), *tisboides* (Claus) and *fasciatum* (Böck, *Porcellidium*), British, on the fronds of *Laminaria*, the former rare, the latter common; Brady, *op. cit.* ii. pp. 175–180, pl. lxxviii. figs. 1–11, & pl. lxxix. figs. 1–9.

Zaus goodsiri, new name for *Z. ovalis* (Claus), not *Sterope ovalis* (Goodsir), British; *id. l. c.* p. 156, pl. lxvi. figs. 10–13.

Peltidium (Philippi, 1839) = *Alteutha* (Baird, 1845) = *Carillus* and *Sterope* (Goodsir, pt.); *P. depressum* (Baird) = *C. oblongus* (Goods.) = *P. purpureum* (Philippi ?, White) = *A. purpuricincta* (Norm.), chiefly on *Laminaria saccharina*; *interruptum* (Goods.) = *A. bopyroides* (Claus) = *A. norvegica* (Böck), all round the British shores; *crenulatum*, sp. n., Scilly Islands, at low-water mark on algæ, and at the surface. Brady, *l. c.* pp. 158–164, pl. lxxii. figs. 1–15, & pl. lxxi. figs. 4–15.

Oniscidium (Claus). Generic character enlarged; first subgenus, *Peltidium* (Philippi, 1839) = *Oniscidium* (Claus, 1863). Inner branch of the first pair of feet two-jointed, rarely three-jointed, armed with bristles. *O. tri-articulatum* and *sculptum* (Haller, 1879) fully described and figured; Haller, Arch. f. Nat. xlvi. pp. 63–67, pls. iv. figs. iii. 7 & iv. 6, & pl. v. figs. 1–3, Messina.

Zausoscidium (Haller, 1879), second subgenus of *Oniscidium*. Both branches of the first pair of feet prehensile, the third joint of the outer branch very small, armed with hooks; the inner branch two-jointed. *Z. folii* (Haller, 1879) fully described and figured. Haller, *l. c.* pp. 67–70, pl. v. figs. iii., iv., & 4, Messina.

Porcellidium (Claus, 1860) = *Thyone* (Philippi ‖), *P. subrotundum* (Norman), and 3 other species already figured, British, chiefly on the

fronds of *Laminaria* and other sea-weeds; Brady, *l. c.* pp. 165–170, pls. 69, 70, & 71. *P. ovatum* and *parvulum* (Haller, 1879), fully described and figured; Haller, *l. c.* pp. 57–61, pl. iv. fig. i. 1–3, & fig. ii. 4 & 5, Messina.

Calanidæ.

Diaptomus cæruleus (A. Fr. Müller). Note on its synonymy and history, and *D. gracilis* (Sars, 1862) = *amblyodon* (Marenzeller) both observed at Bremen; Rehberg, *l. c.* pp. 552 & 553.

Heterocope saliens (Lillj.) = *robusta* (Sars); *id. l. c.* p. 553.

Temora. Inner branch of the first pair of feet two-jointed in *T. longicornis*, one-jointed in *T. velox*; Brady, *op. cit.* iii. p. 73.

Temora clausi (Hoek, 1875) = *Cyclopsina lacinulata* (Fischer, 1853, nec *Cyclops lacinulatus*, O. F. Müller), common near Bremen beyond the dykes; Rehberg, *l. c.* p. 553.

Temora affinis, sp. n., Poppe, Abh. Ver. Brem. vii. pp. 55–60, pl. iii., in brackish water on the coast of Northern Germany, also entering the rivers and found in freshwater, for instance in the Elbe at Altona.

Ascidiicolidæ.

Salpicola, g. n., not described. *S. ialina* [*hyalina* ?], in the branchial cavity of *Salpa mucronata*, Richiardi, Catal. Sez. Ital. Espos. internaz. di Pesca Berlino, 1880, p. 147.

Corycæidæ.

Corycæus anglicus (Lubbock, 1857) = *germanus* (Leuckart, 1859), Valentia and Cornwall; Brady, *op. cit.* p. 34, pl. lxxxi. figs. 16–19, pl. lxxxiii. figs. 11–15, pl. lxxxiv. figs. 10–14.

Monstrilla anglica (Lubbock); *id. l. c.* pp. 37 & 38, woodcut.

Lichomolgidæ.

Lichomolgus. General notes on the genus; *Doridicola*, *Sepicola*, *Sabellophilus*, *Terebellicola*, *Eolidicola*, and *Chonophilus* are not sufficiently distinct from it. *L. actiniæ*, sp. n., on *Actinia concentrica* (Risso). *L. pteroidis*, sp. n., on *Pteroides spinulosum*, and *L. chromodoridis*, sp. n., on *Chromodoris elegans* (Cantr.), all from Naples. A. della Valle, Atti Acc. Rom. (3) v. Mem. sci. fis. pp. 117–120, pl. i. figs. 1–30, & pl. ii. figs. 31–45.

Lichomolgus fucicolus (Brady, 1872, as *Macrochiron*), *liber* (Br. & Rob.), *arenicolus* (Brady, 1872, as *Bœckia*), *thorelli* (Br. & Rob.), *furcillatus* (Thorell), and *forficula* (Thor.), British, the four former living free in the littoral and Laminarian zones, the last in the branchial sac of Ascidians; Brady, *op. cit.* iii. pp. 40–51, pl. lxxxv.–lxxxviii.

Bomolochus minimus, *muræna*, *oblongus*, and *unicirrus*, spp. nn., not described, on the gills of *Serranus*, *Muræna*, *Oblada*, and *Lichia*;

Richiardi, Catal. Sez. Ital. Esposiz. intern. di Pesca in Berlino, 1880, p. 147.

Anthessius, g. n. Maxillæ very like the first pair of maxillipeds of *Lichomolgus*, falciform, armed on its convex margin with numerous strong teeth and on the concave margin with a palpiform ciliated appendage; in other respects like *Lichomolgus*. *A. solecurti* and *pleurobrancheæ*, spp. nn., Naples, on *Solecurtus strigilatus* and *Pleurobranchea meckeli*, A. della Valle, Atti Acc. Rom. (3) v. Mem. Sci. fis. pp. 121–123, pl. ii. figs. 49–53.

Ascomyzontidæ.

Cyclopicera nigripes (Br. & Rob.), free, from the surface to 27 fath., *lata* (Brady) = *Ascomyzon echinicola* (Norman), free, in tidal pools, and upon *Echinus esculentus*; *gracilicauda*, sp. n., Yorkshire, 35 fath. Brady, *op. cit.* iii. pp. 53–58, pl. lxxxiii., lxxxix., & xc.

Artotrogus and *Asterocheres* (Böck) and *Ascomyzon* (Thorell) united into one genus; *A. bœcki*, new name for *Ascomyzon lilljeborgi* (Böck); *magniceps*, sp. n.; *normani* (Br. & Rob., as *Dyspontius*) and *lilljeborgi* (Thorell, as *Asterocheres*), British, surface–27 fath. *Id. l. c.* pp. 59–65, pl. xci.–xciii.

Dyspontius striatus (Thorell); *id. l. c.* p. 66, pl. xcii. figs. 1–13.

Stellicola kossmanniana, sp. n., on *Pteroides spinosum*, var. *longispinulosum* (Kölliker), Trieste; A. della Valle, Boll. Soc. Adr. vi. p. 51, pl. i.

Acontiophorus, new name for *Solenostoma* (Br. & Rob. 1873 ‖); *A. scutatus* and *armatus* (Br. & Rob.), British, surface–40 fath.; Brady, *l. c* pp. 23 & 69–72, the latter figured, pl. lxxxvii. figs. 8–15.

Caligidæ.

Caligus serrani, *lepidopi*, *fissus*, *petersi*, *smaris*, *trachini*, and *trachuri*, spp. nn., not described, Richiardi, Catal. Sez. Ital. Esposiz. intern. di Pesca Berlino, 1880, p. 148, on *Serranus gigas*, *Lepidopus*, *Box*, *Carcharias*, *Smaris*, *Trachinus*, and *Trachurus*.

Luetkenia integra, sp. n., not described, on the gills of *Galeus* and *Mustelus*; id. *ibid.*

Dinemura musteli-lævis, sp. n., Hesse, Rev. Montp. (2) ii. pp. 5–15, with 1 pl., Mediterranean coast of France.

Phyllophorus crassus, sp. n., not described, on the gills of *Prionodon glaucus*, Richiardi, *l. c.* p. 148.

Dichelesthiidæ.

Lernanthropus vorax, *brevis*, *foliaceus*, and *tylosuri*, spp. nn., not described, on the gills of *Charax*, *Sargus*, *Thyrsites*, and *Tylosurus*; id. *l. c.* p. 150.

Philichthys fiatolæ, sp. n., *id.* (Atti Soc. Tosc.), Zool. Anz. iii. p. 69, in the sinuosities of the head of *Stromateus fiatola* (L.), Mediterranean.

Philichthys stromatei, *sciænæ*, *edwardsi*, *steenstrupi*, *sieboldi*, *minimus*, *grubii*, *agassizi*, *hœckeli*, *murænæ*, *lichiæ*, *denticis*, *pagri*, *pagelli*, and

baraldi, spp. nn., not described, on *Stromateus*, *Sciæna*, *Serranus cabrilla*, *Mullus*, *Box*, *Serranus hepatus*, *Sargus annularis*, *Charax*, *Brama*, *Muræna*, *Lichia*, *Dentex*, *Pagrus*, *Pagellus*, and *Chrysophrys*, of the Mediterranean; Richiardi, Catal. &c. p. 149.

Lernæidæ.

Pennella costai, sp. n., not described, on *Xiphias*; Richiardi, *l. c.* p. 150.

Tripaphylus, new genus for *Lernæonema musteli* (Beneden), not defined; *id. l. c.* p. 151.

Lernæenicus sargi, *vorax*, *neglectus*, and *labracis*, spp. nn., not described, on *Sargus*, *Umbrina*, *Corvina*, *Sciæna*, *Mugil*, *Labrax*, *Box*, and *Trachurus*; id. *l. c.* p. 150.

Lernæa ninni, spp. nn., not described, in the muscles of *Smaris*; id. *ibid.*

Lernæopodidæ.

Lernæopoda scyllii, sp. n., not described, on the male appendages of *Scyllium*; id. *l. c.* p. 151.

Brachiella elegans, *inconcinna*, *minuta*, *obesa*, *neglecta*, and *ramosa*, spp. nn. (not described), on *Lichia*, *Raia maculata*, *Pagellus*, *Trigla corax*, *Sciæna*, and *Xiphias*; id. *ibid.*

Anchorella carusi, *canthari*, *characis*, *clava*, *crassa*, *elongata*, *lichiæ*, *subtilis*, *simplex*, and *tenuis*, spp. nn. (not described), on *Trigla*, *Cantharus*, *Charax*, *Mæna*, *Merlucius*, *Sargus annularis*, *Lichia*, *Umbrina*, and *Pagellus*; id. *l. c.* p. 152.

CIRRIPEDIA.

Balanidæ.

Balanus crenatus (Brug.). One specimen from Discovery Bay, Greenland, 30 fath.; Miers, J. L. S. xv. p. 73.

Peltogastridæ.

Sacculina rotundata, sp. n., on *Eriphia lævimana*, Malayan Sea, Miers, Ann. N. H. (5) v. p. 470, pl. xv. figs. 18 & 19.

"Ascothoracidæ."

H. de Lacaze-Duthiers proposes this new division of the abortive *Cirripedia* for:—

Laura, g. n. Body enclosed in a bean-shaped, cartilaginous, minutely perforated test, with one hiloid aperture, internally curved sigmoidally, consisting of 12 segments, the head included; 6 pairs of simple (not branched) feet on the six first segments after the head. The test is a

duplicature of the integument of the back, and contains the liver and ovary, between the outer stronger and the inner membranaceous layer, the oviduct opening in the first pair of feet; the testicles are contained in the second-fifth pairs of feet, in which the vasa deferentia are opened; the sixth pair of feet are more slender, and have no generative functions. Both sexes are united in the same individual; the eggs are fecundated within the test; the Nauplius-stage of development with three pairs of feet has been observed. *L. gerardiæ*, sp. n., is fixed on its back to *Gerardia* (*Gorgonia tuberculata*, Lam., = *Liopathes lamarcki*, M.-Edw.), in the Mediterranean, and enveloped by its cœnosarc throughout except the hiloid aperture; test 2–4 centimetres long. Lacaze-Duthiers, Arch. Z. expér. viii. pp. 537–581, woodcuts; abstract in J. R. Micr. Soc. (2) i. pp. 242 & 243.

XIPHOSURA.

A. S. Packard gives an anatomical (chiefly histological) description of *Limulus polyphemus*, discussing the histology of the intestinal tract, the structure of the liver, and the bright red glandular bodies, which he supposes to be renal in their nature, although apparently lacking an excretory duct. As regards the structure of the eyes, he confirms in most parts the description of the compound eye given by Grenacher [Zool. Rec. xvi. *Crust.* p. 6], and adds the histological description of the ocellus; the latter is very simple, exhibiting a repetition of the general structure of the individual eyes of the compound organ of vision, but rather more rudimentary. The hard parts of the compound eyes of the Trilobites, especially *Asaphus*, here also described, show the closest possible homology with those of *Limulus*; the ocellus of the Myriapods, on the contrary, is, as a whole, entirely unlike that of *Limulus*. The author also describes the general anatomy, internal structure, and histology of the brain and œsophageal and abdominal ganglia; histologically, the brain agrees with that of the higher *Crustacea*, in having similar large and small ganglion-cells, but topographically its internal structure is constructed on a wholly different plan. The paper is concluded by some further contributions to the embryology of *Limulus*, describing the blastodermic skin, or serous membrane, the first appearance and development of the nervous system and digestive canal, the origin of the liver, the structure of the testes, and the development of the spermatozoa. Transverse sections of the whole animal and injections of the arteries are represented on the plates. The author comes to the conclusion that *Limulus* really belongs to the *Crustacea*, but forms with the Trilobites, a special subclass "*Palæocarida*," in which there are no true antennæ, the gnathopods are modified mouth-parts (the last pair possibly representing a pair of thoracic feet), the fore part of the body corresponds to the cephalothorax of the *Decapoda*, the posterior part being truly an abdomen, and the spine simply the last body-segment, or ninth abdominal arthromere. Anniversary Mem. Bost. Soc. 1880, 45 pp., 7 pls.

See also *anteà* (p. 6), "Nervous System" and "Organs of Sense."

ARACHNIDA.

BY

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(Assisted by F. M. CAMPBELL, F.L.S., &c.)

LIST OF GENERAL PUBLICATIONS.

BALFOUR, F. Development of the Araneina. Q. J. Micr. Sci. xx. pp. 167–189.

Contains a very valuable account of the development of the ovum in *Agelena labyrinthica*, in all its stages. The results point to the affinity of Arachnids being more with the *Tracheata* than with the *Crustacea* (*Branchiata*); and that the falces (cheliceræ) are true mandibles, not antennæ, seems pretty certain. [*Cf.* "Studies from the Morphological Laboratory in the University of Cambridge," 1880, pp. 83–106, pls. viii.–x., where the present paper is reprinted.]

——. Comparative Embryology. London: 1880.

Vol. i. pp. 357–379, treats on *Arachnida*. The special history of each group as yet worked out is dealt with: *Scorpionidæ*, p. 357; *Pseudo-scorpionidæ*, p. 359; *Phalangidæ* (of which nothing of the early stages appears to be known), and *Araneina*, p. 361. The treatment of this last Order is as nearly as possible identical with that in the work above recorded (Q. J. Micr. Sci. xx.). The subjects are *Pholcus*, *Epeira*, *Lycosa*, *Clubiona*, *Tegenaria*, and *Agelena*. The history of the germinal layers in this Order is given, pp. 369–375. The conversion of these layers into the various organs agrees closely with that in Scorpions. "Summary and general conclusions" are given, pp. 376 & 377. It is stated in these that Scorpions and Spiders agree more nearly in their embryonic forms than Scorpions and Chelifers, which is probably because of the very early stage at which the latter are hatched. The larvæ of the *Acarina* are much modified larval forms, but it is not easy to assign a meaning to the hexapodous stage generally passed through. The cheliceræ (falces) are not homologous with the antennæ of *Insecta*, being always developed on the post-oral segments, and corresponding to the mandibles of Insects. Arachnid appendages are, therefore, much more primitive in their present condition than those

of Insects, and the ancestors of the present *Insecta* and *Arachnida* must have diverged from a common stem of *Tracheata* at a time when the second pair of maxillæ (equivalent to the first pair of legs in Arachnids) were still organs of locomotion. The order of development of appendages and segments is very different in different ordinal groups, showing that the order of appearance is a matter of embryonic convenience, and not very significant morphologically. The formation of the layers and the embryonic envelopes in the *Tracheata* (in respect to which there is a striking constancy throughout the group) is treated of, pp. 377–379. The authors principally followed and quoted are: Metschnikoff, Rathke, Stecker, Balbiani, Balfour, Barrois, Claparède, Herold, Ludwig, and P. van Beneden.

Bertkau, P. Verzeichniss der bisher bei Bonn beobachteten Spinnen. Verh. Ver. Rheinl. xxxvii. pp. 215–343, pl. vi.

315 species of *Araneidea*, belonging to various families, and distributed among 106 genera, are recorded. Fam. *Theraphosidæ* (*Atypidæ*, auct.), 1 gen. 2 spp. *Dysderidæ*, 3 gen. 5 spp. *Salticidæ* (*Attidæ*, auct.), 12 gen. 26 spp. *Thomisidæ* (*Thomisidæ* et *Sparassidæ*, auct.), 13 gen. 42 spp. *Drassidæ* (*Drassidæ* et *Anyphænidæ*, auct.), 16 gen. 73 spp. *Lycosidæ* (includes *Oxyopidæ*), 8 gen. 31 spp. *Agelenidæ* (*Agelenidæ*, *Argyronetidæ*, et *Hahniidæ*, auctt.), 9 gen. 16 sp. *Dictynidæ* (*Dictynidæ* et *Amaurobiidæ*, auct.), 4 gen. 11 spp. *Uloboridæ*, 2 gen. 2 spp. *Eresidæ*, 1 gen. 1 sp. *Scytodidæ*, 2 gen. 2 spp. *Theridiidæ* (*Micryphantidæ*, *Theridiidæ*, et *Pachygnathidæ*, auct.), 28 gen. 68 spp. *Epeiridæ*, 8 gen. 35 spp. Five species (belonging to *Philodromus*, *Drassus*, *Phrurolithus*, *Trochosa*, and *Lophomma* [*Walckenaera*, Bl., pt.]), are described as new.

——. Verzeichniss der von Prof. Ed. van Beneden auf seiner im Auftrage der Belgischen Regierung unternommen wissenschaftlichen Reise nach Brasilien und La Plata im Jahren 1872–73 gesammelten Arachniden. Mém. cour. Ac. Belg. 4to, xliii. pp. 1–120, pls. i. & ii..

Contains a record and description of 3 species of *Scorpionidea* (1 new), 58 species of *Araneidea* (2 gen. and 36 spp. new), 14 of *Phalangidea* (*Opiliones*, auct.; 2 gen. and 6 spp. new), and 4 spp. of *Acaridea*.

Cambridge, O. P. On some new and little known Spiders of the genus *Argyrodes*. P. Z. S. 1880, pp. 320–342, pls. xxviii.–xxx.

Describes 27 species, of which 21 are new.

Croneberg, A. Ueber die Mundtheile der Arachniden. Arch. f. Nat. xlvi. pp. 285–300, pls. xiv.–xvi.

An important paper on the mouth-parts of the *Arachnida*, comparing in detail those of the various Orders of that Class.

Karsch, F. Arachnologische Blätter (i.). Z. ges. Naturw. liii. pp. 373–409, pl. xii.

This paper is divided into 10 sections, and treats of numerous species and genera (some new) of various Orders and Families of *Arachnida*, from many different parts of the world.

[Karsch, F.] Mittheilung über die von Herrn Dr. O. Finsch während seiner polynesischen Reise gesammelten Myriopoden und Arachniden. SB. Nat. Fr. 1880, pp. 77–84.

Records 19 species of *Arachnida* (1 *Scorpionidea*, 18 *Araneidea*), 10 new, with characters of a new genus of *Thomisidæ* (*Pedinopistha*).

Koch, Ludwig. Die Arachniden Australiens nach der Natur beschrieben und abgebildet. Part xxvi. pp. 1157–1212, pls. ci.–civ. Nürnberg : 1880.

This continuation of the work [*Cf.* Zool. Rec. xvi. *Arachn.* p. 4] contains descriptions of 17 spp. nn. of *Salticidæ*, and characterizes a new genus, *Opisthoncus*.

Keyserling, Eugen [Graf] von. Neue Spinnen aus Amerika. Verh. z.-b. Wien, xxix. pp. 293–349, pl. iv.

36 species of various families and genera are described (3 genera and 30 spp. new).

——. Die Spinnen Amerikas. *Laterigradæ*. Nürnberg : 1880, pp. 1–283, pls. i.–viii.

Describes and records 154 species, belonging to 27 genera (6 genera and 120 species new).

Mégnin, P. Les parasites et les maladies parasitaires, chez l'homme, les animaux domestiques, et les animaux sauvages avec lesquels ils peuvent être en contact. Paris : 1880, pp. 1–440, with 63 woodcuts and 26 pls.

Chap. v. pp. 109–439, is devoted to the *Arachnida*, which consist wholly of *Acaridea*. [For details, see special part.]

Moschen, L. Aggiunto alla fauna Aracnologica del Trentino. Atti Soc. Pad. vi. pp. 28–31.

Five known species of *Araneidea*, and one of *Scorpiones* are given as new to the fauna of the Trentino. A list is added (pp. 29 & 30) of *Araneidea* from Povereto, belonging to 54 known species, distributed among 10 families and 28 genera. Four known species of *Scorpiones* are also recorded from the Trentino.

Pavesi, Pietro. Studi sugli Aracnidi Africani. i. Aracnidi di Tunisia. Ann. Mus. Genov. xv. pp. 283–388.

In the Introduction (pp. 283–296), various expeditions and other means by which materials have been obtained are mentioned. Africa is divided into five arachnological provinces—i. *Mediterranean*, extending nearly to the Tropic of Cancer, and including the Azores, Madeira, Canaries, and Cape de Verde Islands; ii. *Oriental*, or Central African; iii. *Western African*, extending from the Gambia to the Congo ; iv. *The Southern*, included by a line drawn from Kalahini to Limpopo, and comprising a portion of the eastern coast to the Mozambique ; v. *Malagasic*, the Lemur country, with Madagascar. The numerous existing works and papers on African *Arachnida* are noticed, and a list given. The object of the present work is stated to be to bring together all these materials, and present them on one plan and method in accordance with the above-mentioned zoological

provinces. The Arachnids recorded from Tunis are—*Scorpionidea*, 5 species; *Solpugidea* (*Solifugæ*, auct.), 4; *Phalangidea* (*Opiliones*, auct.), 4; *Araneidea*, 96 (2 genera and 10 species new); and *Acaridea*, 5. At the end of the paper these results are compared with the faunæ of other adjacent regions, whence it appears that the arachnological fauna of Tunis bears very close relation to those of Algeria and Italy.

Simon, Eugène. Études Arachnologiques. 11e Mémoire. xvii. Arachnides recueillés aux environs de Pékin. Ann. Soc. Ent. Fr. (5) x. pp. 97–128, pl. iii.

Contains a record of 36 species of *Araneidea* (2 genera and 23 species new), 1 of *Scorpionidea* (new), and 1 of *Phalangidea* (new). 9 of the known species of *Araneidea* are identical with European species, 2 others being doubtful, while some others again are closely allied to European forms which they appear to replace.

——. Matériaux pour servir à une faune Arachnologique de la Nouvelle Calédonie. CR. Ent. Belg. xxiii. pp. clxiv.–clxxv.

37 species of *Araneidea* (2 genera and 18 species new), 2 of *Scorpiones*, 1 of *Pseudoscorpiones* (new), and 1 of *Phalangidea* (new), are recorded or described.

——. Arachnides nouveaux de France, d'Espagne, et d'Algérie. Premier Mémoire. Bull. Soc. Zool. Fr. iv. [1879], pp. 251–263.

13 new species of *Araneidea*, 1 of *Pseudoscorpiones* (*Chernetes*, auct.), and 1 of *Phalangidea* (*Opiliones*, auct.), are described from various parts of France.

Taczanowski, Ladislas. Les Aranéides du Pérou Central (suite). Hor. Ent. Ross. xv. pp. 102–136, pls. i. & ii. [*Cf.* Zool. Rec. xvi. *Arachn.* p. 6.]

Describes or records 31 species of *Epeiridæ* and *Gasteracanthidæ*; 2 genera and 21 species, chiefly of the latter, new.

Taschenberg, E. L. Praktische Insekten-kunde. Bremen : 1879–80.

Part v. pp. 134–164, includes the *Arachnida*, under the heading of "Flügellose Gliederfüsser, mit welchen der Mensch in Gleicherweise, wie mit den vorher auf geführter Insekten, in nähere Berührung kommt." Descriptions, life-history, and habitat are given of various well-known species of *Acaridea*, *Araneidea*, and *Pseudoscorpiones*.

Anton Stecker (MT. african. Ges. ii. pp. 78–80) refers to some Arachnids observed at Sokna (Tripoli), and notices a case of protective resemblance in the nest of an *Epeira* covered with débris and the elytra of beetles, &c.

Léon Becker (CR. Ent. Belg. xxiii. pp. xii.–xiv.) gives a list of 58 known species of *Araneidea*, distributed among 8 families and 31 genera, 1 of *Pseudoscorpiones*, and 1 of *Scorpiones*, collected in Hungary by Horváth. This list is in continuation of several others (*l. c.* 1878–79). Also (pp. cxxxix.–cxlii.) a list of *Arachnida* found at Porquerolles, France. *Araneidea*, 13 families and 96 species; *Scorpiones*,

1; *Pseudoscorpiones* (as *Chernetes*, fam. *Cheliferidæ*), 3; *Phalangidea* (*Opiliones*), 3; all known.

The same author, under the title of "Excursions en Belgique" (CR. Ent. Belg. xxiii. pp. cxlii. & cxliii.) records various species of *Araneidea*, *Pseudoscorpiones*, and *Phalangidea*, either new to Belgium or otherwise of local interest; and, under heading of "Communications Arachnologiques" (*l. c.* pp. clxxxviii. & clxxxix.), records 12 species of *Araneidea* and 3 of *Pseudoscorpiones* from Mariemburg; 1 of the former (*Linyphia cristata*, Menge) new to Belgium.

Eugène Simon, Bull. Soc. Ent. Fr. (5) x. p. xxxvi., gives a list of 16 Arachnids (12 *Araneidea*, 1 *Scorpiones*, 1 *Pseudoscorpiones*, and 1 *Phalangidea*) found at Sebenico, Dalmatia, by Munier Chalmas; 1 species (*Araneidea*) being new.

Also (*l. c.* pp. xlvii. & xlviii.) lists of Arachnids found in the immediate environs of Alexandria, Egypt: *Araneidea* 14, *Pseudoscorpiones*, 1; all known species.

ARANEIDEA.

Barrois, J. Recherches sur le développement des Araignées. J. Anat. Phys. xiv. p. 527; translated by W. E. Dallas, Ann. N. H. (5) v. pp. 197–211, pl. ix.

The Spiders investigated are *Tegenaria domestica*, C. Koch, *Epeira diadema*, C. L. K., and some species of *Lycosa* (not named). The works of Balbiani, Ludwig, Claparède, Metschnikoff, and others, are referred to. Attention is drawn to a Limuloid stage of development, and to a vitelline vesicle corresponding to that of fishes.

P. Bertkau (Vorgetragen in der Herbstversammlung des naturhistorischen Vereins am 3 October, 1880, im Bonn), in reference to the Spiders found near Bonn (*vide anteà*, p. 2), remarks on the wide geographical distribution of some of them, and compares those of the Bonn district with those of Münster and its neighbourhood recorded by F. Karsch (1873), of Nürnberg by L. Koch, Danzig by A. Menge, Silesia by Fickert (1876), and Switzerland by Lebert. Remarks are also made upon the comparative sizes of the sexes in some Spiders, with other interesting and important observations on structure, &c.

C. V. Boys describes the influence of a tuning-fork on a Garden Spider; Nature, xxiii. p. 149.

F. M. Campbell (J. L. S. xv. pp. 152–155, with woodcut figures) writes upon the stridulating organs of Spiders, quotes Westring, Wood-Mason, Darwin, and O. P. Cambridge, and describes and figures the supposed stridulating apparatus of *Steatoda guttata*, Wid., and *Linyphia tenebricola*, Wid., that of the former being seated beneath the fore extremity of the abdomen, and hinder extremity of the thorax, while that of the latter is on the outer side of the falces and opposed humeral joints of the palpi. The apparatus is, in each case, found in both sexes, whereas Westring speaks of it in the male only.

The same author (*l. c.* pp. 155–158, with woodcuts) notes certain

glands in the maxillæ of *Tegenaria domestica*, Bl. [*T. guyoni*, Guér.], supposed to be salivary, and varying in number, 13–80, according to age and development.

J. H. Payne, in a note on a "Tarantula" (P. Z. S. 1880, p. 421), states that a mare died from the bite of a Spider at Cape Town, allied (on the authority of O. P. Cambridge) to *Tegenaria guyoni*, Guér.

F. M. Campbell (Tr. Hertford. Soc. i. pp. 37–48), in "General Observations on Spiders," divides them into those (i.) on systematic arrangement, (ii.) general anatomical structure, (iii.) life-history, (iv.) senses, (v.) habits, (vi.) general remarks.

G. Hind (J. Quek. Club, v. pp. 10 & 11) gives a method for collecting and mounting Spiders' webs for the microscope, and offers an explanation [which can scarcely be accepted as sufficient] of the production of the viscid beads on the lines of Epeirid snares. J. Fenner, in reference to G. Hind's paper, gives another method which he thinks is more effective ; English Mechanic, xxxi. p. 135.

M. MacLeod, Bull. Ac. Belg. (2) l. pp. 110–113, writes on the "Poison-organs" of Spiders, chiefly in respect to their structural characters, and refers to *Epeira diadematа*, *Agelena labyrinthica*, and *Tegenaria domestica*.

T. Workman (P. Belfast Soc. April, 1880, pp. 1–16, with 1 plate), in a paper on "Irish Spiders," gives a short conspectus of the families and genera, in which are comprised the species (112) contained in the subsequent list. More than half are included in the family *Theridiidæ*.

Salensky.—F. M. Balfour, in "Studies from the Morphological Laboratory in the University of Cambridge" (1880), p. 106, refers to an important paper (written in Russian by this author, on the "Development of the Araneina") published in 1871, by the Kiew Society of Naturalists, and abstracted in JB. Anat. Physiol. 1878. The author confirms Balfour's account of the development of the heart, and describes the final stages of the provisional abdominal appendages (not observed by Balfour), the 3rd and 4th pairs of which he believes to become the spinners, while the anterior are developed into the breathing organs.

Eugène Simon, Bull. Soc. Ent. Fr. (5) ix. [1879] pp. xxxvi. & xxxvii., gives a list of 13 species of *Araneidea* found near Constantinople, 1 (Epeirid) new, (*op. cit.* x. p. xxi.) from the environs of Paris, 10 known species of *Araneidea*, of which all, excepting 1, had hitherto been found only in the Mediterranean region.

J. H. Emerton (Am. Nat. xiv. p. 595, 1 fig., woodcut) describes the copulation of a male and female *Xysticus* (unnamed).

Eugène Simon, "Revision de la Famille des *Sparassidæ*," Act. Soc. L. Bord. xxxiv. pp. 223–351, revises his family *Sparassidæ* [which is included, *infrà*, in family *Thomisidæ*]. It comprises *Selenops*, *Delena*, *Sparassus*, *Olios*, and *Clastes*, Walck., and various other allied genera since established by other authors: as *Plator*, E. Simon, *Hemiclæa* and *Holconia* (*Voconia*), Thor., *Zachria*, *Prychia*, *Isopeda*, and *Palystes*, L. Koch, *Heteropoda*, Latr., *Pelmopoda*, Karsch, *Pandercetes*, L. Koch, *Micrommata*, Latr., *Sarotes*, Sund., *Cebrennus* (*Cebrenis*), E. Sim., *Themeropis*, L. Koch. 16 new genera and 41 new species are here characterized.

The total species recorded, exclusive of 15 unknown to the author, are 207. Analytical tables of genera and species are also added (cf. Simon, Bull. Soc. Ent. Fr. 5, x. No. 93).

A. W. M. Van Hasselt, Versl. Ak. Amst. xv. pp. 196–198, observes that Menge based a new genus (*Anetes*) on an imperfect or injured example, much in the same way as Schiödte did in respect to *Liphistius*. [Cf. *Theraphosidæ*, infrà. There is this broad distinction between Schiödte's and Menge's errors, that however inapplicable the name may be, the genus *Liphistius* is itself a good one, while *Anetes* fails entirely, being based on a young example of a known Spider. *Cf.* also T. Thorell, Sv. Ak. Handl. (n. f.) xiii. 1875, note to p. 284.]

Theraphosidæ.

G. H. Bryan, Sci. Gos. xvi. pp. 60, 61, 127, & 128, remarks on the nests of Trapdoor Spiders and on their makers, from original observation, quoting also from Kirby & Spence, J. G. Wood, J. T. Moggridge, and O. P. Cambridge. Woodcut figures from the latter source are given.

Liphistius desultor, Schiödte. A. W. M. Van Hasselt, Versl. Ak. Amst. xv. pp. 186–196, records an example (provided with spinners) from Sumatra, and comes to the conclusion that this Spider and *L. mammillanus*, Cambr., are identical, and that the supposed absence of the spinners in *L. desultor*, Sch., is owing either to incorrect observation or to natural deformity in Schiödte's example.

Homœomma familiaris [*-re*], sp. n., P. Bertkau, Mém. cour. Ac. Belg. 4to, xliii. p. 37, pl. i. fig. 11, Tijuca.

Pachypelma, g. n., for *Mygale oculata*, Nic.; F. Karsch, Z. ges. Naturw. liii. p. 389, Chili.

Orthothricus, g. n.; type, *O. vulpinus*, sp. n., *id. l. c.* p. 390, Chili and Valparaiso.

Lasiodora benedeni, sp. n., Bertkau, *l. c.* p. 34, fig. 10, Chapeo d'Uvas.

Theraphosa, Walck., characterized; Karsch, *l. c.* p. 844.

Theraphosa blondii, Latr., described from Surinam, *id. l. c.* p. 844, and *T. panamana*, sp. n., *id. l. c.* p. 845, Chiriqui, Central America.

Tapinauchenius reduncus, sp. n., F. Karsch, *l. c.* p. 387, Costa Rica.

Trechona adspersa, sp. n., P. Bertkau, *l. c.* p. 30, fig. 9, Pedra Açu.

Crypsidromus fallax, sp. n., P. Bertkau, *l. c.* p. 27, fig. 8, Tijuca.

Ischnocolus tunetanus, sp. n., Pavesi, Ann. Mus. Genov. xv. p. 362, Tunis.

Acanthogonatus, g. n. (near *Leptopelma*, Auss.), p. 391, for *A. franki*, sp. n., p. 392, F. Karsch, *l. c.*, Chili.

Diplura gymnognatha, sp. n., P. Bertkau, *l. c.* p. 21, fig. 5, Pedra Açu.

Thalarothele, g. n.; allied to *Diplura*, *Macrothele*, and *Ischnothele* (nearest to the two latter); for *T. fasciata*, sp. n., P. Bertkau, *l. c.* p. 24, fig. 6, Tijuca.

Macrothele annectens, sp. n., *id. l. c.* p. 26, Pedra Açu.

Nemesia anomala, p. 17, fig. 3, and *N. fossor*, p. 19, fig. 4, Pedra Açu, spp. nn., *id. l. c.*

Cyrtauchenius maculatus, sp. n., Bertkau, *l. c.* p. 14, fig. 7, Tijuca.
Pachylomerus rugosus, sp. n., F. Karsch, *l. c.* p. 388, Costa Rica.

Filistatidæ.

Filistata capitata, Hentz (= *Teratodes depressus*, C. L. Koch), p. 345, pl. iv. fig. 33, and *T. hibernalis*, ibid. p. 248, Eugen von Keyserling, Verh. z.-b. Wien, xxix. Mississippi.

Miltia letourneuxi, sp. n., E. Simon, Bull. Soc. Ent. Fr. (5) x. p. lvi., Alexandria.

Drassidæ.

Tylophora, g. n.; allied to *Chrysothrix*, Sim., and *Hypsinotus*. L. Koch; for *T. antinorii*, sp. n., Pietro Pavesi, Rend. Ist. Lomb. (2) xiii. Equatorial Africa; *cf.* same author, Ann. Mus. Genov. xv. pp. 344 & 345.

Gnaphosa zeugitana, p. 352, and *G. recepta*, p. 355, P. Pavesi, Ann. Mus. Genov. xv. spp. nn., Tunis. *G. sinensis*, sp. n., Eugène Simon, Ann. Soc. Ent. Fr. (5) x. p. 121, pl. iii. figs. 9, 22, 23, & 24, Pekin. *G. luctifica*, sp. n., *id.* Bull. Soc. Zool. Fr. iv. [1879] p. 259, Ile de Porquerolles. *G. spinosissima*, Sim., male new to science; P. Pavesi, *l. c.* p. 357, Tunis.

Pythonissa flavitarsis, sp. n., E. Simon, Ann. Soc. Ent. Fr. (5) x. p. 120, pl. iii. fig. 25, Pekin.

Prosthesima oryx, p. 260, Oasis of Biskra, and *P. stolida*, p. 261, Algiers, spp. nn., E. Simon, Bull. Soc. Zool. Fr. iv. [1879]. *P. foveolata*, sp. n., *id.* Ann. Soc. Ent. Fr. (5) x. p. 117, pl. iii. fig. 17, Pekin. *P. kerimi*, p. 348, and *P. incompta*, p. 350, spp. nn., P. Pavesi, spp. nn., Ann. Mus. Genov. xv., Tunis.

Drassus myogaster, sp. n., Bertkau, Verh. Ver. Rheinl. xxxvii. p. 267, pl. vi. fig. 5, Bonn. *D. pugnans*, p. 118, figs. 20 & 21, and *D. rebellatus*, p. 119, figs. 18 & 19, spp. nn., E. Simon, Ann. Soc. Ent. (5) x. pl. iii. Pekin. *D. perexiguus*, sp. n., *id.* CR. Soc. Ent. Belg. xxiii. p. clxxiii., Noumea.

Leptodrassus scutatus, sp. n., E. Simon, Bull. Soc. Zool. Fr. iv. [1879] p. 262, Oasis of Biskra.

Hypsinotus cruentus, p. 50, fig. 14, Rio Janeiro, *H. loricatus*, p. 52, fig. 15, Pedra Açu, *H. inermis*, p. 54, fig. 16, Tijuca, *H. plumipes*, p. 54, fig. 17, St. John del Ré or Theresopolis, and *H. selysi*, p. 111, Barbacena, spp. nn., P. Bertkau, Mém. cour. Ac. Belg. 4to, xliii. pl. i.

Clubiona paduana, sp. n., F. Karsch, Z. ges. Naturw. liii. p. 379, pl. xii. fig. 8, Punta Arenas, Straits of Magellan. *C. venusta*, sp. n., P. Pavesi, Ann. Mus. Genov. xv. p. 342, Tunis.

Corinna gigantea, sp. n., F. Karsch, Z. ges. Naturw. liii. p. 375, pl. xii. fig. 3, Brazil. *C. rubripes*, C. L. Koch, palpus figured, fig. 1, and *C. nigricans*, ibid., palpus and tarsal claw figured, fig. 2, F. Karsch, *l. c.* pl. xii.

Corinnomma, g. n.; type, *Corinna severa*, Thor., *id. l. c.* pp. 374 & 375.

Thargalea, g. n., p. 374; types, *Corinna memnonia*, Colombia, and *C. ungulata*, Pennsylvania, p. 376, C. L. Koch, *id. l. c.*

Mandane, g. n. for *M. sudana*, sp. n., *id. l. c.* p. 377, pl. xii. fig. 4, Ada Foah, Hungary.

Megalostrata, g. n., pp. 374 & 377, for *M. venefica*,, sp. n., p. 378, pl. xii. fig. 5, *id. l. c.*, Costa Rica.

Corinnidæ. Subfamily of *Drassidæ*, formed for *Corinna*, *Corinnomma*, *Thargalea*, *Mandane*, and *Megalostrata*; id. *l. c.* p. 374.

Chiracanthium molle, p. 330, fig. 25, and *C. granadense*, p. 331, fig. 26, Colombia, with *C. paucalense*, p. 332, fig. 27, Paucal, Peru, spp. nn., E. von Keyserling, Verh z.-b. Wien, xxix. pl. iv.

Castianeira, g. n., for *C. rubicunda*, sp. n., *id. l. c.* p. 335, pl. iv. fig. 28, Colombia.

Anyphæna mollicoma, p. 323, fig. 21, and *A. mandibularis*, p. 324, fig. 22, Sta Fé de Bogota, *A. furcata*, p. 326, fig. 23, Peru, and *A. pilosa*, p. 327, fig. 24, Colombia, spp. nn., *id. l. c.* pl. iv. *A. trivittata*, sp. n., P. Bertkau, Mém. cour. Ac. Belg. 4to, xliii. p. 44, pl. i. fig. 12, Pedra Açu.

Heteromma, g. n. Allied to *Anyphæna*; for *H. fuegiana*, sp. n., F. Karsch, Z. ges. Naturw. liii. p. 380, pl. xii. fig. 9, Punta Arenas.

Agræca aureo-plumata, sp. n., E. von Keyserling (in Fam. *Agelenidæ*), Verh. z.-b. Wien, xxix. p. 321, pl. iv. fig. 20, Colombia.

Liocranum lubricum, E. Simon, Ann. Soc. Ent. Fr. (5) x. p. 122, pl. iii. figs. 26 & 27, Pekin, and *L. alexandrinum*, id. *tom. cit.* Bull. p. xcix., Alexandria, spp. nn. *L. hæmorrhoum*, sp. n., P. Bertkau, Mém. cour. Ac. Belg. 4to, xliii. p. 47, Theresopolis (or St. John del Ré). *L. spinulosum*, Thor., ♂ new to science, P. Pavesi, Ann. Mus. Genov. xv. p. 341, Tunis.

Ctenophthalmus, g. n., p. clxxiii. Allied to *Zora* (*Hecaerge*, Bl.), for *C. lineatus*, p. clxxiv., sp. n., E. Simon, CR. Ent. Belg. xxiii., Noumea.

Zoropsis albertisi, sp. n., P. Pavesi, Ann. Mus. Genov. xv. p. 338, Tunis.

Uduba, g. n. Allied to *Agræca*, Westr., and *Uliodon*, L. Koch, for *Olios madagascariensis*, Vins., and *O.* (*Zoropsis*, Sim.) *rufipes*, Lucas (Canary Islands), E. Simon, Act. Soc. L. Bord. xxxiv. p. 343.

Phrurolithus scalaris, sp. n., P. Bertkau, Verh. Ver. Rheinl. xxxvii. p. 273, pl. vi. fig. 6.

Adcatomus, g. n., approaches the *Thomisidæ* (*Heteropoda* and *Sparassus*), p. 386, for *A. ciudadus*, sp. n., p. 387; F. Karsch, Z. ges. Naturw. liii. Lima.

Dictynidæ.

Diotima, g. n., allied to *Amaurobius*, *Titanæca*, *Dictyna*, and *Lethia*, but differs from all in various particulars; for *D. hirsutissima*, sp. n. E. Simon, Bull. Soc. Ent. Fr. (5) x. p. lv. Bouches du Rhone, Martigues.

Dinopidæ.

Dinopis granadensis, sp. n., E. von Keyserling, Verh. z.-b. Wien, xxix. p. 343, pl. iv. fig. 32, Colombia.

Agelenidæ.

Cybœus varius, sp. n., E. von Keyserling, *l. c.* p. 319, fig. 19, Peru. *C. antarcticus*, sp. n., F. Karsch, Z. ges. Naturw. liii. p. 379, pl. xii. fig. 7, Punta Arenas.

Thaida, g. n. Near *Cybœus*; for *T. peculiaris*, sp. n., F. Karsch, Z. ges. Naturw. liii. p. 398, pl. xii. fig. 14, Chili.

Cœlotes munieri, sp. n., E. Simon, Bull. Soc. Ent. Fr. (5) x. p. xxxvi., Sebenico (Dalmatia). *C. plancii*, p. 115, figs. 12, 13, & 14, *C. modestus*, p. 116, fig. 15, and *P. spinivulva*, p. 116, fig. 16, spp. nn., *id.* Ann. Soc. Ent. Fr. (5) x. pl. iii., Pekin.

Scytodidæ.

Dictis nigro-limbata, sp. n., E. Simon, Ann. Soc. Ent. Fr. (5) x. p. 123, Pekin.

Theridiidæ.

Argyrodes flavescens, p. 321, fig. 1, Ceylon, *A. concinna*, p. 322, fig. 2, Amazons, *A. samoensis*, p. 323, fig. 3, Samoa, *A. argentata*, p. 325, fig. 5, East Indies, Amazons, Ceylon, Madagascar, *A. jucunda*, p. 326, fig. 6, Parana, *A. antipodiana*, p. 327, Sydney, and New Zealand, *A. lugens*, p. 327, figs. 2 *a'*, 2 *b'*, & 2 *c'*, pl. xxviii., Amazons, *A. abscissa*, p. 328, fig. 7, Madagascar, *A. procrastinans*, p. 330, fig. 9, Bombay, *A. scintillulana*. p. 332, fig. 10, Ceylon, *A. nasuta*, p. 333, fig. 11, Ceylon, *A. bicornis*, p. 334, fig. 12, Parana, pl. xxix. *A. sextuberculata*, p. 335, fig. 13, and *A. ululans*, p. 336, fig. 14, Amazons, *A. minax*, p. 336, fig. 15, Madagascar, *A. affinis*, p. 337, fig. 16, Parana, *A. obtusa*, p. 338, fig. 17, *A. amplifrons*, p. 339, figs. 17 *a'*, *d'*, *e'*, 17 *b'*, *c'*, *d'*, *e'*, *f'*, *g*, *h*, and *A. infelix*, p. 340, fig. 18, Amazons, *A. felix*, p. 340, fig. 19, Parana, and *A. nigra*, p. 341, fig. 20, Ceylon, pl. xxx., spp. nn., O. P. Cambridge, P. Z. S. 1880. *A. nephilæ*, Tacz., described and figured, from the Amazons, *id. l. c.* p. 324, pl. xxviii. fig. 4. *A. rostrata*, Bl., noted and figured, from the Seychelle Islands; *id. l. c.* p. 325, figs. 4 *a'* & 4 *b'*. *A. fissifrons*, Cambr., Ceylon, = *A. inguinalis*, Thor., Amboina, the former figured; *id. l. c.* p. 329, pl. xxix. fig. 8 *a'*. *A. amboinensis*, Thor., described and figured, from Amboina; *id. l. c.* p. 331, pl. xxix. fig. 8. *A. epeiræ*, Sim., figured; *id. l. c.* pl. xxviii. fig. 3 *a*. *A. inguinalis*, Thor., figured; *id. l. c.* pl. xxix. fig. 9 *a'*.

Theridion suave-olens, p. 256, Seine-et-Marne, Fontainebleau, Gironde, &c., and *T. leuco-plagiatum*, p. 258, South France, generally distributed, spp. nn., E. Simon, Bull. Soc. Zool. Fr. iv. [1879]. *T. todinum* and *T. ludius*, p. clxx., and *T. flavo-aurantiacum*, p. clxxi., spp. nn., Noumea, *id.* CR. Ent. Belg. xxiii. *T. hæmorrhoidale*, sp. n., P. Bertkau, Mém. cour. Ac. Belg. 4to, xliii. p. 78, Rio Janeiro. *T. palustre*, sp. n., P. Pavesi, Ann. Mus. Genov. xv. p. 328, Tunis. *T. dromedarius*, sp. n., E. Simon, Bull. Soc. Ent. Fr. (5) x. p. xcix., Alexandria.

Nesticus eremita, sp. n., E. Simon, Bull. Soc. Zool. Fr. iv. [1879] p. 258, Grotto of Fades, near Hyères.

Lithyphantes atrocyaneus, sp. n., E. Simon, CR. Ent. Belg. xxiii. p. clxxi., Noumea.

Euryopis dentigera, p. 251, South France, Basses-Alpes, *E. argenteo-maculata*, p. 252, France, various localities, *E. sericata*, p. 253, Briançon, *E. procax* and *E. nigro-reticulata*, p. 254, Seine-et-Marne, Fontainebleau, with *E. pyramidalis*, p. 255, Basses Pyrénées, La Rhune, spp. nn., E. Simon, Bull. Soc. Zool. Fr. iv. [1879].

Enoplognatha, g. n.; type, *Theridion mandibulare*, Lucas, South Europe, Algiers, &c., P. Pavesi, Rend. Ist. Lomb. (2) xiii. [This Spider has been placed in various genera of *Theridiidæ*, and also in *Epeira*, by different authors.] *Cf.* also *id.* Ann. Mus. Genov. xv. p. 325.

Erigone plancii, sp. n., E. Simon, Ann. Soc. Ent. Fr. (5) x. p. 113, pl. iii. figs. 10 & 11, Pekin. *E.* (*Lophomma*, Menge) *vittatum*, sp. n., P. Bertkau, Verh. Ver. Rheinl. xxxvii. p. 306, pl. vi. fig. 10.

Oroodes (*Stegosoma*, Cambr.) *musivus*, sp. n., E. Simon, CR. Ent. Belg. xxiii. p. clxxi., Noumea.

Taphiassa, g. n. Allied to *Linyphia* in its aspect, but differs in various material points of structure, in which it is nearer to *Theridion*. For *T. impressa*, sp. n., *id. l. c.* p. clxxii., Noumea.

Linyphia cristata, Menge, new to Belgium; L. Becker, CR. Ent. Belg. xxiii. p. clxxxix.

Epeiridæ.

Meta triangularis, p. 315, fig. 16, Peru, and *M. nigriventris*, p. 316, fig. 17, Colombia, spp. nn., E. von Keyserling, Verh. z.-b. Wien, xxix. pl. iv.

Eugnatha isidis, sp. n., E. Simon, Bull. Soc. Ent. Fr. (5) x. p. xcviii., Alexandria.

Tetragnatha cladognatha, sp. n., P. Bertkau, Mém. cour. Ac. Belg. 4to, xliii. p. 79, pl. ii. fig. 27, Rio Janeiro. *T. olindana*, sp. n., F. Karsch, SB. nat. Fr. 1880, p. 81, Olinda. *T. illinoiensis*, sp. n., E. von Keyserling, *l. c.* p. 318, fig. 18, Illinois.

Cyclosa punctata, sp. n., E. von Keyserling, *l. c.* p. 312, pl. iv. fig. 14, New Friburg. *C. pusilla*, sp. n., E. Simon, CR. Ent. Belg. xxiii. p. clxviii., Noumea.

Singa abbreviata, p. 301, fig. 5, and *S. duodecim-guttata*, p. 302, fig. 6, spp. nn., E. von Keyserling, *l. c.* pl. iv., Colombia.

Herennia sampitana, sp. n., F. Karsch, Z. ges. Naturw. liii. p. 381, Sampit, Borneo.

Argiope (as *Argyopes*) *hirta*, sp. n., L. Taczanowki, Hor. Ent. Ross xv. p. 103, pl. i. fig. 23, Central Peru.

Epeira maculata, Keys., described, E. von Keyserling, *l. c.* p. 304. *E. punctillata*, p. 304, fig. 7, Illinois, *E. baltimoriensis*, p. 305, fig. 8, Baltimore, *E. unanima*, p. 306, fig. 9, *E. uniformis*, p. 307, fig. 10, *E. venustula*, p. 308, fig. 11, *E. veles*, p. 310, fig. 12, and *E. alticeps*, p. 311, fig. 13, New Friburg, spp. nn., *id. l. c.* pl. iv. *E. flavicoma*, p. clxviii. Canala, *E. noumeensis* and *E. savesi*, p. clxix., Noumea, E. Simon, CR. Ent. Belg. xxiii. *E. biplagiata*, p. 86, fig. 30, Theresopolis, *E. cærulea*, p. 87,

fig. 31, Rio Grande, *E. undulata*, p. 89, fig. 32, Copa Cobana, and *E. 12-tuberculata*, p. 91, fig. 33, Tijuca, Rio Janeiro, &c., spp. nn., P. Bertkau, Mem. cour. Ac. Belg. 4to, xliii. pl. ii. *E. turcica*, sp. n. (allied to *E. adianta*, C. L. Koch), E. Simon, Bull. Soc. Ent. Fr. (5) ix. [1879] p. xxxvi., Constantinople.

Larinia rubro-guttata, sp. n., E. von Keyserling, *l. c.* p. 314, pl. iv. fig. 15, Peru.

Gasteracanthidæ.

Eurysoma scutatum, Perty, described and figured, from Cayenne, Colombia, and Peru ; E. von Keyserling, *l. c.* p. 293, fig. 1.

Cyrtarachne cornigera, Hentz, described, from New Orleans ; *id. l. c.* p. 300, pl. iv. fig. 4.

Taczanowskia, g. n. Allied to *Cyrtarachne*, Thor., p. 297. For *T. striata*, p. 298, sp. n. ; *id. l. c.* pl. iv. fig. 3, Peru.

Inca, g. n., p. 104. Allied apparently to *Cœrostris*, Thor. Type, *I. branickii*, sp. n., p. 105, pl. i. fig. 24, L. Taczanowski, Hor. Ent. Ross. xv. Amable Maria and Monterico, Central Peru.

Paraplectana semialba, sp. n., E. Simon, CR. Ent. Belg. xxiii. p. clxviii., Noumea. *P. peruana*, sp. n., E. von Keyserling, *l. c.* p. 296, pl. iv. fig. 2, Peru.

Hypophthalma coccinellina, p. 125, fig. 37, Amable Maria, *H. geometrica*, p. 126, fig. 38, Pumamarca, *H. testudinaria*, p. 128, fig. 39, Pattaypampa and Pumamarca, *H.* ? *cordata*, p. 129, fig. 40, and *H.* ? *eresimorpha*, fig. 41, Amable Maria, spp. nn., L. Taczanowski, *l. c.*, Central Peru.

Testudinaria, g. n. (of Gasteracanthid form, &c., in respect to the abdomen, but nearer to the *Theridiidæ* in cephalothorax), p. 131, for *T. geometrica*, p. 133, fig. 42, *T. elegans*, p. 134, fig. 43, and *T. quadripunctatum*, p. 135, fig. 44, spp. nn., *id. l. c.* pl. ii., Amable Maria, Central Peru.

Gasteracantha raimondii, p. 106, figs. 25 & 26, Lima, Chorillos, and Monbana de Nancho, and *G. proboscidea*, p. 108, fig. 27, Lima, Central Peru, spp. nn., *id. l. c.*

Acrosoma occidentalis[*-le*], p. 111, fig. 28, *A. bifida*[*-dum*], p. 112, fig. 29, *A. gibbosa*[*-sum*], p. 113, fig. 30, *A. acutoides*, p. 114, fig. 31, and *A. peruana*, p. 116, fig. 32, Amable Maria, *A. raimondii*, p. 118, Montana de Nancho, *A. agriliformis*[*-me*], p. 119, figs. 33, Pattaypampa and Pumamarca, *A.* ? *timida*[*-dum*], p. 120, fig. 34, Amable Maria and Pattaypampa, spp. nn., *id. l. c.* pl. i., Central Peru.

Tricantha scutellata, p. 122, pl. i. fig. 35, Amable Maria, and *T. albopunctata*, p. 123, pl. ii. fig. 36, Amable Maria and Pattaypampa, spp. nn., *id. l. c.*, Central Peru.

Uloboridæ.

Uloborus sinensis, sp. n., E. Simon, Ann. Soc. Ent. Fr. (5) x. p. 111, figs. 8 & 9, Pekin.

Stephanopidæ.

Stephanopis quinque-tuberculata, Tacz., from Colombia and Cayenne, p. 171, fig. 94, *S. stelloides*, Walck., from Island of Tortola, W. Indies,

p. 173, fig. 95, and *S. ditissima*, Nic., from Chili, p. 175, fig. 96, pl. iii., *S. rugosa*, Tacz., from Panama, Para, Cayenne, and Peru, p. 177, fig. 97, *S. cornuta*, Tacz., p. 183, fig. 100, and *S. trispinosa*, ibid., from Cayenne, p. 184, fig. 101, *S. pentagona*, ibid., from Peru, p. 185, fig. 102, pl. iv., *S. edwardsi*, Nic., from Chili, p. 187, fig. 103, and *S. echinata*, Tacz., from Para, Brazil, and Cayenne, p. 189, fig. 104, pl. iii., described and figured, wholly or in part; Keyserling, Spinnen Amerikas. *S. braziliana*, p. 167, fig. 92, and *S. simoni*, p. 169, fig. 93, Para, pl. iii., *S. furcillata*, p. 179, fig. 98, Brazil, Santa Cruz, *S. badia*, p. 181, fig. 99, Colombia and Sta Fé, Bogota, pl. iv., and *S. lucida*, p. 190, fig. 105, Colombia, pl. iii., spp. nn.; *id. l. c.*

Stephanopoides, g. n., p. 166, closely allied to *Stephanopis*, Cambr., for *S. brasiliana*, p. 167, fig. 92, and *S. simoni*, p. 169, fig. 93, Para, spp. nn.; *id. l. c.* pl. iii.

Ceraarachne, g. n. Allied to *Stephanopis*, Cambr., *Monaeses*, Thor., and *Tmarus*, Sim. For *C. varia*, sp. n., *id. l. c.* p. 192, pl. iv. fig. 106, Colombia.

Eripus heterogaster, Guér., fig. 90, and *E. quinque-gibbosus*, Cambr., fig. 91, p. 164, pl. iii., Brazil, *id.* l. c. [*Eripus*, hitherto made the type of a distinct family by O. P. Cambridge, is, by Keyserling, *l. c.*, more properly included in the present group.]

Thomisidæ.

E. von Keyserling, in "Die Spinnen Amerikas: *Laterigradæ*" (Nürnberg: 1880), divides that group into two families: *Thomisoidæ* and *Sicarioidæ*. The former is subdivided into 3 sub-families: i. *Thomisinæ*; ii. *Philodrominæ*; iii. *Heteropodinæ*. The latter consists only of one genus: *Thomisoides*, Nic. [The preceding family (*Stephanopidæ*) is included by Keyserling in his *Thomisinæ*.]

Coriarachne melancholica, sp. n., E. Simon, Ann. Soc. Ent. Fr. (5) x. p. 110, Pekin. *C. versicolor*, sp. n., Keyserling, *l. c.* p. 53, pl. i. fig. 27, whole of N. America.

Thomisus guadahyrensis, sp. n., Keyserling, *l. c.* p. 76, Peru. *T. tuberosulus*, sp. n., F. Karsch, MT. Munch. ent. Ver. 1880, p. 145, Pungo (Western Africa). *T. granulatus*, Nyassa, *T. blandus*, South Africa, fig. 10, and *T. musculus*, Bintang, fig. 11, pl. xii. p. 382, *id.* Z. ges. Naturw. liii.

Misumena oblonga, p. 79, fig. 41, Baltimore and Illinois, *M. spinosa*, p. 81, fig. 42, Georgia, *M. rosea*, p. 82, fig. 43, Baltimore, Georgia, and Peoria, *M. americana*, p. 85, fig. 44, Baltimore and Peoria, *M. georgiana*, p. 86, fig. 45, Georgia and Cuba, *M. mexicana*, p. 89, fig. 47, *M. dubia*, p. 90, fig. 48, *M. gracilis*, p. 92, fig. 49, *M. splendens*, p. 93, fig. 50, Mexico, *M. varia*, p. 94, fig. 51, Sta Fé, Bogota, and New Granada, *M. pallens*, p. 96, fig. 52, Colombia, Brazil, Guatemala, and Peru, *M. crocea*, p. 97, fig. 53, Colombia and Bahia, *M. bivittata*, p. 99, fig. 54, Uruguay, *M. variegata*, p. 101, fig. 55, *M. punctata*, p. 103, fig. 56, *M. amabilis*, p. 105, fig. 57, *M. rubripes*, p. 106, fig. 58, and *M. conspersa*. p. 107, fig. 59, Peru, spp. nn., *M. vatia*, Clk., p. 101, Mount Washington (N. America), *M.*

citreoides, Tacz., p. 109, fig. 60, Guiana, and *M. nigripes*, id. p. 111, fig. 61, St. Laurent de Maroni; Keyserling, *l. c.* pl. ii.

Synema parvula, Hentz, p. 57, fig. 28, Mexico, *S. brasiliana*, p. 59, fig. 29, Brazil, *S. rubro-maculata*, p. 60, fig. 30, Colombia, *S. nigro-maculata*, p. 61, fig. 31, Georgia and Baltimore, and *S. obscura*, p. 64, fig. 32, Mt. Washington, pl. i., *S. nigra*, p. 65, fig. 33, Amable Maria, Peru, *S. lucida*, p. 67, fig. 34, Imin, Peru, *S. illustris*, p. 68, fig. 35, Monterico, Peru, *S. vittata*, p. 69, fig. 36, Peru, spp. nn., *S. æquinoctialis*, p. 71, fig. 37, Guiana, and *S. bipunctata*, p. 72, Cayenne, pl. ii., *id. l. c.*

Strophius, g. n., p. 73. Allied to *Synema*; for *S. nigricans*, sp. n., *id. l. c.* p. 74, pl. ii. fig. 38.

Dicæa rufo-annulata, sp. n., E. Simon, CR. Soc. Ent. Belg. xxiii. p. clxvii., Noumea. *D. kanakana*, sp. n., F. Karsch, SB. nat. Fr. 1880, p. 80, Haleakala. *D. guianensis*, Tacz., p. 112, fig. 62, Sta Cruz, Brazil, and Guiana, *D. damnosa*, p. 114, fig. 63, Mexico, *D. spinosa*, p. 116, fig. 64, Colombia, *D. pallida*, p. 117, fig. 65, Brazil and Colombia, spp. nn., E. von Keyserling, *l. c.* pl. ii. *D. delata*, sp. n., F. Karsch, MT. Münch. ent. Ver. 1880, p. 146, Pungo (Western Africa).

Dieta, g. n. Nearly allied to *Dicæa*, differing in the position of the eyes of the posterior row. For *D. parallela*, sp. n., E. Simon, Ann. Soc. Ent. Fr. (5) x. p. 108, pl. iii. fig. 7, Pekin.

Runcinia nigro-maculata, p. 119, fig. 66, Brazil, *R. crassipes*, p. 121, fig. 67, and *R. parva*, p. 122, fig. 68, Colombia, *R. magna*, p. 125, fig. 69, Colombia and Mexico, and *R. brendeli*, p. 127, fig. 70, Peoria, Baltimore, and Georgia, spp. nn., Keyserling, *l. c.* pl. ii.

Charis, g. n., p. 48. Allied to *Synema*; for *C. rubripes*, sp. n., *id. l. c.* p. 49, pl. i. fig. 24, Amable Maria, Peru.

Platyarachne, g. n., p. 46. Of flattened form, and the eyes very like those of *Misumena*; for *P. episcopalis*, Tacz., p. 47, pl. i. fig. 23, Cayenne, St. Laurent di Maroni, *id. l. c.*

Xysticus stomachosus, p. 7, fig. 1, N. America, *X. funestus*, p. 10, fig. 2, Baltimore and Carolina, *X. triguttatus*, p. 12, figs. 3 & 6, Boston (North America), Colorado, and Georgia, *X. pulcherrimus*, p. 14, fig. 4, and *gracilis*, p. 17, fig. 5, Colombia, *X. discursana*, p. 20, fig. 7, Colorado and Nevada, *X. benefactor*, p. 22, fig. 8, Colorado, *X. locuples*, p. 24, fig. 9, Colorado and Nevada, *X. auctificus*, p. 25, fig. 10, *X. lenis*, p. 27, fig. 11, and *X. quinque-punctatus*, p. 28, fig. 12, Colorado, *X. punctatus*, p. 30, fig. 13, North Carolina, *X. elegans*, p. 31, fig. 14, Georgia, *X. flavo-vittatus*, p. 33, fig. 15, America, *X. limbatus*, p. 35, fig. 19, Colorado, Texas, and Illinois, *X. californicus*, p. 37, fig. 17, Mariposa, California, *X. emertoni*, p. 39, fig. 18, and *X. variabilis*, p. 40, fig. 19, Georgia, *X. quadrilineatus*, p. 42, fig. 20, Illinois, *X. gulosus*, p. 43, fig. 21, Georgia and Illinois, and *X. maculatus*, p. 45, fig. 22, Georgia, spp. nn., Keyserling, *l. c.* pl. i. *X. ephippiatus*, sp. n., E. Simon, Ann. Soc. Ent. Fr. (5) x. p. 107, pl. iii. fig. 6, Pekin.

Oxyptila pseudo-blitea, sp. n., E. Simon, Ann. Soc. Ent. Fr. (5) x. p. 109, Pekin. *O. nevadensis*, p. 50, fig. 25, Nevada, and *O. georgiana*, p. 52, fig. 26, Georgia, spp. nn., E. von Keyserling, *l. c.* pl. i.

Uraarachne, g. n., for *U. longa*, sp. n., E. von Keyserling, *l. c.* p. 130, pl. ii. fig. 71, Brazil.

Cerinius luzonicus, sp. n., F. Karsch, Z. ges. Naturw. liii. p. 383, Luzon.

Bomis duricoria, sp. n., E. Simon, CR. Ent. Belg. xxiii. p. clxvii., New Caledonia.

Tmarus stolzmanni, p. 138, fig. 74, and *T. tinctus*, p. 140, fig. 75, Peru, *T. montericensis*, p. 141, fig. 76, Monterico, Peru, *T. litoralis*, p. 144, fig. 78, *T. galbanatus*, p. 147, fig. 79, *T. cæruleus*, p. 148, fig. 80, *T. rubrosignatus*, p. 150, fig. 81, *M. interritus*, p. 151, fig. 82, and *T. viridis*, p. 153, fig. 83, Para, *T. magniceps*, p. 156, fig. 85, California, *T. rubro-maculatus*, p. 158, fig. 86, Georgia, *T. albo-lineatus*, p. 159, fig. 87, Brazil, *T. incertus*, p. 161, fig. 88, and *T. maculosus*, p. 163, fig. 89, Colombia, spp. nn., *T. caudatus*, Hentz, p. 154, fig. 84, N. America, *T. jelskii*, Tacz., p. 143, Cayenne; E. von Keyserling, *l. c.* pl. iii.

Acanthonotus guianensis, Tacz., p. 132, fig. 72, and *A. peruvianus*, sp. n., p. 134, fig. 73, Peru, *id. l. c.* pl. iii.

Thomisoides, Nic., included in a separate family, *Sicarioidæ*; id. *l. c.* p. 268. *T. nicoleti*, p. 271, fig. 149, Chili, *T. peruensis*, p. 272, fig. 150, and *T. gracilis*, p. 275, Peru, spp. nn., *T. terrosa*, Nic., p. 268, fig. 148, Chili, *id. l. c.* pl. viii.

Platythomisus homeyeri, sp. n., F. Karsch, MT. Münch. ent. Ver. 1880, p. 145, Pungo.

Hexophthalma (*Hexomma*), Karsch, and *Thomisoides*, Nic., formed into a family, *Hexophthalmidæ*; *id.* Z. ges. Naturw. liii. pp. 385 & 386.

Voconia (*Holconia*, Thor.) *maculata*, sp. n., E. von Keyserling, *l. c.* p. 232, pl. vi. fig. 127, Uruguay (included under *Isopoda*, L. Koch; E. Simon, Act. Soc. L. Bord. xxxiv. p. 250).

Selenops spixi, Perty, p. 226, fig. 124, Brazil, *S. mexicanus*, p. 228, fig. 125, and *S. nigro-maculatus*, p. 230, fig. 126, Mexico, spp. nn., E. von Keyserling, *l. c.* pl. vi. *S. peregrinator*, Walck., described from St. Louis, Senegal, p. 233, *S. malabarensis*, p. 234, Malabar, and *S. cocheleti*, p. 235, Paraguay, spp. nn., E. Simon, Act. Soc. L. Bord. xxxiv.

Heteropoda venatoria, Linn., Brazil, &c., and *H. pumila*, sp. n., p. 237, pl. vi. fig. 129, Sta Fé de Bogota, E. von Keyserling, *l. c.*

Themeropis granadensis, sp. n., E. von Keyserling, *l. c.* p. 235, pl. vi. fig. 128, Colombia. *T. orichalcea*, p. 336, Borneo, and *T. papuana*, p. 338, Dorey, New Guinea, spp. nn., E. Simon, Act. Soc. L. Bord. xxiv.

Sparianthis, g. n. Near to but differs in many particulars from *Themeropis*, L. Koch. Type, *Themeropis granadensis*, Keys., p. 339, *S. amazonica*, sp. n., p. 340, Amazons, Teffé (Brazil), Pevas (Peru). E. Simon, *l. c.*

Pedinopistha, g. n. Between *Opitis* and *Pandercetes*, L. Koch; for *P. petulcum*, p. 79, hab. not indic. and *P. finschi*, p. 80, Olinda, spp. nn., F. Karsch, SB. nat. Fr. 1880.

Pyrnus, g. n., differs from *Hemiclæa* (Thor.) in having the cephalothorax broader than long. For *Hemiclæa fulva* and *H. flavitarsis*, by L. Koch. E. Simon, Act. Soc. L. Bord. xxxiv. p. 237.

Rebilus, g. n., differs from *Pyrnus*, Sim., and *Hemiclæa*, Thor., in the form of the sternum. For *H. lugubris*, *H. præsignis*, and *H. diversus*, L. Koch; *id. l. c.* p. 238.

Damastes, g. n. Near *Delena*, Walck., E. Simon, Act. Soc. L. Bord. xxxiv. p. 241. *D. grandidieri*, p. 242, *D. coquereli*, p. 243, and *D. flavomaculatus*, p. 244, spp. nn., Madagascar ; *id. l. c.*

Isopeda (*Olios*) *imerinensis*, Vinson, and *I.* (*Olios*) *viridis*, id., described from Madagascar ; *id. l. c.* pp. 250 & 251.

Tychicus, g. n., differs from *Heteropoda*, Latr., in the very narrow clypeus ; from *Palystes*, L. Koch, in the depressed cephalothorax ; and from *Isopoda*, L. Koch, in the longer cephalothorax and other characters. For *Delena plumipes*, Dol., and *Olios longipes*, Walck, pp. 253 & 254, also *T. gaymardi*, p. 35, sp. n., New Ireland. *Id. l. c.*

Tortula, g. n. Near *Isopeda*, L. Koch, differs in the clypeus being broader than the anterior eyes. For *T. gloriosa*, sp. n., *id. l. c.* p. 257, Cochin China.

Pediana, g. n. Near *Isopeda*, L. Koch, and *Tortula*, Sim. ; differing greatly in the position of the eyes. For *Heteropoda regina*, L. Koch ; *id. l. c.* p. 258.

Panaretus, g. n. Near *Tortula*, Sim., and *Heteropoda*, Latr., p. 259. *P. javanus*, p. 260, Java, and *P. ignichelis*, p. 261, Saigon. *Id. l. c.*

Palystes chaperi, p. 263, Cape of Good Hope, *P. kochi*, p. 265, Singapore, *P. crucifer*, p. 266, Port Said, *id. l. c.*, spp. nn.

Heteropoda (*Ethilla*, Sim.) *variegata*, E. Simon, Egypt and Syria, p. 271, and *H.* (*Olios*) *freycineti*, Walck., Ile de Guam, p. 273, *H. flavimana*, p. 274, Sumatra, *H. mediocris*, p. 276, Java and New Guinea, *H. crassa*, p. 277, Java, and *H. meticulosa*, p. 278, Upper Amazons and Pevas (Peru), spp. nn. ; *id. l. c.*

Spariolenus, g. n. Near *Pandercetes*, L. Koch, differing in the curve of the anterior row of eyes, the high clypeus, and the maxillæ wanting the oblique keel. For *S.* (*Olios*) *taprobanicus*, Walck., Ceylon, and *S. tigris*, sp. n., Calcutta. *Id. l. c.* pp. 280 & 281.

Adrastis, g. n., p. 282. Near *Pandercetes*, L. Koch, differing in the form of the cephalothorax. For *A. atomaria*, sp. n., p. 283, Java. *Id. l. c.*

Micrommata, Latr. On the distinctive value of certain specific characters in four species of this genus ; *id. l. c.* p. 284, note. *M. ophthalmica*, sp. n., *id.*, Bull. Soc. Ent. Fr. (5) x. p. lxiv., Algeria ; ♂ & ♀ described, *id.*, Act. Soc. L. Bord. xxxiv. p. 285.

Phidyle, g. n. Near *Micrommata*, differing in the clypeus and form of labium, p. 286. For *Sparassus punctipes*, Nicolet, p. 287, Chili. *P. bergi*, sp. n., p. 345, Argentine Republic, E. Simon, Act. Soc. L. Bord. xxxiv.

Vindullus, g. n. Near *Sparassus*, Walck. For *V. viridans*, sp. n., *id. l. c.* p. 288, Brazil.

Sparassus walckenarius, Aud.-Sav., = *S. cambridgii*, E. Sim., and ♂ & ♀ described, from various N. African and other localities, p. 292. *S. fontanieri*, sp. n., p. 294, Persia ?. *Id. l. c.*

Olbus, g. n. Comes near the *Drassidæ*, especially to *Liocranum*, L. Koch. For *Olios sparassoides*, Nicolet, described from Chili. *Id. l. c.* pp. 295 & 296.

Olios lamarcki, Latr., = *O. captiosus*, Walck., described from Réunion and Madagascar, p. 301, *O. senilis*, p. 303, Ceylon, *O. zulu*, p. 304,

Lessouto (North of the Cape of Good Hope), *O. pusillus*, p. 305, Madagascar, *O. fasciiventris*, p. 306, Zanzibar, *O. fasciculatus*, p. 307, California (Mariposa), *O. atomarius*, p. 309, Amazons and Pevas (Peru), spp. nn., *id. l. c.*

Midamus, g. n., allied to *Olios* and *Sparassus*; type, *Sparassus boulayi*, E. Simon, Morocco, also *M. auricomis*, sp. n., p. 312, Zanzibar. *Id. l. c.*

Sarotes coccinciventris, sp. n., *id. l. c.* p. 315, Moluccas (Gilolo and Ternates), New Guinea (Dorey).

Sadala, g. n., *id. l. c.* p. 317. Founded for various species of *Sparassus*, described from S. America by Keyserling in 1880. *S. paraensis*, Keys., p. 319, described, from Para, *S. pictitarsus*, p. 320, Amazons, Teffé (Brazil), and Iquitos, Peru, *S. nigristernis*, p. 322, Brazil, St. Paul d'Olivença, Upper Amazons (near the frontier of Peru), *S. keyserlingi*, p. 323, Brazil (Province of Para), Santarem (Amazon), Teffé, St. Paul d'Olivença, *S. velox*, p. 325, *S. mathani*, p. 327, and *S. punicea*, p. 328, Peru, Pevas (Upper Amazons), spp. nn.

Nisueta, g. n., *id. l. c.* p. 329. Allied to *Cebrennus*, Sim. For *N. quadrispilota*, sp. n., p. 330, Zanzibar.

Cebrennus, name substituted for *Cebrenis*, Sim., pre-occupied, p. 331. *C. wagæ*, Sim., described, from Algeria, p. 332; *C. castaneitarsis*, p. 333, Algeria (Oran), *C. æthiopicus*, p. 334, Nubia (Massowa), spp. nn., and *C. pulcherrimus*, E. Sim., described, from South Algeria, p. 335; *id. l. c.* *C. pulcherrimus*, sp. n., *id.* Bull. Soc. Ent. Fr. (5) x. pl. lxiv., South Algeria.

Sparassus luteus, p. 244, fig. 132, *S. montanus*, p. 245, fig. 133, *S. nigrovittatus*, p. 247, fig. 134, *S. funestus*, p. 249, fig. 135, *S. pellucidus*, p. 250, fig. 136, and *S. tigrinus*, p. 251, fig. 137, Peru, *S. clarus*, p. 253, fig. 138, Mexico, *S. obscurus*, p. 255, fig. 139, *S. rapidus*, p. 257, fig. 141, Brazil, spp. nn., *S. ferrugineus*, C. L. Koch, p. 256, fig. 140, Mexico, *S. fasciatus*, p. 259, fig. 142, Brazil, *S. helvus*, p. 262, fig. 144, Colombia, *S. rufus*, p. 263, fig. 145, Colombia, Sta Fé de Bogota, *S. antiguensis*, p. 264, fig. 146, Antigua, *S. paraensis*, p. 266, fig. 147, Para, spp. nn., *S. martius*, Nic., p. 260, fig. 143, Chili, *S. gracilipes*, Tacz., p. 241, fig. 130, Cayenne, and *S. cayanus*, Tacz., p. 242, fig. 131, Guiana; E. von Keyserling, Spinnen Amerika's, pl. vii. *S. extensipes*, sp. n., F. Karsch, Z. ges. Naturw. liii. p. 383, pl. xii. fig. 12, Cairo.

Plator, g. n., p. 105. Near *Sparrasus*, but with small narrow caput. For *P. insolens*, p. 106, sp. n., E. Simon, Ann. Soc. Ent. Fr. (5) x. pl. iii. figs. 4 & 5, Pekin. *P. niger*, sp. n., *id.* Act. Soc. L. Bord. xxxiv. p. 236, Teffé, on the Amazon.

Thanatus minaceus, sp. n., *id.* Ann. Soc. Ent. Fr. (5) x. p. 110, Pekin. *T. granadensis*, p. 199, fig. 109, Colombia, *T. maculatus*, p. 201, fig. 110, and *T. chorillensis*, p. 202, fig. 111, Peru, *T. rubicundus*, p. 204, fig. 112, Georgia, *T. coloradensis*, p. 206, fig. 113, Colorado, spp. nn.; E. von Keyserling, *l. c.* pl. v.

Tibellus duttoni, Hentz, p. 195, Georgia, *T. oblongus*, Walck., p. 196, Mt. Washington and Colorado, and *T. punctulatus*, Tacz., p. 197, pl. v. fig. 108, Guiana; E. von Keyserling, *l. c.*

Philodromus prolustris, p. 209, fig. 114, *P. spectabilis*, p. 210, fig. 115,

P. satullus, p. 211, fig. 116, Colorado, *P. clarus*, p. 214, fig. 117, Nevada, *P. laticeps*, p. 215, fig. 118, Georgia, *P. expositus*, p. 220, fig. 121, Mount Washington, *P. infuscatus*, p. 222, fig. 122, Baltimore, *P. imbecillus*, p. 224, fig. 123, Georgia, spp. nn. ; *P. aureolus*, Walck., Peoria, Utah, Manitou, Illinois, and Colorado, *P. rufus*, Walck., p. 217, Boston, Peoria, and Baltimore, *P. vulgaris*, Hentz, p. 218, fig. 120, Boston and Baltimore : E. von Keyserling, *l. c.* pl. v. *P. claræ*, sp. n., P. Bertkau, Verh. Ver. Rheinl. xxxvii. p. 246, pl. vi. fig. 1, Bonn.

Triclaridæ.

Labdacus should be placed in the *Ctenoidæ*; Simon, Bull. Soc. Zool. Fr. v. p. 152.

Labdacus iricolor, p. 153, and *L. parallelus*, p. 156, Brazil, Teffé, *L. plumosus* and *L. ruficapillus*, p. 154, Brazil, Para, *L. purpureus*, p. 155, Panama, *id. l. c.*

Senoculus, Tacz., provisionally renamed *Platyctenus* ; it is placed in the *Ctenoidæ*, and has 8 eyes, not 6 only, as stated in the original description [it appears to be identical with *Labdacus*, Cambr.] ; E. von Keyserling, Verh. z.-b. Wien, xxix. p. 338.

Senoculus rubro-maculatus, sp. n., *id. l. c.* p. 339, pl. iv. fig. 30, Peru.

Lycosidæ (including Ctenoidæ, Keys., pt.).

Ctenus cyclothorax, sp. n., P. Bertkau, Mém. cour. Ac. Belg. 4to, xliii. p. 56, pl. i. fig. 18, Tijuca.

Isoctenus, g. n. ; differs but very slightly from *Ctenus*; for *I. foliiferus*, *id. l. c.* p. 61, Chapeo d'Uvas.

Caloctenus major, sp. n., E. von Keyserling, Verh. z.-b. Wien, xxix. p. 337, fig. 31, Peru ; *C. variegatus*, sp. n., P. Bertkau, *l. c.* p. 59, pl. i. fig. 19, Theresopolis.

Stenoctenus, g. n. ; differs from *Senoculus*, Tacz., in the narrower form and in armature of the anterior legs ; for *S. gracilis*, sp. n., E. von Keyserling, *l. c.* p. 341, pl. iv. fig. 29, Peru.

Dolomedes similis, sp. n., E. Simon, Ann. Soc. Ent. Fr. (5) x. p. 101, Pekin ; *D. albicoxa*, sp. n., P. Bertkau, *l. c.* p. 63, Theresopolis.

Ancylometes, g. n. ; close to *Dolomedes*; for *A. vulpes*, sp. n., P. Bertkau, *l. c.* p. 114, Barbacena.

Trochosa humicola, sp. n., *id. l. c.* p. 65, pl. i. fig. 20, Rio Janeiro ; *T. terminalis*, id. Verh. Ver. Rheinl. xxxvii. p. 283, pl. vi. fig. 8, Bonn.

Lycosa erudita, sp. n., E. Simon, Ann. Soc. Ent. Fr. (5) x. p. 102, Pekin ; *L. magellanica*, sp. n., F. Karsch, Z. ges. Naturw. liii. p. 378, pl. xii. fig. 6, Punta Arenas, Straits of Magellan ; *L.* (*Arctosa*) *versicula*, p. 81, *L. calvata*, *L. virgata*, and *L. caduca*, p. 82, *L. aliusmodi* and *L. bruta*, p. 83, Olinda, spp. nn., *id.* SB. nat. Fr. 1880 [the last 5 species appear to belong to *Tarentula*, Sund.] ; *L. molitor*, sp. n., Bertkau, *l. c.* p. 76, pl. ii. fig. 26, Tijuca ; *L. festiva*, sp. n., P. Pavesi, Ann. Mus. Genov. xv. p. 369, Tunis.

Tarentula nyc[*h*]*tthemera*, p. 68, fig. 21, *T. volxemi*, p. 70, fig. 22, *T. pugil*,

p. 71, fig. 23, *T. sternalis*, p. 73, fig. 24, Theresopolis, and *T. pardalina*, p. 75, fig. 25, Rio Janeiro, spp. nn., P. Bertkau, *l. c.* pl. ii.

Pardosa multivaga, sp. n., E. Simon, Ann. Soc. Ent. Fr. (5) x. p. 104, pl. iii. figs. 2 & 3, Pekin. *P. rubro-fasciata*, Sim., = *Lycosa farreni*, Cambr.; *id.* Bull. Soc. Ent. Fr. (5) x. p. lvi.

Léon Becker, CR. Ent. Belg. xxiii. pp. clv.–clviii., details original observations on two Lycosids, *Tarentula* (as *Lycosa*) *narbonnensis*, Latr., from Mentone, and another allied species, supposed to be new, but not named, from America.

Anoteropsis flavo-vittata, sp. n., E. Simon, CR. Ent. Belg. xxiii. p. clxvi., Noumea.

Salticidæ.*

Salticus furcatus, Bengal, and *S. pracus*, Ceylon, p. 395, *S. denticulatus*, Kübeck, *S. contractus*, Ceylon and Bintang, *S. attenuatus*, Luzon, and *S. dilatatus*, Nyassa, p. 396, spp. nn., F. Karsch, Z. ges. Naturw. liii.

Janigena, g. n., for *Janus melanocephalus*, C. L. Koch; *id. l. c.* p. 394.

Synemosyna. Genus discussed, with *Toxeus* and *Janus*; id. *l. c.* pp. 392–394. *S. pumilio*, Bengal, and *S. furcata*, Samar, spp. nn., p. 395.

Heliophanus cambridgii, Sim., said to be found in England; P. Bertkau, Verh. Ver. Rheinl. xxxvii. p. 229. [This is probably a mistake.]

Homalattus deplanatus, sp. n., F. Karsch, Z. ges. Naturw. liii. p. 397, Luzon; *H. gambeyi*, sp. n., E. Simon, CR. Ent. Belg. xxiii. p. clxvi., Canala.

Neon punctulatus, sp. n., F. Karsch, *l. c.* p. 397, Bolivia.

Hyctia insignipes, E. Simon, *l. c.* p. clxv., Canala.

Evophrys lunatus, sp. n., P. Bertkau, Mém. cour. Ac. Belg. 4to, xliii. p. 41, Rio Janeiro.

Attus fasciger, p. 99, pl. iii. fig. 1, and *A. niveo-signatus*, p. 100, spp. nn., E. Simon, Ann. Soc. Ent. Fr. (5) x., Pekin.

Philæus bulbosus, sp. n., F. Karsch, *l. c.* p. 397, Bolivia.

Alcmena vittata, sp. n., *id. ibid.*, Caracas.

Dendryphantes comatus, sp. n., *id. ibid.*, Syria.

Eris barbatus, sp. n., *id. ibid*, pl. xii. fig. 16, Luzon and Manilla.

Mœvia luzonica, sp. n., *id. l. c.* p. 398, Luzon.

Ictidops constrictus and *I. deruptus*, spp. nn., *id. ibid.*, Luzon.

Hasarius cœlestis, sp. n., *id. ibid.*, Luzon.

Plexippus calcaratus, Macassar, *P. lividus*, *P. setosus*, *P. cærulcus*, *P. unicolor*, *P. simplicissimus*, *P.* ? *intermedius*, and *P. planiceps*, Luzon, spp. nn., *id. l. c.* p. 399.

Astia mollicoma, p. 1158, pl. c. figs. 6 & 7, Gayndah, Bowen, Rockhampton, Sydney, and Cape York, *A. minitabunda*, p. 1160, fig. 1, Sydney and Shelley's Flats, *A. respersa*, p. 1163, figs. 2 & 3, Sia (350 miles N. of Sydney), New Zealand, Sydney, Shelley's Flats, Port Mackay, and Peak Downs, *A. aurea*, p. 1167, figs. 4 & 5, Sydney, spp. nn., pl. ci., L. Koch, Arachn. Austr.

Amycus splendidus, p. 1171, pl. ci. fig. 6, *A. micans*, p. 1173, fig. 1, and

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* The order of the genera in this family is not intended to be systematic.

A. modestus, p. 1176, fig. 2, Cape York, *A. micarioides*, p. 1178, fig. 3, Port Mackay and Cape York, *A. tristriatus*, p. 1181, fig. 4, Pelew Island, pl. cii., spp. nn., *id. l. c.*

Opisthoncus, g. n., p. 1184. *O. lineativentris*, p. 1185, pl. cii. figs. 5 & 6, Sydney, Rockhampton, and Boudi (near Sydney), *O. pallidulus*, p. 1190, fig. 1, and *O. mordax*, p. 1192, fig. 2, Sydney, *O. bitæniatus*, p. 1195, fig. 3, Sydney, Gayndah, Belle Vue Hill, *O. albo-rufuscens*, p. 1197, figs. 4 & 5, Rockhampton, Gayndah, Port Mackay, Sydney, and Peak Downs, *O. mandibularis*, p. 1202, fig. 6, Sydney, pl. ciii., *O. parce-dentatus*, p. 1205, figs. 1 & 2, Sydney, Bowen, and Peak Downs, *O. magnidens*, p. 1209, figs. 3 & 4, Caigan, Nepean Towers, Sydney, pl. civ., spp. nn., *id. l. c.*

Portia, Bertkau. The genus discussed ; F. Karsch, Z. ges. Naturw. liii. p. 384.

THELYPHONIDEA.

Phryneidæ.

Karsch, F. Zur Kenntniss der Tarantuliden. Arch. f. Nat. xlvi. 1, pp. 244–249.

The author disagrees with the conclusions of A. G. Butler (Ann. N. H. 5, iv. [1879], pp. 313–316), though his facts and reasoning would still appear to prove that writer's position, *i.e.*, that the number of divisions in the tibiæ of the fourth pair of legs is of comparatively small value in classification [*cf.* Zool. Rec. xvi. *Arachn.* p. 43].

SCORPIONIDEA.

Scorpiones.

L. Becker, in "Études sur les Scorpions," premier article, Ann. Soc. Ent. Belg. xxiv. pp. 134–145, shortly reviews the published systems of Gervais, Peters, Thorell, Karsch, and Simon, and describes 9 species, of which 5 are new.

P. Mantegazza, "Sul Veneno dello Scorpione," Bull. Ent. Ital. xi. pp. 73–76, gives the results of numerous experiments with the poison of *Scorpius* (*Euscorpius*) *italicus* on fish, insects, and other animals.

E. Simon, Bull. Soc. Ent. Fr. (5) x. p. xxix., mentions 3 Scorpions found at Mossoul (the ancient Nineveh) : *Heterometrus maurus*, Linn., *Buthus crassicauda*, Oliv., and *B. saulcii*, sp. n. (not described). He records also *B. crassicauda* and *Hemiscorpio lepturus*, Pet., from Bagdad, and 9 species from Syria (*cf.* Ann. Soc. Ent. Fr. 1872, p. 245) ; also *Buthus doriæ*, Thor., Teheran, and *B. hedenborgi*, Thor., probably =*B. judaicus*, E. Sim.

Buthus saulcii, p. 378, Mossoul, and *B. confucius*, p. 124, Pekin, E. Simon, Ann. Soc. Ent. Fr. (5) x.

Grosphus, g. n. ; closely allied to *Buthus* ; type, *G. madagascariensis*, Gerv., Madagascar. *Id. l. c.* pp. 377 & 378.

Chærilus borneensis, sp. n., *id. l. c.* p. 379, North Borneo. The 3 species of *Chærilus* diagnosed ; *id. l. c.* p. 381.

Broteas paraensis, sp. n., *id. l. c.* p. 381, Para. The 5 species of *Broteas* diagnosed; *id. l. c.* pp. 382 & 383.

Chactas rubro-lineatus, p. 383, Upper Amazons, and *C. amazonicus*, p. 38, Upper Amazons and Peru, spp. nn., and the 3 species of *Chactas* diagnosed, p. 386; *id.* l. c. *C. quinque-dentatus*, p. 405, Southern India, and *C. schaumi*, p. 406, Hindostan, spp. nn., F. Karsch, Z. ges. Naturw. liii.

Opisthophthalmus chaperi, p. 387, Cape Colony, and *O. colesbergensis*, p. 388, Colesberg, Cape Colony, spp. nn., and the species of the genus diagnosed, pp. 391 & 392; E. Simon, *l. c.*

The family *Bothriuridæ* contains *Mecocentrus*, Karsch, *Telegonus*, Sim., *Cercophonius*, Peters, *Timogenes* and *Thestylus*, Sim., p. 392. The above diagnosed, p. 393; *id. l. c.*

Cercophonius, Pet., = *Acanthochirus*, p. 394; type, *C. squama*, Gerv., p. 395: *id.* l. c. *C. glasioni*, sp. n., P. Bertkau, Mém. cour. Ac. Belg. 4to, xliii. p. 10, pl. i. fig. 2, Pedra Açu.

Thestylus, g. n.; type, *Cercophonius glasioni*, Bertk. E. Simon, *l. c.* p. 394.

Timogenes, g. n., p. 395; near *Bothriurus*; type, *T. sumatranus*, sp. n., p. 396, Sumatra. *Id. l. c.*

Mecocentrus, Karsch, includes *Scorpio ehrenbergi*, Gerv., and *S. gervaisi*, Nic.; *id. l. c.* p. 397.

Lepreus, Thor., includes *Uroplectes occidentalis*, Sim., which is closely allied to *L. fischeri*, Karsch; *id. ibid.*

Cyphocentrus, Karsch, includes *Scorpio lesueuri*, Gerv.; *id. ibid.*

Oiclus, g. n.; type, *Diplocentrus purvesi*, L. Becker: *id. l. c.* p. 398. *Oiclus*, *Diplocentrus*, and *Cyphocentrus* shortly diagnosed; *id. ibid.*

Scorpio = *Heterometrus*, Hemp. & Ehrenb.; L. Becker, l. c. *S. rœseli*, Sim., fig. 2, *S. simoni*, sp. n., fig. 1, pp. 137 & 138, and *S. imperator*, C. L. Koch, fig. 3, described, figured, and differentiated; *id. l. c.* pl. ii., pp. 137–140. *S. crassimanus*, sp. n., *l. c.* p. 140, pl. iii. fig. 1, Netherlands Indies.

Teuthrastes atramentarius, Sim., described and figured from near Quito, p. 141, fig. 6, and *T. ecuadorensis*, sp. n., p. 142, fig. 5, Pensaqui-Imbabura, Ecuador, pl. iii.; *id. l. c.*

Cyphocentrus, g. n.; formed for *Diplocentrus sulcatus*, Karsch: F. Karsch, Z. ges. Naturw. liii. p. 408.

Diplocentrus purvesi, sp. n., L. Becker, *l. c.* p. 142, pl. iii. fig. 2, Antigua. *D. keyserlingi*, sp. n., F. Karsch, SB. nat. Fr. 1880, p. 57, Oaxaca. *D. gundlachi*, F. Karsch, *l. c.* p. 407, Trinidad and Santiago.

Diplocentrus, Pet., and *Cyphocentrus*, Karsch, formed into a group, *Diplocentruri*; F. Karsch, *l. c.* p. 408; each again forming the type of a sub-group.

Ischnurus dechangii, sp. n., L. Becker, *l. c.* p. 143, pl. iii. fig. 3, Manilla.

Telegonus. Name pre-occupied; changed to *Maeocentrus*: F. Karsch, Z. ges. Naturw. liii. p. 408.

Isometrus devillii, sp. n., L. Becker, *l. c.* p. 144, pl. iii. fig. 4, Guayaquil Coquimbo. *I. maculatus*, Degeer, recorded, and *I. americanus*, Linn., described, pl. i. fig. 1, p. 7, from Brazil; P. Bertkau, Mém. cour. Ac.

Belg. 4to, xliii. *I. vescus*, sp. n., F. Karsch, SB. nat. Fr. 1880, p. 56, Australia.

Hormurus, Thor., = *Liocheles*, Sund.; F. Karsch, Z. ges. Naturw. liii. p. 408.

Pseudo-Scorpiones.

Obisium antipodum, sp. n., E. Simon, CR. Ent. Belg. xxiii. p. clxxiv., Noumea.

Olpium microstethium, sp. n., P. Pavesi, Ann. Mus. Genov. xv. p. 314, Tunis; *O. olivieri*, sp. n., E. Simon, Bull. Soc. Zool. Fr. iv. [1879], p. 262, Ile de Porquerolles.

SOLPUGIDEA.

Karsch, F. Zur Kenntniss der Galeodiden. Arch. f. Nat. xlvi. 1, pp. 228–243.

Part i. contains a critical discussion on E. Simon's work, "Essai d'une Classification des Galéodes," and on some of the genera and species in it, with rectification of synonyms. 4 new genera are characterized, and 2 new species. Part ii. contains descriptions or notes of 8 new or little-known species.

Zerbina, g. n., for *Z. gracilis*, C. L. Koch; *id. l. c.* p. 283.

Dœsia, g. n., for *D. præcox*, C. L. Koch; *id. l. c.* p. 284.

Biton, g. n., for *B. ehrenbergi*, sp. n.; *id. l. c.* pp. 234 & 240, pl. x. fig. 231, Arabia, Syria, Egypt, Dongola.

Gnosippus, g. n.; for *G. klunzingeri*, sp. n., *id. l. c.* pp. 234 & 241, pl. x. fig. 24, Egypt.

Solpuga niassa, p. 237, Nyassa, *S. nasuta*, p. 238, Zanzibar, *S. schweinfurthi*, Djur, and *S. scopulata*, Hantam, p. 239, spp. nn., *id. l. c.*

Cleobis cubæ, Luc., p. 240, pl. x. fig. 22, recorded and part figured, from Cuba, *id. l. c.*

Gylippus quæstiunculus, sp. n., *id. l. c.* p. 242, pl. x. fig. 25, Kübek.

Blossia, g. n., p. 399. Near *Cleobis*; for *B. spinosa*, sp. n., p. 400, Eugéne Simon, Ann. Soc. Ent. Fr. (5) x., Lower Egypt.

Barrus, g. n.; for *B. letourneuxi*, sp. n., *id. l. c.* p. 401, Lower Egypt.

PHALANGIIDEA.

Gonyleptidæ.

Sörensen, W. Om bygningen af Gonyleptidernes en type af Arachnidernes Classe. Nat. Tijds. xii. pp. 97–222, pls. i. & ii.

A long and important paper on the structure of the *Gonyleptidæ*. Two new species are described, and furnish types for numerous beautiful figures of internal anatomy.

Gonyleptes vatius, p. 95, fig. 35, Theresopolis, and *G. piceus*, p. 98, fig. 36, Copa Cobana, spp. nn., P. Bertkau, Mém. cour. Ac. Belg. 4to, xliii. pl. ii. *G. uncinatus*, sp. n., Sörensen, *l. c.* p. 214, Riacho del Oro, Argentine Republic, and La Zanjaog, Monte Rita, Paraguay.

Cœlopygus granulatus, sp. n., P. Bertkau, *l. c.* p. 101, Theresopolis.

Ancistrotus acanthoscelis, p. 103, fig. 37, Pedra Açu, and *A. urceolaris*, p. 104, Copa Cobana, spp. nn., *id. l. c.* pl. ii.

Mischonyx, g. n., p. 106; for *M. squalidus*, sp. n., p. 107, *id. l. c.* pl. ii. fig. 38, Copa Cobana.

Collonychium, g. n.; for *C. bicuspidatum*, sp. n., *id. l. c.* p. 108, pl. ii. fig. 39, Copa Cobana.

Ibalonius, g. n. Near *Epedanus*, Thor., p. 400; for *I. jagori*, p. 401, sp. n., pl. xii. figs. 17 & 18, F. Karsch, Z. ges. Naturw. liii. Luzon.

Hinzuanus, g. n.; for *H. insulanus*, sp. n., *id. l. c.* p. 402, Anjouan Island.

Adœum, g. n. Near *Scotolemon*, Luc.; for *A. asperatum*, sp. n., *id. ibid.*, Cape of Good Hope.

Phalangodidæ.

Equitius, g. n. (following *Epedanus*, Thor.). Characterized by the eye-eminence being drawn out into a long erect tubercle, considerably removed from the frontal margin of the cephalothorax; legs short; metatarsi biarticulate; differs from *Epedanus* in having a single terminal tarsal claw on the third and fourth pairs of legs. Type, *E. doriæ*, sp. n., E. Simon, CR. Ent. Belg. xxiii. pp. c. & ci.. Blue Mountains, N. S. Wales.

Mermerus savesi, sp. n., *id. l. c.* p. clxxv., Noumea.

Cosmetidæ.

Analytical table of genera altered; E. Simon, CR. Ent. Belg. xxiii. p. ciii.

Dampetrus, g. n.; for *D. australis*, sp. n., F. Karsch, Z. ges. Naturw. liii. p. 403, Eastern Australia.

Cosmetus flavo-pictus, sp. n., Simon, *l. c.* p. ci., Darien Coast, Colombia. *C. orensis*, sp. n., W. Sörensen, *l. c.* p. 217, Riacho del Oro, Argentine Republic.

Pœcilœma, C. L. Koch, and *Gryne*, Sim. The comparative characters of these two genera are modified, E. Simon, *l. c.* p. cii. *P. leucomelas*, Sim., Upper Amazons, St. Paul d'Olivença, *id. l. c.*; allied to *Cosmetus andrea*, Perty, *id. l. c.* p. ciii.

Discosoma, Perty; genus characterized, *id. l. c.* p. ciii. *D. cinctum*, Perty, described from Upper Amazons, *id. ibid.*

Phalangiidæ.

H. W. de Graaf (Zool. Anz. iii. p. 42) considers that the male is sometimes hermaphrodite from the conversion of the testes into an ovary; the female has no spermathecæ. (*Cf.* J. Micr. Sc. iii. p. 248.)

J. C. C. Loman, referring to H. W. de Graaf's paper, gives the result of his own investigations on the anatomy of *Phalangium cornutum*, Linn., *P. urnigerum*, Meade, *P. parietinum*, De Geer, and *Liobunus rotundus*, Latr., Zool. Anz. iii. pp. 90–92. (*Cf.* J. R. Micr. Sc. iii. p. 423.)

Acantholophus diversicolor, sp. n., F. Karsch, Z. ges. Naturw. liii. p. 404,

S. Africa. *A. bidens*, sp. n., E. Simon, Ann. Soc. Ent. Fr. (5) x. p. 126, Pekin.

Platybunus arbuteus, sp. n., E. Simon, Bull. Soc. Zool. Fr. iv. (1879) p. 263, Ile de Porquerolles.

Blanc, D. H. Anatomie et Physiologie de l'appareil sexuel male des Phalangides. Bull. Soc. Vaud. xvii. pp. 49–77, pls. iv.–vi.

Treats very fully under the following heads on:—i. Anatomy and Physiology of the male sexual apparatus of Phalangids. ii. Anatomy of the testicle; spermatogenesis; and description of the spermatozoa and their passage to the glans. iii. How contact between the spermatozoa and the ovum is effected. iv. Hermaphroditism in male Phalangids. The works of Lister, Treviranus, Fulk, Menge, and Krohn, as well as the very recent papers of De Graaf and Loman are referred to and discussed. On the question of hermaphroditism in the male Phalangid, the author defines hermaphroditism to be of two kinds:—i. self-sufficient, giving the power, sometimes, of self-fecundation; ii. rudimentary, one only of the sexual elements coming to maturity. The occurrence of ova in the testicles of Phalangids belongs to the second kind. The species examined and dissected are *Phalangium cornutum*, Linn., *P. opilio*, Latr., *P. longipes*, Koch, and *P. rotundum*, Latr.

PYCNOGONIDEA.

Wilson, Edmund B. Report on the *Pycnogonida* of New England and adjacent waters. Rep. U. S. Commission of Fish and Fisheries, 1878 [published 1880], pt. vi. pp. 463–506, pls. i.–vii.

Practically a repetition of the same author's treatise in Tr. Conn. Ac. v., noticed in Zool. Rec. xvi. *Arachn.* pp. 22 & 23. Fifteen species belonging to 9 genera are discussed; 5 of them are European, occurring also in Greenland. *Pseudopallene*, Wils., and *Anoplodactylus*, Wils., are recharacterized, and the following species described and figured besides those mentioned in Zool. Rec. xvi.:—

Nymphon strœmi, Kröyer, = *giganteum*, Goodsir, *macrum*, sp. n., *longitarse*, Kröy., *grossipes*, Fab., *mixtum* and *brevitarse*, Kröyer, and *hirtum*, Fab., = *hirtipes*, Bell, = *femoratum*, Leach; pp. 485-497, pls. iv. figs. 21–23, v.–vii.; the recently hatched larva of the last, pl. vii. fig. 41.

Phoxichilidium maxillare, Stimps.; pp. 480 & 481, pl. iii. figs. 12–15.

Achelia spinosa, Stimps. (as *Zetes*), and *A. scabra*, sp. n.; pp. 473–476, pl. i. fig. 4, & pl. ii. fig. 8.

Pycnogonum littorale, Ström; pp. 469–471, pl. i. figs. 1–3. It sometimes clings to *Actinidæ*, and *P. pelagicum*, Stimps., is evidently only an immature form of it.

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5 spp. of Pycnogonids from Barents' Sea, collected by W. T. Grant, enumerated by W. S. M. D'Urban, Ann. N. H. (5) vi. p. 263.

Nymphon robustum, Bell: adult female from Discovery Bay, Greenland, described by E. J. Miers, J. L. S. xv. p. 72.

Cœlopygus granulatus, sp. n., P. Bertkau, *l. c.* p. 101, Theresopolis.

Ancistrotus acanthoscelis, p. 103, fig. 37, Pedra Açu, and *A. urceolaris*, p. 104, Copa Cobana, spp. nn., *id. l. c.* pl. ii.

Mischonyx, g. n., p. 106; for *M. squalidus*, sp. n., p. 107, *id. l. c.* pl. ii. fig. 38, Copa Cobana.

Collonychium, g. n.; for *C. bicuspidatum*, sp. n., *id. l. c.* p. 108, pl. ii. fig. 39, Copa Cobana.

Ibalonius, g. n. Near *Epedanus*, Thor., p. 400; for *I. jagori*, p. 401, sp. n., pl. xii. figs. 17 & 18, F. Karsch, Z. ges. Naturw. liii. Luzon.

Hinzuanus, g. n.; for *H. insulanus*, sp. n., *id. l. c.* p. 402, Anjouan Island.

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Mermerus savesi, sp. n., *id. l. c.* p. clxxv., Noumea.

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Analytical table of genera altered; E. Simon, CR. Ent. Belg. xxiii. p. ciii.

Dampetrus, g. n.; for *D. australis*, sp. n., F. Karsch, Z. ges. Naturw. liii. p. 403, Eastern Australia.

Cosmetus flavo-pictus, sp. n., Simon, *l. c.* p. ci., Darien Coast, Colombia. *C. orensis*, sp. n., W. Sörensen, *l. c.* p. 217, Riacho del Oro, Argentine Republic.

Pœcilœma, C. L. Koch, and *Gryne*, Sim. The comparative characters of these two genera are modified, E. Simon, *l. c.* p. cii. *P. leucomelas*, Sim., Upper Amazons, St. Paul d'Olivença, *id. l. c.*; allied to *Cosmetus andrea*, Perty, *id. l. c.* p. ciii.

Discosoma, Perty; genus characterized, *id. l. c.* p. ciii. *D. cinctum*, Perty, described from Upper Amazons, *id. ibid.*

Phalangiidæ.

H. W. de Graaf (Zool. Anz. iii. p. 42) considers that the male is sometimes hermaphrodite from the conversion of the testes into an ovary; the female has no spermathecæ. (*Cf.* J. Micr. Sc. iii. p. 248.)

J. C. C. Loman, referring to H. W. de Graaf's paper, gives the result of his own investigations on the anatomy of *Phalangium cornutum*, Linn., *P. urnigerum*, Meade, *P. parietinum*, De Geer, and *Liobunus rotundus*, Latr., Zool. Anz. iii. pp. 90–92. (*Cf.* J. R. Micr. Sc. iii. p. 423.)

Acantholophus diversicolor, sp. n., F. Karsch, Z. ges. Naturw. liii. p. 404,

S. Africa. *A. bilens*, sp. n., E. Simon, Ann. Soc. Ent. Fr. (5) x. p. 126, Pekin.

Platybunus arbuteus, sp. n., E. Simon, Bull. Soc. Zool. Fr. iv. (1879) p. 263, Ile de Porquerolles.

Blanc, D. H. Anatomie et Physiologie de l'appareil sexuel male des Phalangides. Bull. Soc. Vaud. xvii. pp. 49–77, pls. iv.–vi.

Treats very fully under the following heads on :—i. Anatomy and Physiology of the male sexual apparatus of Phalangids. ii. Anatomy of the testicle; spermatogenesis; and description of the spermatozoa and their passage to the glans. iii. How contact between the spermatozoa and the ovum is effected. iv. Hermaphroditism in male Phalangids. The works of Lister, Treviranus, Fulk, Menge, and Krohn, as well as the very recent papers of De Graaf and Loman are referred to and discussed. On the question of hermaphroditism in the male Phalangid, the author defines hermaphroditism to be of two kinds:—i. self-sufficient, giving the power, sometimes, of self-fecundation; ii. rudimentary, one only of the sexual elements coming to maturity. The occurrence of ova in the testicles of Phalangids belongs to the second kind. The species examined and dissected are *Phalangium cornutum*, Linn., *P. opilio*, Latr., *P. longipes*, Koch, and *P. rotundum*, Latr.

PYCNOGONIDEA.

Wilson, Edmund B. Report on the *Pycnogonida* of New England and adjacent waters. Rep. U. S. Commission of Fish and Fisheries, 1878 [published 1880], pt. vi. pp. 463–506, pls. i.–vii.

Practically a repetition of the same author's treatise in Tr. Conn. Ac. v., noticed in Zool. Rec. xvi. *Arachn.* pp. 22 & 23. Fifteen species belonging to 9 genera are discussed; 5 of them are European, occurring also in Greenland. *Pseudopallene*, Wils., and *Anoplodactylus*, Wils., are recharacterized, and the following species described and figured besides those mentioned in Zool. Rec. xvi. :—

Nymphon strœmi, Kröyer, = *giganteum*, Goodsir, *macrum*, sp. n., *longitarse*, Kröy., *grossipes*, Fab., *mixtum* and *brevitarse*, Kröyer, and *hirtum*, Fab., = *hirtipes*, Bell, = *femoratum*, Leach; pp. 485-497, pls. iv. figs. 21-23, v.-vii.; the recently hatched larva of the last, pl. vii. fig. 41.

Phoxichilidium maxillare, Stimps.; pp. 480 & 481, pl. iii. figs. 12–15.

Achelia spinosa, Stimps. (as *Zetes*), and *A. scabra*, sp. n.; pp. 473–476, pl. i. fig. 4, & pl. ii. fig. 8.

Pycnogonum littorale, Ström; pp. 469–471, pl. i. figs. 1–3. It sometimes clings to *Actinidæ*, and *P. pelagicum*, Stimps., is evidently only an immature form of it.

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5 spp. of Pycnogonids from Barents' Sea, collected by W. T. Grant, enumerated by W. S. M. D'Urban, Ann. N. H. (5) vi. p. 263.

Nymphon robustum, Bell: adult female from Discovery Bay, Greenland, described by E. J. Miers, J. L. S. xv. p. 72.

ACARIDEA.

G. Haller, in a valuable and interesting paper ("Die Milben als Parasiten der Wirbellosen, insbesondere der Arthropoden," Halle-a-S.: 1880, pp. 1–90, with woodcuts), treats upon the Acaridean parasites and their relation to their hosts. Those known to belong to certain *Arthropoda* are tabulated, and many original observations are recorded, as well as useful references given to the extant literature on nomenclature, classification, and habits of this group of Acarids. Remarks are also made on collecting and preserving.

The same author, in "Acarinologisches," Arch. f. Nat. xlvi. pp. 355–374, pl. xvii., discusses at considerable length:—(i.) The Hydrachnid genus *Pontarachne*, Phil. ii. *Megamerus*, Dugés (Fam. *Trombidiidæ*). iii. The supposed hearing organs of Acarids.

P. Mégnin, in "Les parasites et les maladies parasitaires," Paris: 1880, appears to bring together the results of his previous works on the subject. He classifies the *Acaridea* (which occupy pp. 105–439 out of the 456 pp. contained in the vol.) very nearly according to Dugés and P. Gervais, dividing the order into 9 families:—i. *Bdellidæ*; ii. *Trombididæ*; iii. *Hydrachnidæ*; iv. *Gamasidæ*; v. *Ixodidæ*; *Oribatidæ*; vii. *Sarcoptidæ*; viii. *Demodicidæ*; ix. *Arctisconidæ*. In an analytical table, p. 108, two other families are intercalated, *Limnocharidæ* and *Hygrobatidæ*. Analytical tables are also given of the 5 families treated upon in the present work:—*Gamasidæ*, p. 109, *Ixodidæ*, p. 117, *Sarcoptidæ*, p. 136, *Trombididæ*, p. 238, and *Demodicidæ*, p. 253. Numerous genera and species are characterized and described. Pp. 274–439 are occupied with details of the noxious effects of the attacks of *Acari* upon—i. the human subject, pp. 276-327; ii. indigenous domestic animals—the horse, pp. 327–346, the ass and mule, p. 346, the ox, pp. 347–364, sheep, pp. 364–378, goat, pp. 378–382, pig, pp. 382–386, dog, pp. 386–404, cat, pp. 404–409, hare, pp. 409–413, domestic birds, pp. 413–425; iii. exotic domestic animals—dromedary, p. 425, llama, p. 427, giraffe, p. 427; iv. animals kept in menageries, and wild animals in a free state—lion, hyena, and bear, p. 429, fox, p. 430, wolf, p. 432, coati, p. 432, rat, p. 434, mouse, p. 436, gazelle and moufflon, pp. 436 & 437, bubal antelope, p. 437, chamois, pp. 437 & 438, monkey, p. 438, wombat, pp. 438 & 439.

Trombidiidæ.

P. Pichard, "Sur un Acarien destructeur du Phylloxera gallicole," C. R. xc. pp. 1572 & 1573, describes the larva of a *Trombidium* found at Vaucluse, in the larger galls of the *Phylloxera*; no name is given to it. [*Cf.* note by P. Mégnin, Bull. Soc. Ent. Fr. (5) x. p. c., who received from the same district and a similar nidus the hexapod larvæ of *Trombidium sericeum.*]

Megamerus haltica, sp. n., G. Haller, Arch. f. Nat. xlvi. p. 364, pl. xvii. figs. 5 & 6, Thunersee, in moss.

Trombidium audiens, sp. n., G. Haller, *l. c.* p. 370, figs. 7–9, Berne.

Cheyletus heteropalpus, p. 242, *C. parasitivorax*, p. 241, pl. xxii., *C. macronychus*, p. 243, Még., described ; P. Mégnin, *l. c.*

Harpirrhyncus nidulans, Még., = *Sarcoptes undulans*, Nitsch ? ; *id. l. c.* p. 244, pl. xxiii.

Hydrachnidæ.

Neuman, C. J. Om Sveriges Hydrachnider. Sv. Ak. Handl. (n. f.) xvii. No. 3, pp. 1-123, pls. i.-xiv.

Treats (pp. 1-16) on the literature of the family, and (pp. 16 & 17) the anatomy, &c., and then describes 72 species, belonging to 20 genera, 5 of which and 23 of the species are new. The species are distributed as follows :—*Atax*, Fabr., 5 ; *Nesæa*, C. L. Koch, 21 (10 new) ; *Piona*, Koch, 5 (3 new) ; *Hydrocheutes*, Koch, 3 ; *Hygrobates*, Koch, 2 (1 new), g. n. ; *Megapus*, 1 (sp. n.) ; *Midea*, Bruzelius, 1, g. n. ; *Mideopsis*, 1 (sp. n.), g. n. ; *Libertia*, 1 (sp. n.), g. n. ; *Pseudomarica*, 1 (sp. n.), *Marica*, C. L. Koch, 1 ; *Axona*, Kramer, 1 ; *Arrhenurus*, Kram., 14 (5 spp. nn.) ; *Anurania*, g. n., 2 ; *Limnesia*, C. L. Koch, 4 (with descriptions of the larvæ of 3 others, in second stage) ; *Eylais*, Latr., 1 ; *Diplodontus*, Dugés, 1 ; *Hydrachna*, Müller (C. L. Koch), 2 ; *Hydrodroma*, C. L. Koch, 1 ; *Bradypates*, Neum., 1.

Nesæa mirabilis, p. 31, pl. iii. fig. 3, *N. despiciens*, p. 32, *N. alpicola*, p. 37, *N. brevipalpus*, p. 38, *N. decorata*, p. 39, pl. viii. fig. 1, *N. spectabilis*, p. 40, pl. xii. fig. 4, *N. borealis* and *N. alpina*, p. 44, *N. brevipes*, p. 49, pl. ii. fig. 3, and *N. unguiculata*, p. 50, pl. v. fig. 3, spp. nn., *id. l. c.*, Sweden.

Piona lapponica and *P. mura*, p. 55, pl. ii. fig. 1, and *P. abnormis*, p. 56, pl. viii. fig. 3, spp. nn., *id. l. c.*, Sweden.

Hygrobates impressus, sp. n., *id. l. c.* p. 63, pl. iv. fig. 4, Sweden.

Megapus, g. n., p. 63. Type, *M. spinipes*, sp. n., p. 64, pl. i. fig. 4, *id. l. c.*, Sweden.

Mideopsis, g. n. ; type, *M. depressa*, sp. n., p. 67, pl. v. fig. 1, *id. l. c.*, Sweden.

Libertia, g. n., p. 68. Type, *L. insignis*, sp. n., p. 69, pl. viii. fig. 4, *id. l. c.*, Sweden.

Pseudomarica, g. n., p. 70. Type, *P. formosa*, sp. n., p. 71, pl. v. fig. 2, *id. l. c.*, Sweden.

Arrhenurus virens, p. 81, *A. kjerrmanni*, p. 83, pl. vi. fig. 3, *A. forcipatus*, p. 90, pl. vi. fig. 2, *A. nobilis*, p. 92, pl. x. fig. 1, and *A. castaneus*, p. 93, pl. ix. fig. 3, spp. nn., *id. l. c.*, Sweden.

Anurania, g. n. For *Acercus elegans*, Neum., pl. xiv. fig. 3, and *Acercus gotlandica*, id. pl. xi. fig. 3, *id. l. c.* p. 95, Sweden.

Pontarachna, Phil. : genus discussed ; G. Haller, Arch. f. Nat. xlvi. 1, p. 355 et seq. *P. punctulum*, Phil., p. 362, described ; *P. globula*, Phil., figured, pl. xvii. figs. 1-4.

Gamasidæ.

Gamasus sp. ?, found on a spider (*Homœomma familiare*) ; Bertkau, Mém. cour. Ac. Belg. 4to, xliii. p. 109, Tijuca.

Ixodidæ.

Ixodes algeriensis, sp. n., P. Mégnin, *l. c.* p. 124, found on oxen introduced into France from Africa. *I. marginatus* and *I. erinaceus*, found abundantly upon sheep afflicted with the "louping-ill sickness," and supposed to be in some way connected with it; Report of the Louping-ill Committee, pp. 1-11, Teviotdale Farmers' Club ("Hawick Express" Office: Nov. 4, 1880). [These Acarids appear to be merely consequent upon the disease, not a cause of it.]

Amblyomma adspersum, C. L. Koch, Barbacena, on a boa constrictor; *A. oblongo-guttatum*, Koch, Chapeo d'Uvas, on *Coryphodon*; and *A. infumatum*, Koch, hab. cit., on *Hydrochærus capybara*; P. Bertkau, *l. c.* p. 109.

Hæmalastor crassitarsus, p. 141, Caracas, and *H. acutitarsus*, p. 142, Japan, spp. nn., F. Karsch, MT. Münch. ent. Ver. 1880.

Ornithodorus rudis, New Granada, and *O. miliaris*, Bengal, spp. nn., *id. l. c.* p. 141.

Oribatidæ.

G. Haller, in "Miscellanea Acarinologica—*Oribatidæ*," treats (1) on the arrangements for the production of the egg, (2) on the larvæ. MT. schw. ent. Ges. v. pp. 502-508.

A. D. Michael & C. F. George, in "A Further Contribution to the Knowledge of British *Oribatidæ*," treat: (1) on the life-histories of the *Oribatidæ*; (2) on different modes of carrying the cast dorso-abdominal skins; (3) on the aquatic or amphibious species; (4) on new species, with summary. Some curious facts are detailed respecting the transformations of various species from the larval to the nymphal and perfect states. J. R. Micr. Soc. iii. pp. 32–43, pls. iii. & iv.

The same authors, in continuation of the above, describe and record various species, some of which are figured and several are new; *l. c.* pp. 177–201, pls. v. & vi.

Oribata sphagni, p. 179, fig. 6, nymph fig. 7, and *O. quadricornuta*, p. 181, fig. 1, nymph fig. 2, spp. nn., *iid. l. c.* pl. iv., England.

Liosoma ‖ *palmicincta*[*-tum*], sp. n., *iid. l. c.* p. 184, pl. iii. fig. 4, larva and nymph figs. 1, 2, & 3, England.

Tegeocranus velatus, sp. n., *iid. l. c.* p. 190, pl. vi. fig. 9, England.

Sarcoptidæ.

Canestrini, G. Intorno ad alcuni Acari parassiti. Atti Soc. Pad. vi. pp. 32–42, pls. i.–iv.

Gives an analysis (pp. 33 & 34) of the genera *Freyana*, Haller, *Pterolichus*, Rob., *Proctophyllodes*, Rob., *Xoloptes* and *Alloptes*, gg. nn., p. 34, *Dimorphus*, Hall., *Analges*, Nitsch. The first three of these have no sexual dimorphism in the development of the feet; but it is present in the last four. Of *Freyana*, 1 known species is recorded; of *Pterolichus*, 17; of *Proctophyllodes*, 7; *Xoloptes*, 1; *Alloptes*, 2 known spp. and 1 sp. n. *Dimorphus*, 5 known species; *Analges*, 2; *Myocoptes*, Clap., 1; *Listrophorus*, Pag., 1; *Cheyletus*, Latr., 1; and *Dermalichus* ?, 1.

P. Mégnin, in "Les parasites et les maladies parasitaires," divides this family into 5 tribes, distinguished from each other by anatomical characters and habits. i. DETRITICOLÆ, p. 138, including *Glyciphagus, Carpoglyphus, Tyroglyphus, Carpophagus*, and *Serrator*. ii. PLUMICOLÆ, p. 148, comprising *Dermoglyphus*, Még., *Pterolichus*, Rob., *Freyana*, Haller, *Pteronyssus*, Rob., *Analges*, Nitsch, *Dermalichus*, Még. & Koch, *Proctophyllodes*, Rob., *Pterodectes*, Rob., *Pterophagus*, Még. iii. CYSTICOLÆ, p. 151, comprising *Laminoscoptes* and *Cytolichus*. iv. GLIRICOLÆ, p. 155, comprising *Listrophorus*, Pag., and *Myocoptes*, Clap. v. PSORICÆ, p. 156, including *Sarcoptes*, Latr., *Psoroptes*, P. Gerv., and *Chorioptes*, ibid.

Alloptes palmatus, sp. n., G. Canestrini, *l. c.* pp. 38 & 41, pl. iv. fig. 1, on *Fringilla cœlebs*.

Serrator, Még., p. 144, and *S. amphibius*, Még., p. 145, found in rotting mushrooms, = *Tyroglyphus rostro-serratus*, Még.; Mégnin, *l. c.*

Cytolichus sarcoptoides, Még., *id. l. c.* p. 153, pl. viii. [*cf.* id., J. de l'Anat. Phys. xv. 1879, pp. 123–153, pls. vii. & viii., where this species and *Sarcoptes cysticola*, Vizioli, are described and figured.]

Listrophorus, Pag.: on this genus, *cf.* G. Haller, Z. wiss. Zool. xxxiv. p. 259. *L. pagenstecheri*, sp. n.. *id. l. c.* pl. ix. figs. 1–3.

Homopus, C. L. Koch: *id. l. c.* p. 261. *H. sciurinus*, C. L. Koch, figured, *ibid.* pl. ix. figs 4–6.

Dermacarus, g. n., p. *id. l. c.* 268. For *D. sciurinus*, Haller, p. 269, pl. xi. figs. 7–16.

Tyroglyphus megnini, sp. n., *id. l. c.* p. 273, pl. x. fig. 1, & pl. ix. fig. 16.

On the eggs of *Tyroglyphus* and some other Mites, *id. l. c.* pp. 289–293, pl. ix. figs. 4–7, & pl. x. figs. 12–19; and on the internal anatomy of *Tyroglyphus* and *Dermacarus*, with a summary of the characters of the *Tyroglyphidæ*, id. *l. c.* pp. 274–289, pls. ix.–xi. (in part).

Glycyphagus. P. Kramer, in a paper on its post-embryonal development, concludes (contrary to Mégnin) that the genital opening is developed before the adult state is attained. The larval and nymphal stages are indistinguishable. Arch. f. Nat. xlvi. p. 102.

P. Mégnin, "Sur une modification particulière d'un Acarien parasite" (C. R. xc. pp. 1371–1373), describes a protective cotton-like covering on the eggs of *Cheyletus heteropalpus* (?), found on *Cardinalis fulgens*.

ACARIDÆ.

Labidostomma luteum, Kramer. New to Britain; A. D. Michael, J. Quek. Club, 1880, p. 107, pl. vi. fig. 1, nymph, ? adult. [This genus appears to belong to the family *Pœcilophysidæ*, Cambr.

Pygmephorus spinosus, Kram. New to Britain; *id. l. c.* pp. 113–120, pl. vii. fig. 1, ad. ♂, fig. 2, ♀.

PHYTOPTIDÆ.

Phytoptus piri, Sorauer, described, and life-history given; E. L. Taschenberg, Praktische Insektenkunde, part v. p. 158, where reference

is made to a description of the same in a hitherto-unrecorded work by Sorauer, "Die Milbensucht der Birnbaüme," in "Arbeiten der pflanz-physiologischen Versuchsstation am Pomol. Institut zu Proskau, 1877."

Pentastomidæ.

Pentastomum polyzonum, Harley, rediscovered in an African Python, and its differences from *P. annulatum*, Baird (= *P. multicinctum*, Harley), pointed out; F. Jeffrey Bell, Ann. N. H. (5) vi. p. 173. [*Cf.* P. Z. S. 1857, for a good figure and short description of *P. polyzonum*, Harley.]

Tardigradæ.

F. E. L. Beal, Am. Nat. xiv. p. 593 (with woodcut), describes the manner of depositing eggs in this group.

The following papers have been omitted from former Records:—

Mégnin, M. Mémoire anatomique et zoologique sur un nouvel Acarien de la Famille des Sarcoptides, le *Tyroglyphus rostroserratus*, et sur son Hypopus. J. de l'Anat. Phys. ix. pp. 369–388.

——. Mémoire sur l'organisation et la distribution zoologique des Acariens de la Famille des Gamasides. *Op. cit.* xii. pp. 288–336, pls. vii. vii.

A general paper on the *Gamasidæ*, treating (i.) on their anatomy and physiology; (ii.) classification, based exclusively on organic affinity; (iii.) proof of the *Gamasidæ* forming a very natural transition between Arachnids and Insects; (iv.) establishment of the fact that the parasitism of Gamasids belongs exclusively to nymphs, or very young fecundated females, as a means of preservation and distribution, being thus "false parasites." The literature relating to this family is noticed; general considerations are entered into to show its place in the *Acaridea*; and an analytical table of the various families, together with Donnadieu's table (Recherches sur les Tetranyches. Lyon et Paris: 1875, 4to) is given. Analytical tables are also given of the genera and species of *Gamasidæ*, whose typical genus is *Uropoda* (not *Gamasus*). At pp. 327–335 a synopsis of the known species of *Gamasidæ* is given, viz., *Uropoda*, De Geer, 3; *Gamasus*, Latr., 13; *Dermanyssus*, Dugés, 3; *Pteroptus*, 1. Figures of each genus are given.

——. Mémoire sur les Sarcoptides plumicoles. *Op. cit.* xiii. pp. 209–248, 391–429, 498–519, & 629–656, pls. xii., xiii., xxii.–xxix., & xxxvi.–xxxviii.

An important and exhaustive treatise on the parasitic *Acaridea* living on birds' feathers. Part i. pp. 209–248, pls. xii. & xiii., treats upon the external anatomy of the family *Sarcoptidæ* in general, but especially of the *Sarcoptidæ plumicolæ*, in the following order:—Structural characters of *Acaridea*, pp. 210–212; ditto of fam. *Sarcoptidæ*, pp. 214–217; hairs of ditto, pp. 217–222; skin and cutaneous furrows, pp. 222–225; segments of cephalothorax, rostrum, legs, and abdomen, pp. 225–228; genital

organs, pp. 228–240 ; the different stages through which each individual, male and female, passes, pp. 228–240. The normal stages are, for males, four; for females, five : 1, egg ; 2, hexapod larva ; 3, octopod nymphs, without sexual organs ; 4, sexually perfect males, and immature females often wanting external genital organs, but capable of copulation ; 5, females sexually perfect and fecundated. Each of these stages is separately and fully discussed. Remarks are added on the moultings of *Sarcoptidæ*, pp. 240–244 ; on the habitat of the *plumicolæ* in general, pp. 245 & 246; and on their zoological affinities, pp. 246–248. Part ii., pp. 391–429, 498–519, & 629–656, characterizes and describes the genera (6 in number) and species (32), an analytical table being given, p. 392 : *Pterolichus*, C. Rob., 10 spp. ; *Pteronyssus*, C. Rob., 2 spp. ; *Dermalichus*, C. L. Koch, 11 spp. (9 of these last, however, are described further on under *Analges*, Nitsch, and 1 under *Dermoglyphus*, C. Rob., p. 498, *et seq.*) ; *Proctophyllodes*, C. Rob., 8 spp. (4 of which are included under the subgenus, *Pterodactes*, C. Rob.); *Pterophagus*, Még. The greater number are figured ; none are new.

[MÉGNIN, M.]. Mémoire sur le *Demodex folliculorum*, Owen. J. Anat. Phys. xiii .(1877) pp. 97–122, pl. ix.

Treats at considerable length upon the bibliography and zoological position of this curious Arachnid. The genus is characterized, p. 110, and the species, *D. folliculorum*, with its varieties, *hominis* and *cati*, are described, pp. 111 & 112. Its anatomy and physiology are fully detailed, pp. 113–122.

ROBIN, C. Note sur une nouvelle espèce de Tyroglyphe, le *Tyroglyphus sironiformis*. J. de l'Anat. Phys. ix. pp. 435–438.

DONNADIEU, A. L. Sur un Acarien nouveau, suivi d'un essai d'une classification parallèle de l'ordre des Acariens. J. de l'Anat. Phys. xii. pp. 595–602, pl. xviii.

The species described is *Heterotrichus inæque-armatus*.

MYRIOPODA.

BY

W. F. Kirby, M.E.S., &c.

The General Subject.

Fanzago, F. Escursione in Calabria: Miriapodi. Bull. Ent. Ital. xii. pp. 265–277, pl. ii.

Includes notes on the species taken, and descriptions of several known as well as new species.

Giard, A. Note sur l'existence temporaire de Myriapodes dans les fosses nasales de l'homme, suivie de quelques réflexions sur le parasitisme inchoatif. Bull. Sci. Nord, 1880.

[Not seen by the Recorder.]

Graber, V. Ueber das unicorneale Tracheaten- und speciell das Arachnoiden- und Myriopoden-Auge. Arch. mikr. Anat. xvii. pp. 58–94, pls. v.–vii.

Grenacher, H. Ueber die Augen einiger Myriapoden. Zugleich eine Entgegnung an V. Graber. Arch. mikr. Anat. xviii. pp. 415–467, pls. xx. & xxi.

The structure of the eyes in several species of *Scolopendridæ*, and of *Lithobius*, *Julus*, *Glomeris*, and *Cermatia* is described and figured.

Chilopoda.

Bogdanova, A. E. [Anatomy of *Lithobius forficatus*.] Moscow: 1880, 4to, pp. 34, pls. i.–iii. (col.), and woodcuts.

A pamphlet entirely in Russian.

Haase, E. Schlesiens Chilopoden. I. *Chilopoda-Anamorpha*. (Inaugural Dissertation.) Breslau: 1880, 4to, pp. 44.

[Not seen by the Recorder.]

Latzel, R. Die Myriopoden der Österreichisch-Ungarischen Monarchie. Mit Bestimmungs-Tabellen aller bisher aufgestellten Myriopoden-Gattungen, und zahlreichen, die morphologischen Verhältnisse dieser Thiere illustrirenden, Abbildungen. Erste Hälfte. Die Chilopoden. Wien: 1880, 8vo, pp. xv. & 228, pls. x.

Very full details are given respecting bibliography, structure, &c., and the genera and species are also fully described in all stages, many of the latter being new. The plates represent generic details.

Tömösváry, E. Beitrag zur Kenntniss der Myriopoden Ungarns. I.—Die Chilopoden. Zool. Anz. iii. pp. 617–619.

List of species, with descriptions of 4 new ones.

Cermatia forceps. Eye and brain described; the former does not differ essentially from that of other *Myriopoda*; the latter resembles that of *Bothropolys.* The brain of Myriopods more resembles that of Insects than that of *Crustacea,* including *Limulus*; and the structure of the eye is also essentially different from that of the latter. Mason & Packard, Am. Nat. xiv. pp. 662 & 663.

Lithobius. Larva noticed; Ryder, Am. Nat. xiv. p. 376.

Lithobius sibiricus, Gerstf. Under this name, Gerstfeldt confounded two species, *L. affinis* and *orientalis*, Ssel., for the former of which the name should be retained; Sseliwanoff, Zool. Anz. iii. pp. 541–543.

Lithobius sibiricus and *Craspedosoma armatum*, Gerstf., redescribed; Haase, *op. cit.* pp. 223–225.

In the *Geophilidæ*, each segment bearing a single pair of legs is double, being formed of a front and back segment; Sseliwanoff, *l. c.* p. 167.

Geophilus electricus. Phosphorescence; J. MacLeod, Feuill. Nat. x. p. 38.

Stigmatogaster, g. n., Latzel, Die Myriopoden, p. 211. Allied to *Bothriogaster*; a deep stigma-like pit on each side of several adjacent abdominal plates, set rather forward; dorsal shields with a double fork. Types, *Himantarium subterraneum*, Leach, and *H. gracile*, Mein.

Notiphilides, g. n., *id.* Zool. Anz. iii. p. 547. Allied to *Notiphilus*; type, *N. maximiliani*, Humb. & Sauss.

New species :—

Lithobius leptopus, Austria, p. 53, *dalmaticus*, Dalmatia, p. 61, *peregrinus*, Austria, p. 63, *nigrifrons*, p. 71, *aulacopus*, p. 84, *pygmæus*, p. 86, *anodus*, Austria, p. 88, *subtilis*, Tyrol, p. 91, *pusillus*, p. 108, *stygius*, p. 113, *illyricus*, Austria, p. 115, *id.* l. c.; *L. nodulipes* and *cyrtopus*, id. Zool. Anz. iii. p. 225, Austria; *L.* (*Eulithobius*) *maculatus*, p. 201, *L.* (*Neolithobius*) *terreus*, p. 203, *L.* (*L.*) *parvolus* (sic), p. 213, *inæquidens*, p. 214, *ardesiacus* and *violaceus*, p. 215, *marginatus*, p. 217, and *L.* (*Archilithobius*) *meridionalis*, Fedrizzi, Atti Soc. Pad. v. (1878, omitted from Zool. Rec. xv.), Italy; *L. calabrensis* and *depressus*, Fanzago, Bull. Ent. Ital. xii. pp. 269 & 270, Calabria; *L. brachycephalus*, id. *l. c.*, Resoconti, 1880, p. 16, Avellana; *L. dubius*, S. Hungary, and *dadayi*, S. Transylvania, Tömösváry, Zool. Anz. iii. p. 618; *L. thetidis*, Karsch, Z. ges. Naturw. (3) v. p. 848, China.

Mecistocephalus hungaricus, Tömösváry, *l. c.* p. 619, E. Hungary.

Geophilus paradoxus, id. *l. c.*, E. Hungary ; *G. sudeticus*, Haase, Zool. Anz. iii. p. 68, Altvater; *G. gorizensis*, p. 170, *strictus*, p. 174, *condylogaster*, p. 178, and *pygmæus*, p. 182, Latzel, *l. c.*, Austria.

Chilognatha.

Chatin, J. Morphologie des pièces mandibulaires dans l'Ordre des Chilognathes. Bull. Soc. Philom. (7) iii. pp. 117–120.

The appearance of the different parts on dissection is described. All the morphological elements in the maxillary organs of an insect are met with readily in the mandibles of the *Myriopoda*, without presenting any primary or essential differences.

Polyxenes fasciolatus, Say, var. *pallidus*, from Chesapeake Bay, described by Ryder, Am. Nat. xiv. pp. 821 & 822.

Polydesmus (*Fontaria*) *dœnitzi*, sp. n., Karsch, Z. ges. Naturw. (3) v. p. 848, Japan.

Cryptodesmus getschmanni, sp. n., id. SB. nat. Fr. 1880. p. 58, Asturias.

Iulus anguinus, id. *l. c.* p. 77, Sandwich Islands ; *I. zameniscolor* and *blasioi*, Fanzago, Bull. Ent. Ital. xii. pp. 272 & 273, Calabria, spp. nn.

Hirudisoma pallidum, sp. n., *id. l. c.* p. 276, pl. ii., Calabria.

"Symphula."

Under this name, Ryder erects the genus *Scolopendrella*, Gerv., into a new order of *Articulata*, intermediate between the *Myriopoda*, *Insecta*, and *Thysanura*; Am. Nat. xiv. pp. 375 & 376. He also (*l. c.*) indicates *Scolopendrella gratia*, from Philadelphia, as a form probably distinct from *S. immaculata*, Newp.

Peripatus.

General notes; Peters, SB. nat. Fr. 1880, pp. 28 & 29. On the variation in the number of legs ; *id. l. c.* pp. 165 & 166.

INSECTA.

THE GENERAL SUBJECT.

By W. F. Kirby, M.E.S., &c.

Adolph, G. E. Ueber Insectenflügel. Verh. L.-C. Ak. xli. pp. 213–292, pls. xxvii.–xxxii.

Relates to the development, homologies, and neuration (normal and abnormal) of the wings of *Hymenoptera*, *Lepidoptera*, *Neuroptera*, *Pseudo-Neuroptera*, and *Diptera*. Some of the plates are photographic.

——. Ueber abnorme Zellenbildungen einiger Hymenopterenflügel. *L. c.* pp. 293–328, pl. xxxiii.

Relates to *Apidæ*, *Sphegidæ*, *Pompilidæ*, *Sapygidæ*, *Scoliidæ*, and *Vespidæ*.

Ashmead, W. H. Orange Insects. A treatise on the injurious and beneficial Insects found on the Orange Trees of Florida. Jacksonville, Florida : 1880, 8vo, pp. xv. & 78, pl. iv. and woodcuts.

The introduction relates to the general history of the orange and its cultivation. Several new species of insects, &c., of various Orders, are described in the body of the work; and the complete natural history of every species mentioned is given as far as known.

Balbiani, F. Leçons sur la génération des Vertébrés. Paris : 1879, 8vo.

Contains important observations on parthenogenesis in Invertebrata, which are discussed in Kosmos, vii. pp. 307–310.

Bargagli, P. Di tre opuscoli sugli insetti fossili e sulle formazioni inglesi e straniere nelle quali sono stati scoperti avanzi d'insetti, pubblicati da H. Goss. Bull. Ent. Ital. xii. pp. 127–138, 232–240, & 255–264.

Becker, A. Beiträge zu meinen Verzeichnissen der am Sarepta und am Bogdo vorkommenden Pflanzen und Insecten, und Beschreibung einer *Mylabris*-larve. Bull. Mosc. lv. pp. 145–156.

Includes lists of *Lepidoptera*, *Coleoptera*, *Hymenoptera*, and *Diptera*.

Bertkau, P. Bericht über die wissenschaftlichen Leistungen im Gebiete der Arthropoden im Jahre 1879. Arch. f. Nat. xlvi. pt. ii, pp. 233–570.

Brandt, A. Commentäre zur Keimbläschentheorie des Eies. ii. Das Keimbläschen als primäre Zelle. Die amöboide Beweglichkeit des Keimbläschens und Zellkerns, besonders in ihren Beziehungen zur Eifurchung, Befruchtung und Kerntheilung. Arch. mikr. Anat. xvii. pp. 551–574.

A review of criticisms by various authors on the writer's previous papers on the subject.

Brandt, E. Recherches sur l'anatomie comparée du systéme nerveux dans les divers Ordres de la Classe des Insectes. C. R. xci. pp. 935–937.

The writer sums up his principal observations on *Coleoptera, Lepidoptera, Diptera*, and *Hemiptera* as follows. *Coleoptera*: (1) In some species the sub-œsophagal ganglion is confounded with the thoracic ganglion; the cerebral ganglia are always convoluted. (2) There are one to three thoracic ganglia; if two or three are present, only the last is composite. (3) The number of abdominal ganglia varies from one to eight; in some species there are no separate abdominal ganglia, as they are confounded with the thoracic portion; sometimes the males of the same species present more separate ganglia than the females. *Lepidoptera*: (1) All present two cephalic ganglia; the sub-œsophagal ganglion is convoluted. (2) There are generally two thoracic ganglia, the first simple, the second composite; some species have three, sometimes close together, sometimes separated; an intermediate form with two, the second constricted, also occurs. (3) There are always 4 abdominal ganglia; *Hepialus humuli* alone has 5. *Diptera*: (1) Two separated cephalic ganglia are always present, and the sub-œsophagal ganglion is always convoluted. (2) There are from one to three thoracic ganglia; if two, both are composite; if three, the last only is so. (3) The number of abdominal ganglia varies from one to eight, and sometimes varies according to the sex; in the *Muscidæ Calypteræ* the abdominal ganglia are not separated, but confounded with the central nervous mass of the thorax. (4) There is one frontal and two pairs of small pharyngeal ganglia; but the abdominal portion of the sympathetic system is not distinct. *Hemiptera.* (1) Some have no separate sub-œsophagal ganglion, when it is confounded with the medullary portion of the thorax. (2) In some cases it is separate, and placed in the thorax instead of the head; the cerebral lobes are always convoluted. (3) In some cases, where two thoracic ganglia are present, the first is formed by the fusion of the first thoracic ganglion with the sub-œsophagal ganglion. (4) The number of thoracic ganglia varies from one to three. (5) There are no separate abdominal ganglia; they are always confounded with the thoracic portion of the nervous system. The numbers of species examined are as follows:—*Coleoptera*, 235 perfect insects, 36 larvæ; *Lepidoptera*, 118 perfect insects, 42 larvæ; *Diptera*, 275 perfect insects, 29 larvæ; *Hemiptera*, 70 species.

Cameron, P. Notes on the Coloration and Development of Insects. Tr. E. Soc. 1880, pp. 69–79.

Relates to *Sphingidæ* and *Tenthredinidæ*.

Chambers, V. T. Insects injuring the Black Locust (*Robinia pseudacacia*). Am. Ent. iii. pp. 59–61.

Hispa suturalis, *Lithocolletis robiniella* and *ornatella*, *Gelechia robiniella*, and *Cecidomyia robiniæ* are the chief destroyers.

Chatin, J. Recherches sur le grand sympathique des Insectes. Bull. Soc. Philom. (7) iv. pp. 11–15.

After briefly noticing the anatomy, histology, and morphology of the ventral cord in insects, the writer concludes that its evolution runs parallel with that of the sub-intestinal chain, revealing an identity between them which only disappears in the last stages of their development.

Comstock, J. H. Report upon Cotton Insects, prepared under the direction of the Commissioner of Agriculture. Washington: 1879, 8vo, pp. v. & 511, 3 pls.

[Not seen by the Recorder.]

Dalla Torre, K. W. v. Addenda und Corrigenda zu Hagen's Bibliotheca Entomologica. ii. Ent. Nachr. vi. pp. 125–129, 137–140, 168–171, 261–267.

Fitch, E. A. Insects bred from *Cynips kollari* galls. Ent. xiii. pp. 252–263, fig.

A great number of species, chiefly *Hymenoptera*, some new to Britain; but various *Lepidoptera*, *Diptera*, *Coleoptera*, *Orthoptera*, and *Neuroptera* are also recorded. The insect figured is the young larva of *Meconema varium*, F. (*Locustidæ*).

Fuller, A. S. The Insect Enemies and Diseases of our Small Fruits. Am. Ent. iii. pp. 61–63, 91–93, 109, & 110, woodcuts.

Relates to the insects injurious to blackberry, raspberry, currant, gooseberry, and strawberry in the United States.

——. Birds versus Insects. *L. c.* pp. 69–72 & 96–100.

Discusses the question as to whether birds are injurious or beneficial to agriculturists.

Gestro, R. Appunti sull' Entomologia Tunisina. Ann. Mus. Genov. xv. pp. 405–424.

Relates to insects of various orders, especially *Coleoptera*, of which a list is given, and several new species described.

Godman, F. Ducane, & Salvin, O. Biologia Centrali-Americana: or Contributions to the Knowledge of the Fauna and Flora of Mexico and Central America. Pts. iii.–viii. London, 1880, 4to.

The portions relating to Entomology published during 1880 are as follows:—*Coleoptera*, vol. iii. pt. ii., by H. S. Gorham, pp. 1–24, pls. i. & ii. *Coleoptera*, vol. v., by H. W. Bates, pp. 17–152, pls. v.–x. *Coleo-*

ptera, vol. vi. pt. 1, by M. Jacoby, pp. 1–72, pls. i.–iii. *Lepidoptera—Rhopalocera*, by F. D. Godman & O. Salvin, pp. 57–88, pls. v.–viii. *Rhynchota*, by W. L. Distant, pp. 1–88, pls. i.–viii.

Goss, H. Introductory Papers on Fossil Entomology, Nos. 10 & 11. Ent. M. M. xvi. pp. 176–181 & 198–201.

Relates to the insects of the Miocene and Quatenary periods.

——. [See Bargagli, P.]

Hartwig, R. Anlage der Keimblätter bei den Insecten. Jen. Z. Nat. xiv. pp. 124–128.

The writer concludes that the mesoblast of insects is separated from the endoblast by a fold, and that the body-cavity first originates in a bifurcation of the rudimentary intestine.

Hauser, G. Physiologische und histiologische Untersuchungen über das Geruchsorgan der Insecten. Z. wiss. Zool. xxxiv. pp. 367–403, pls. xvii.-xix.

The sense of smell appears to reside in the antennæ, which are always more strongly developed in the male than in the female. Insects deprived of their antennæ are unable to find their way to odoriferous food placed near them, and in most cases appear to have lost the sexual instinct. The writer details his histological observations on the antennæ, &c., of a large number of insects of different orders, and arrives at the following conclusions:—The olfactory organs of all the *Orthoptera*, *Pseudo-Neuroptera*, *Diptera*, and *Hymenoptera*, and of a large proportion of *Lepidoptera*, *Neuroptera*, and *Coleoptera*, consist of (1) a strong nerve rising from the cephalic ganglion, and running into the antennæ. (2) A perceptive apparatus, consisting of terminal points of the hypodermis, connected with the fibres of the nerves. (3) An accessory apparatus, formed by furrows or pits filled with a watery fluid, which are to be regarded simply as indentations of the epidermis.

Hubbard, H. G. Two days' collecting in the Mammoth Cave, with Contributions to a Study of its Fauna. Am. Ent. iii. pp. 34–40 & 79–84, figs. 8–10 & 19–24.

Several of the more interesting insects, &c., are described and figured.

Jaworowski, A. Ueber die Entwicklung des Rückengefässes und speciell der Musculatur bei *Chironomus* und einigen anderen Insecten. SB. Ak. Wien, lxxx. Abth. 1, pp. 238–258, pls. i.–v.

Preliminary notes, from a larger work in progress on the same subject. The author's conclusions are as follows:—(1) Every nucleus in the contractile epidermis of the heart (Herzwand) is accompanied by a retractile cell; (2) every circular muscle is developed from two lateral cells, which partly coalesce on the median line; (3) a portion of the muscles of the heart fulfils the functions of valves.

Joseph, G. Vorlaüfige Mittheilungen über Innervation und Entwickelung der Spinnorgane der Insecten. Zool. Anz. iii. pp. 326–328.

Relates to *Lepidoptera*, *Hymenoptera*, and *Neuroptera*, but the paper does not admit of abridgment.

KARSCH, F. Neue Zoocecidien und Cecidozoën. Z. ges. Naturw. (3) v. pp. 286–309.

Includes notices of 41 galls, mostly undetermined; but 5 species of *Diplolepis*, and 1 of *Cecidomyia*, are described as new.

KATTER, F. Index Entomologicus, pars i., qua continentur nomina Entomologorum Europæ (exceptis Galliæ Coleopterologis), Societatum Actorumque entomologicorum. Putbus: 1880, 12mo, pp. 1–124.

KÖPPEN, F. T. Die schädlichen Insecten Russlands. St. Petersburg: 1880, 8vo, pp. vi. & 526, pl. 1. [Forms Beitr. Russ. Reiches (2) iii.]

In an introduction of 84 pp., the author first discusses the climatic zones of Russia, of which he admits 4: (1) the arctic, or tundra zone; (2) the forest zone; (3) the steppe zone; (4) the Mediterranean district. The principal trees and cultivated plants of Russia are then enumerated, and the insects injurious to the root, leaves, &c., indicated. The chief agricultural zones of Russia are marked by rye, flax, mixed grain, mangel-wurzel, and wheat. The introduction concludes with general remarks on the destruction of injurious insects, the question of State interference, &c. The bulk of the work consists of more or less detailed notices of the principal insects injurious to agriculture, &c., in Russia, systematically arranged under the various orders.

KRAATZ, G. Missbildungen von Insecten. Deutsche E. Z. xxiv. figs. 339–345, pl. ii.

Referring to Mocquerys's work (vide *Coleoptera*), Kraatz describes and figures a considerable number of malformed *Coleoptera*, and a malformed pupa of *Sphinx ligustri*.

KRAUCHER, G. Der Bau der Stigmen bei den Insecten. Zool. Anz. iii. pp. 584–588.

The author describes the structure and development of the stigmata, of which he recognizes 5 distinct forms:—

I. Without lips.
   a. The stigma is a simple cavity, kept open by a chitinous ring.
   b. The stigma consists of a series of separate stigmata, generally surrounded by a common chitinous ring. They project as tubes into the underlying trachea.

II. With lips.
   c. The lips are represented by simply formed thinly haired chitinous elevations.
   d. The lips slope inwards, and are covered with dense hair or down.
   e. On one side of the round stigma is a process projecting towards the middle.

LIÉNARD, V. Recherches sur le système nerveux des Arthropodes; constitution de l'anneau œsophagien. 1ière partie. Bull. Ac. Belg. xlix. pp. 176–188, pl.; Arch. Biol. i. pp. 381–391, pl. xv.

Four types of structure, of which Crustaceans, *Dytiscus*, *Cossus*, and Haustellate Insects generally, may be respectively regarded as typical, are

defined; but, as each of these so-called types includes many insects, *Crustacea*, &c., of very different groups, the classificatory value of the observations appears to be nil. The most important observation, however, is that the commisural fibres are never detached from the connective except occasionally in appearance.

McLachlan, R. *Eucalyptus* Galls. Ent. M. M. xvii. pp. 145–147, woodcuts.

These contained remains of Dipterous and Lepidopterous larvæ, and Hymenopterous parasites.

Mégnin, P. Les Parasites et les maladies parasitaires chez l'homme, les animaux domestiques et les animaux sauvages, avec lesquels ils peuvent être en contact. Insectes, Arachnides, Crustacés. Avec 63 figures dans le texte, et un Atlas de 26 planches dessinées par l'auteur. Paris: 1880, 8vo, pp. 478, pls. xxvi.

A useful treatise, divided into six chapters, dealing with *Diptera*, *Hemiptera*, *Aphaniptera* and *Coleoptera*, *Epizoa*, *Acari*, and *Crustacea*.

Meinert, F. Sur la conformation de la tête et sur l'interpretation des organes chez les Insectes, ainsi que sur la systématique de cet Ordre. Ent. Tidskr. i. pp. 147–150.

The author briefly describes the structure of the head and mouth-organs in Insects, and proposes to divide the class into two main sections, as follows:—

I. Insects with fixed and jointed mouth-organs: *Coleoptera*, *Synistata*, *Hymenoptera*, *Lepidoptera*, *Mallophaga*, *Chilognatha*, *Ulonata*, and *Chilopoda*.

II. Insects with protractile mouth-organs, which are scarcely jointed: *Diptera*, *Siphonoptera*, *Siphonculæ*, and *Hemiptera*.

——. Om Ordenen *Diploglossata*. Vid. Medd. 1879–80, pp. 343–346.

Hemimerus is intermediate between the *Orthoptera* and *Thysanura*, and the writer is inclined to refer it to the latter group, rather than to place it in an Order by itself.

Müller, H. Alpenblumen, ihre Befruchtung durch Insecten, und ihre Anpassung an dieselben. Leipzig: 1881 (Nov., 1880), 8vo, pp. iv.–611, woodcuts.

[Not seen by the Recorder.]

Nickerl, O. Bericht über die im Jahre 1879 der Landwirthschaft Böhmens schädlichen Insekten. Erstattet zu einen hohen Landesculturrath für das Königreich Böhmen. Prag: 1880, 8vo, pp. 23.

Contains notices of the appearance of 30 insects of various Orders.

Notthaft, J. Über die Gesichtswahrnehmungen Vermittels des Facettenauges. Abh. Senck. Ges. xii. pp. 35–124, pls. i.–iii.

An elaborate paper, written chiefly from optical and mathematical standpoints, discussing the vision of insects of various Orders, and comparing it with that of the higher animals.

Ormerod, E. A. Notes of Observations of Injurious Insects, Report, 1879. London: 1880, 8vo, pp. iv. & 44, woodcuts.

Discusses the ravages of 32 species, of different Orders, in a practical manner.

Poletajew, H. Die Flugmuskeln der Lepidopteren und Libelluliden. Zool. Anz. iii. pp. 212 & 213.

The wing-muscles of *Lepidoptera* may be considered as the model of those of many other insects. They may be divided into three groups: (1) a pair of median longitudinal muscles, which run longitudinally upwards into the metathorax and depress the wings; (2) lateral dorso-ventral muscles of the meso- and meta-thorax, which are fixed above to the pterygodes, and below to the sides of the external skeleton, and which depress the wings; (3) middle dorso-ventral muscles, lying between the dorsal and lateral muscles, attached above to the dorsal plates, and below to the skeleton of the legs; these raise the wings. There are only two muscles attached to the wings above by tendons. The axis of rotation of the wings runs parallel to the axis of the body. In the *Libellulidæ*, the median wing-muscles and the pterygodes are absent. Each of the principal muscles is connected with one or two very small accessory muscles, and the muscles are attached immediately to the base of the swollen wing-veins. All the muscles are fixed at their upper, and sometimes at their lower end also, by conical, cup-shaped tendons. The rotatory axis of the wings intersects the axis of the insect at an angle of 30–55°.

Puton, A. Quelques mots sur la Nomenclature Entomologique: La Loi de Priorité et la Loi de Prescription. Ann. Soc. Ent. Fr. (5) x. pp. 33–40.

Reichenau, W. von. Beiträge zur Biologie und Psychologie. iii. Reizungs- und Vertheidigungs-organe Geschlechtstrie bund Gefühllosigkeit bei Insecten, insbesondere Schmetterlinge. Ent. Nachr. vi. pp. 203–206.

Relates chiefly to the physiological part played by the scent-organs of insects.

Reichenow, A. Beiträge zur Phaenologie der auffälligeren Insecten um Mainz; betreffend das Jahr 1879 im Vergleiche mit seinen frei vorhergegangenen Jahren (1878, 1877, 1876). Ent. Nachr. vi. pp. 41–45, 76–81.

Dates of first appearance of insects of various Orders.

Reuter, O. M. Sur l'hybridisation chez les Insectes. Ent. Tidskr. i. pp. 174–177.

Rietsch, M. Études de N. Bobretzky sur la formation du blastoderme et des feuillets germinatifs chez les Insectes, analysés au Laboratoire de Zoologie de Marseille. Rev. Montp. (2) ii. pp. 54–60.

A sketch of Bobretzky's observations, with remarks on the comparative embryogeny of insects, *Arachnida*, and *Crustacea*.

Rössler, A. Ueber Studien zur Descendenztheorie. Deutsche E. Z. xxiv. pp. 249–252.

Relates to the writings of Weismann and Schilde on the theory of descent.

Sajó, K. Entomologische Bilder aus den ungarischen Flugsandsteppen. Ent. Nachr. vi. pp. 198–202.

Relates to insects of various Orders.

Schφyen, W. M. Supplement til H. Siebke's Enumeratio Insectorum Norvegicorum. Fasc. i. & ii. (*Hemiptera, Orthoptera*, and *Coleoptera*). Forh. Selsk. Chr. 1879, No. 3, pp. 74.

——. Bidrag til Gudbrandsdalens og Dovrefjelds Insektfauna, beretning om en i Sommeren 1877 foretagens entomologisk Reise. N. Mag. Naturw. xxiv. pp. 153–220, 306–309.

Relates to insects of all orders; the *Lepidoptera* have been already noticed [*cf.* Zool. Rec. xv. *Ins.* p. 165].

Scudder, S. H. Problems in Entomology. Canad. Ent. xii. pp. 161–167.

Stoll, O. Excursionen in Guatemala. MT. schw. ent. Ges. vi. pp. 62–71.

Includes remarks on cochineal, *Hymenoptera*, &c.

Swinton, A. H. Insect Variety: its Propagation and Distribution. Treating of the Odours, Dances, Colours, and Music in all Grasshoppers, *Cicadæ*, and Moths; Beetles, Leaf-Insects, Bees, and Butterflies; Bugs, Flies, and *Ephemeræ*; and exhibiting the bearing of the Science of Entomology on Economy. London: 1880, 8vo, pp. x., 326, 1 col. and 7 plain plates.

A semi-popular work, but containing a considerable amount of original observations, especially relating to the stridulation of insects.

Taeschler, M. Ueber die Stellung der Insekten und der Entomologie in der öffentlichen Meinung. Ber. St. Gall. Ges. 1878–79, pp. 101–174.

A popular article.

Taschenberg, E. L. Praktische Insektenkunde. Bremen: 1880, 8vo, woodcuts. iii. Die Schmetterlinge, pp. viii., 311; iv. Die Zweiflügler, Netzflügler, und Kaukerfe, pp. vii., 227; v., Die Schnabelkerfe, Flügellosen, Parasiten, und als Anhang einiges Ungeziefer, welches nicht in den Insekten gehört, pp. viii., 238.

The completion of the work noticed in Zool. Rec. xvi. *Ins.* pp. 6 & 7. General indices are appended to vol. v.

Thomas, F. Durch Thiere erzeugte Pflanzengallen. Botan. Jahresb. vi.

Wachtl, F. A. Beiträge zur Kenntniss der Gallen erzeugenden Insecten Europas. Verh. z.-b. Wien, xxx. pp. 531–546, pl. xviii.

Relates to the Dipterous genus *Asphondylia*, Loew, and to various *Cynipidæ*

WARD, L. F. The Relation between Insects and Plants, and the Consensus in Animal and Vegetable Life. Am. Ent. iii. pp. 63-67, 87–91, woodcuts.

WATERHOUSE, C. O. Aid to the Identification of Insects, edited by C. O. Waterhouse, lithographed by E. Wilson. Part 1. London: 1880, sm. 4to, pls. i.–viii.

Each plate contains a figure of a single species, which has previously been described, but not figured.

WILLIAMS, J. Beneficial Insects. Rep. E. Soc. Ont. 1878, pp. 36–46, figs. 15–35.

Relates to various species of *Chrysopa*, *Cicindela*, *Calosoma*, and *Coccinellidæ*.

Physiology, Habits, &c.

Nerve-system. See Fœttinger, infrà (*Coleoptera*), p. 12.

There are two distinct kinds of buzzing produced by insects—a grave sound during flight, produced by the vibration of the wings, and an acute sound, only produced during rest, and unaffected by the removal of the wings. The latter is due to vibration of the thoracic muscles. J. de Bellesme, Assoc. Fr. vii. pp. 753 & 754.

Observations on insects placed in vacuo, under water, &c.; *id.* Feuill. Nat. xi. pp. 3, 4, 17 & 18.

Taschenberg (Z. ges. Naturw. 3, v. pp. 903–905) discusses the causes of swarms of insects, and enumerates them as follows:—(1) Over-population, and the necessity of sending out colonies, as in the hive-bee and some *Aphides*; (2) Pairing, as in ants, Termites, gnats, and *Ephemeridæ*; (3) Search for food, as in *Cnethocampa*, the Colorado Beetle, &c.; (4) Search for breeding-places, as in *Psilura monacha*; and (5) Migrations, as with *Vanessa cardui*, and other butterflies and *Libellulidæ*.

Preliminary remarks on monochromatic impressions in *Invertebrata*; Chatin, C. R. xc. pp. 41–43 (*cf.* also *Coleoptera* : *Hydrophilidæ*).

Note on odoriferous *Coleoptera* and *Lepidoptera*. Camerano, Le Nat. ii. p. 210.

On rearing wood-boring larvæ; Riley, Am. Ent. iii. p. 155.

On the fertilization of flowers by insects; Nature, xxi. p. 275; Am. Nat. xiv. pp. 198–204, 288–291, 731–733; Ann. Sci. Nat., Bot. (6) viii.; Naturhistoriker, ii. pp. 69, 70, & 77–79; Kosmos, viii. pp. 219–236, 276–287, & 350–365.

Natural insect-traps (teasel, &c.); Fitch, Ent. xiii. pp. 70–72, *cf.* also Nature, xxii. p. 277.

Various insects noticed as feeding on fern (*Pteris aquilina*); Brischke, Ent. Nachr. vi. pp. 56 & 57.

Dahlias (?) stated to be very attractive, and not injurious to insects in India; Rothney, P. E. Soc. 1880, p. x.

Local Faunæ and Observations.

England.—Observations on insects at Worcester in 1879; J. E. Fletcher Ent. M. M. xvi. pp. 212 & 213.

Captures.—Insects of various orders in the Scilly Islands; F. Norgate, Ent. M. M. xvi. pp. 182 & 183. *Coleoptera* and *Hemiptera* at Hunstanton, Norfolk; W. W. Fowler, *op. cit.* p. 275. Also at Hastings; E. A. Butler, *op. cit.* xvii. pp. 67 & 68. *Hymenoptera* and *Hemiptera* at Colchester; E. Saunders, *tom. cit.* pp. 68 & 69.

Europe.—Notes on new or rare Swedish insects; Spångberg, Ent. Tidskr. i. pp. 198–200, 215, & 216.

Notes on various Silesian *Coleoptera*, *Lepidoptera*, and *Hemiptera*; JB. schles. Ges. lvii. pp. 350–358.

General notes on the entomology of Portugal; A. E. Eaton, Ent. M. M. xvii. pp. 73–79.

Captures.—Various Orders: in the island of Wermlö, near Stockholm; O. T. Sandahl, Ent. Tidskr. i. pp. 42–50. In Norway; J. Sparre Schneider, Forh. Selsk. Chr. 1879, No. 3, pp. 12. In Holland; Tijdschr. Ent. xxiii. pp. xix. & xxi. In the Alps, where insects were unusually scarce in 1880; Fairmaire, Bull. Soc. Ent. Fr. (5) x. pp. cxxxii. & cxxiii. In Spain; Cuni y Martorell, An. Soc. Esp. ix. pp. 207–209, 215–224, 231–233, & 238–242.

Asia.—Notes on collecting in Japan; G. Lewis, Ent. M. M. xvii. pp. 20 & 21.

Notes on insects (chiefly *Coleoptera*) from Candahar, the Andaman Islands, and Gran Bassam (Guinea); Dohrn, S. E. Z. xli. pp. 368–371.

On collecting in Southern India; E. L. Arnold, Ent. xiii. pp. 135–137.

North and Central America and West Indies.—A. J. Cook estimates the probable number of North American species of insects at 200,000 [nearly as many as the total number of insects described from all parts of the world]; Am. Ent. iii. p. 103.

Scarcity of insects in Canada in 1879; C. E. Heustis, Canad. Ent. xii. pp. 19 & 20.

Notes on the appearance of 13 destructive insects; and insect register for 1878; Rep. E. Soc. Ont. 1878, pp. 55–59.

Early appearance of insects in Ohio in the spring of 1880; E. W. Claypole, Canad. Ent. xii. p. 120.

Cave-insects in Jamaica: no true cave-forms met with, but twilight-loving species, frequenting dark places above ground. Hubbard, Am. Ent. iii. p. 30.

Notes on *Coleoptera* and *Hemiptera* in Guatemala; G. C. Champion, Ent. M. M. xvi. pp. 234 & 235.

Economic Entomology.

Notes on various injurious insects; P. Cavanna, Bull. Ent. Ital. xii. pp. 148–152, 246–252, 280–292.

On insects injurious to the sugar-cane:—*Pyralis saccharalis*, *Tomarus bituberculatus*, *Sphenophorus sacchari*, and *Rhyncophorus* (?) *palmarum*. The transformations of a moth (probably identical with *P. saccharalis*, are described in detail under the name of *Procerus sacchariphagus*. E. A. Ormerod, P. E. Soc. 1880, pp. xiv.-xx.

On the relations between parasitic fungi and insects: as far as is known at present, different species of the former confine their attacks to

certain species, or to a few allied species of insects; Giard, C. R. xc. pp. 504 & 505. On destroying insects with yeast, and other fungi, *cf.* also Hagen and others, Canad. Ent. xii. pp. 81–83 & 126–128; Am. Nat. xiv. pp. 363, 364, 516, 517, 575–581, & 630–635; Am. Ent. iii. pp. 40, 41, 53–56, 147–149, 190, 269, 270, 277, 289, 290, & 296; Zool. Anz. iii. p. 185; S. E. Z. xli. pp. 355–359; Bull. Soc. Ent. Fr. (5) x. pp. xviii.–xxi.; Nature, xxi. pp. 447, 448, & 611, xxii. p. 31; Sci. Goss. xvi. pp. 97 & 98.

Use of *Pyrethrum*, and other insecticides; Am. Ent. iii. pp. 41–45, 193–197, 228, 242, 244–247, 250–254, 296.

Collecting, Preserving, &c.

Beating-net described; J. S. Bailey, Rep. E. Soc. Ont. 1878, pp. 21 & 22.

Improved cyanide bottle; P. Noel, Feuill. Nat. x. p. 107.

Cheap entomological cabinet; Harrington, Rep. E. Soc. Ont. 1879, pp. 25 & 26.

On preserving collections with essence of bitter almonds, &c.; A. Gerber, Feuill. Nat. xi. pp. 30 & 31. Bisulphide of carbon recommended; Gorham, Ent. xiii. p. 96; Lombard, Feuill. Nat. x. p. 39.

Entomological collections at Zürich; MT. schw. Ent. Ges. vi. p. 94.

Note on the collection of Dr. Chapuis; De Borre, CR. Ent. Belg. xxiii. p. lxi.

On naming intermediate forms; Fauvel, Ent. Nachr. vi. p. 145.

COLEOPTERA.

BY

W. F. Kirby, M.E.S., &c.

The General Subject.

Bedel, L. Faune de Coléoptères du bassin de la Seine et de ses bassins secondaires. Ann. Soc. Ent. Fr. (5) x. App. pp. 161–288.

Extends from *Chlæniidæ* to *Gyrinidæ*.

Broun, T. Manual of the New Zealand *Coleoptera*. Wellington: 1880, 8vo, pp. xix.–651 [Publication of the Colonial Museum and Geological Survey Department of New Zealand].

1141 species, of which a full list is prefixed, are described in this im-

portant work. The classification followed is mainly that of Lacordaire. A great number of species are described as new.

Camerano, L. La scelta sessuale ed i caratteri sessuali secondari nei Coleotteri. Torino : 1880, 8vo, pp. 128, pls. xii.

Noticed Bull. Ent. Ital. xii. p. 286, where the author's conclusions, which are of an extremely general character, are summed up.

Catalogo della collezione di insetti italiani del R. Museo di Firenze. Serie ii. Coleotteri. Florence : 1879, 8vo.

[Not seen by the Recorder.]

Études sur les insectes d'Angola qui se trouvent au Muséum National de Lisbonne. *Histeridæ*, par De Marseul et P. de Oliviera ; *Cantharidæ*, par De Marseul ; *Lycides*, par J. Bourgeois ; *Dytiscidæ*, *Gyrinidæ*, et *Hydrophilidæ*, par P. de Oliveira. J. Sc. Lisb. xxv. pp. 37–67, 142–158.

A great number of new species are described.

Fairmaire, L. Descriptions de Coléoptères d'Espagne et de Turquie. Ann. Soc. Ent. Fr. (5) x. pp. 238–244.

——. Descriptions des Coléoptères nouveaux du nord de l'Afrique. 3e Partie. *L. c.* pp. 5–32, 245–252.

——. Descriptions de quelques Coléoptères de Nossi Bé. *L. c.* pp. 321–340, pl. xi. figs. 1–9.

Most of the species described in these three papers were previously diagnosed by the author in Le Nat.

Fœttinger, A. Sur les déterminaisons des nerfs dans le muscles des insectes. Arch. Biol. i. pp. 279–304 ; Onderzoek. Physiol. Laborat. (3) v. pp. 293–322.

Comparative observations made on various *Coleoptera*. The cylinder-axis of the nervous fibres which originate motion, on reaching the summit of the terminal layer, appears to divide into a greater or less number of fibrillæ which are directly inserted in the intermediate disks, thus establishing a direct connection between the muscle and the nerve ; and it therefore follows that there is no reservoir of nerve-force in the interior of the muscular tissue, which receives its nervous excitation direct from the cylinder-axis, as above described.

Gobert, E. Catalogue raisonné des Insectes Coléoptères des Landes. Bordeaux (?) : 1873–80, 8vo, pp. 329.

3127 species enumerated, and the larvæ of a considerable number noticed.

Harold, E. v. Beschreibungen neuer, auf seiner von der Akademie unterstützten Reise in Ost-afrika, vorzüglich in den Districten von Taita und Ukamba auf einer Tour von Mombassa nach dem Kenia, von J. M. Hildebrandt gessammelter Coleopteren. MB. Ak. Berl. 1880, pp. 260–270.

43 new species described.

[Harold, E. v.]. Verzeichniss der von E. Steinheil in Neu-Granada gesammelten Coprophagen Lamellicornien. S. E. Z. xli. pp. 13–46.

91 species enumerated, many new.

Harrington, W. H. Some Fungi-eaters. Canad. Ent. xii. pp. 258–262.

A popular article relating to *Coleoptera*.

Heyden, L. v. Vorzeigung und Besprechung neuer und wenig gekannter Coleoptera. Tageblatt d. 52. Versamml. deutsch. Naturf. pp. 230 & 231.

[Not seen by the Recorder.]

——. Verzeichniss von Coleopteren aus Asturien, mit Beschreibungen neuer Arten, von Candèze, Von Heyden, Kirsch, Kraatz, und Stierlin. Deutsche E. Z. xxiv. pp. 280–303.

The variation, synonymy, &c., of several species are noticed.

Horn, G. H. Contributions to the Coleopterology of the United States. Tr. Am. E. Soc. viii. pp. 139–154, pl. iii.

Consists of descriptions of new genera and species, with an occasional table of the American species of various genera.

Jacoby, M. On a Collection of Phytophagous *Coleoptera* made by Mr. Buckley in Eastern Ecuador. P. Z. S. 1880, pp. 588–609, pls. liv. & lv.

92 species enumerated, many new.

Jayne, H. F. Descriptions of some monstrosities observed in North American *Coleoptera*. Tr. Am. Ent. Soc. viii. pp. 155–162, pl. iv.

Relates entirely to malformations by excess, which are common in *Coleoptera*.

Kolbe, H. Natürliches System der carnivoren *Coleoptera*. Deutsche E. Z. xxiv. pp. 258–280.

The *Carnivora* are divided into six groups, and subdivided as follows:—

I. Epihydrodephaga: *Gyrinidæ*; a, *Orectochilini*; b, *Gyrinini*.
II. Euhydradephaga.
1. *Dytiscidæ*: a, *Dytiscini*; b, *Hydroporini*. 2. *Noteridæ*. 3. *Pelobiidæ*. 4. *Haliplidæ*.
III. Amphidephaga. *Omophronidæ*.
IV. Heterodephaga.
1. *Amphizoidæ*. 2. *Trachypachidæ*. 3. *Carabidæ*: a, *Notiophilini*; b, *Carabini*; c, *Cychrini*. 4. *Pamboridæ*.
V. Mesodephaga.
1. *Cicindelidæ*: a, *Manticorini*; b, *Megacephalini*; c, *Cicindelini*; d, *Collyrini*; e, *Ctenostomini*. 2. *Elaphridæ* (*Elaphrus* and *Blethisa*). 3. *Metriidæ*. 4. *Loriceridæ*. 5. *Promecognathidæ*. 6. *Hiletidæ*. 7. *Scaritidæ*: a, *Dyschiriini*; b, *Scaritini*. 8. *Eucheriidæ*. 9. *Siagonidæ*. 10. *Ozænidæ*. 11. *Mormolycidæ*.

VI. HOLODEPHAGA.

I.

1. *Pseudomorphidæ*. 2. *Lebiidæ*: a *Lebiini*; b, *Dromiini*; c. *Pericalini*. 3. *Odacanthidæ*: a, *Odacanthini*; b, *Trigonodactylini*; c, *Ctenodactylini*. 4. *Brachynidæ*. 5. *Dryptidæ*. 6. *Helluonidæ*. 7. *Graphipteridæ*. 8. *Anthiidæ*.

II.

9. *Bembidiidæ*. 10. *Trechidæ*. 11. *Feroniidæ*: a, *Anchomenini*; b, *Trechichini*; c, *Feroniini*; d, *Antarctiini*; e, *Trigonotomini*; f, *Stomini*. 12. *Morionidæ*. 13. *Broscidæ*. 14. *Panagæidæ*. 15. *Chlæniidæ*. 16. *Licinidæ*. 17. *Orthogoniidæ*. 18. *Harpalidæ*: a, *Harpalini*; b, *Anisodactylini*; c, *Cratocerini*. 19. *Ditomidæ*; a, *Apotomini*; b, *Ditomini*.

LECONTE, J. L. Short Studies of North American *Coleoptera*. Tr. Am. Ent. Soc. viii. pp. 163–218.

LEDER, H. Beitrag zur kaukasischen Käfer-Fauna. Unter Mitwirkung von Dr. Eppelsheim und Edmund Reitter in Wien. III. Stück. Verh. z.-b. Wien, xxx. pp. 501–518.

A supplementary list of captures, with descriptions of new species.

LENTZ, —. Catalog der Preussischen Käfer. Königsberg: 1879, 4to, pp. 64.

3255 species are enumerated, about a quarter of the total number of European species.

LUCANTE, —. Essai géographique sur les cavernes de la France et de l'étranger. Paris: 8vo, pp. 76.

Not seen by the Recorder: appears to include notices of cave-inhabiting *Coleoptera*.

MARSEUL, S. A. DE. Nouveau Repertoire contenant des descriptions des éspeces de Coléoptères de l'Ancien-Monde publiés isolement ou en langues étrangers en dehors des Monographies ou Traités spéciaux, et de l'Abeille.

A supplementary volume to L'Abeille. The portion published in 1880 extends to p. 288, and to the genus *Feronia*.

METSCHNIKOFF, E. Zur Lehre über Insectenkrankheiten. Zool. Anz. iii. pp. 44–47.

The larvæ of *Anisoplia austriaca* and other beetles are liable to similar diseases to silkworms, especially "flacherie" and "green muscardine," the latter due to a new fungus named *Isaria destructor*. It is easily propagated, and may prove serviceable in destroying injurious insects.

MILLER, L. Bericht über eine im Frühling 1879 nach Dalmatien unternommene coleopterologische Reise. Verh. z.-b. Wien, xxx. pp. 1-8.

Includes lists of captures, and descriptions of two new species.

Mocquerys, M. L. Tératologie entomologique; Recueil de Coléoptères anormaux. Réimprimé par les soins de la Société des Amis des Sciences naturelles de Rouen, avec Introduction par J. Bourgeois. Rouen: 1880, 8vo, pp. xvi. 143, woodcuts.

This work was originally published as a supplement to Bull. Soc. Rouen, 1879. The various forms of monstrosity, of each of which many examples are described and illustrated, are classified as follows:—(1) Monsters by excess; (*a*) antennæ, (*b*) palpi and mandibles, (*c*) elytra, (*d*) femora and tibiæ, (*e*) claws and tarsi, (*f*) gibbosities. (2) Monsters by defect. (3) Monstrosities of unknown origin. (4) Imperfect development.

Putzeys, L. Études sur les insectes de l'Afrique que se trouvent au Muséum National de Lisbon. Fam. *Cicindelidæ* et *Carabidæ*. J. Sc. Lisb. xxix. pp. 21–48.

141 species enumerated, many new.

Reitter, E. Bestimmungs-Tabellen der europäischen Coleopteren. III. Enthaltend die Familien; *Scaphidiidæ*, *Lathridiidæ*, und *Dermestidæ*. Verh. z.-b. Wien, xxx. pp. 41–94.

Includes descriptions of several new genera and species in the text, and sometimes (more fully) in foot-notes.

——. Coleopterologische Ergebnisse einer Reise nach Croatien, Dalmatien, und der Herzegowina im Jahre 1879. Unter Mitwirkung der Herren Dr. E. Eppelsheim und L. Miller in Wien. *L. c.* pp. 201–228.

A list of the more interesting species obtained, several of which are described as new.

——. Beiträge zur Käfer-fauna von Neu-Zeeland. Verh. Ver. Brünn, xviii. pp. 165–183.

Contains a list of species collected by R. Helms, with descriptions of such as are new.

Rupertsberger, M. Biologie der Käfer Europa's. Eine Uebersicht der biologischen Literatur gegeben in einem alphabetischen Personen- und systematischen Sach- Register, nebst einen Larven- Cataloge. Linz-on-Danube: 1880, 8vo, pp. xii. & 295.

Includes lists of journals, a general bibliography under authors' names, a systematic catalogue of all known larvæ of beetles, with full references to everything published, and complete indices.

Sahlberg, J. Bidrag till Nordvestra Sibiriens Insektfauna. *Coleoptera*. Insamlade under Expeditionerna till Obi och Jenessej, 1876 och 1877. I. *Cicindelidæ—Micropeplidæ*. Sv. Ak. Handl. (2) xvii. No. 4, pp. 116, plate [of conspicuous excellence].

750 species enumerated, with localities and occasional remarks on variation, &c. Several little-known species described by Motschoulsky and others are redescribed, in addition to a considerable number of novelties.

Schiödte, J. C. De Metamorphosi Eleutheratorum Observationes; Bidrag til Insekternes Udviklingshistorie. Nat. Tids. (3) xi. pp. 479–589, pls. v.–xii., xii. pp. 513–598, pls. xiv.–xviii.

The continuation of a most important series of papers on the metamorphoses of *Coleoptera*.

Schoch, G. Practische Anleitung zum Bestimmen der Käfer Deutschlands und der Schweiz, nach der analytischen Methode. Stuttgart: 1878, 8vo, pp. 183, pls. x. and woodcuts.

A compact popular work.

Seriziat, —. Histoire des Coléoptères de France, précédée d'une Introduction à l'étude d'Entomologie, par C. Naudin. Paris: 1880, 8vo, pp. 375 & 239, woodcuts.

Includes descriptions of a large number of common species.

Sharp, D. The *Coleoptera* of Scotland. Scot. Nat. v. pp. 237–240, 285–288, 311, 332–336, 371–378.

Extends from *Orobites* to *Cryptocephalus*.

Stierlin, —. Beiträge zur Kenntniss der Käfer-Fauna des Kantons Wallis, und der *Ditrachelus*-Arten. MT. schw. ent. Ges. v. pp. 547–551.

Contains a table of species of *Ditrachelus*, special remarks on species lately described by Tournier, and lists of captures of *Coleoptera* at Siders, Berisal, and Mons. 2 species are described as new.

Structure.

Paasch remarks on the errors of various authors relative to the structure of *Coleoptera*; Deutsche E. Z. xxiv. pp. 371–374.

On the nervous system of *Coleoptera*; A. K. Brandt, Trudy Ent. Ross. xi. pp. 120–157, pl. v. (in Russian).

Meinert regards the elytra of *Coleoptera* as homologous with the tegulæ of *Hymenoptera* and the pterygodes of *Lepidoptera*, and the wings as homologous to the front wings in the other orders; Ent. Tidskr. i. p. 159.

On the epipleura and pseudepipleura of *Coleoptera*; Preudhomme de Borre & D. Sharp, CR. Ent. Belg. xxiii. pp. lxxv. & lxxvi. cix., cx., & cxvi.

Habits, Localities, &c.

On the food of *Coleoptera*; Webster & Forbes, Bull. Illin. Lab. N. H. iii. pp. 149–160.

Coleoptera found in corn refuse; Billups, Ent, xiii. pp. 208–210, P. E. Soc. 1880, p. xxxv.

Coleoptera found dead in bales of linen from different parts of the world. Bull. Soc. Acclim. (3) vii. pp. 171–173.

Coleoptera captured on board ships arriving from abroad; H. J. Ekeberg, Ent. Tidskr. i. pp. 101–103.

Coleoptera brought down by floods; Slater, Ent. xiii. p. 21.

On collecting *Coleoptera* in towns; Feuill. Nat. x. pp. 45, 46, & 82.

Hibernation of *Coleoptera*; Young, Sci. Goss. xvi. p. 257.

Trap for *Coleoptera*; Rüst, Ent. Nachr. vi. pp. 84 & 85.

The following *Coleoptera* are noticed and figured as destructive to the Rocky Mountain Locust:—*Agonoderus dorsalis*, fig. 23, *Harpalus*, sp. fig. 24, *Amara obesa*, Say, fig. 25, *Harpalus pennsylvanicus*, De Geer, fig. 27,

Epicauta pennsylvanica, De Geer, *Meloe*, sp., fig. 28, *Epicauta vittata*, Fabr., fig. 30, *Macrobasis unicolor*, Kirby, fig. 31, *Telephorus bilineatus*, Say, fig. 33, and several *Cicindelidæ* and *Carabidæ*, figs. 45 & 52 ; 1st Rep. Ent. Comm. on Rocky Mountain Locust, pp. 289–315.

List of *Coleoptera* which live on the hickory ; Leconte, Am. Ent. iii. pp. 236 & 237.

Branches of trees sawn off by Lamellicorns and Longicorns ; Ober, Camps in the Caribbees, &c. [*cf.* Nature, xxii. pp. 216, 533, & 585].

Additions to Kaltenbach's Pflanzenfeinde (*Coleoptera*) ; Isenschmidt & Müller, MT. schw. ent. Ges. v. pp. 575 & 576.

On preparing specimens of wood-boring beetles ; Uhlmann, MT. Ges. Bern, 1879, p. 10.

Europe.

Synonymic notes on 33 species of European *Coleoptera* ; Reitter, Nouv. et faits, ii. pp. 127 & 128.

Notes on the classification and collection of British Beetles ; A. Cottam, Tr. Hertford Soc. i. pp. 25–36.

List of the *Coleoptera* of Dulwich ; Wood & Pim, Rep. Dulwich Soc. iii. pp. 55–58.

Captures of *Coleoptera* in 1879, Hart, Ent. xiii. pp. 112–114 ; in the Forest of Dean and neighbourhood, Hodgson, Ent. M. M. xvi. pp. 183 & 184 ; near Maldon, Fowler, *op. cit.* p. 235 ; in the Isle of Man, Blatch, *op. cit.* xvii. p. 117 ; in Sussex, Gorham, *op. cit.* pp. 162 & 163.

Captures of *Coleoptera* in Sweden ; Wångdahl, Ent. Tidskr. i. pp. 192–196 & 214. At Danzig ; Helm, Schr. Ges. Danz. (2) iv. pp. 56 & 57.

Captures in various parts of France ; Bull. Soc. Ent. Fr. (5) x. pp. lxii. & lxiii., Feuill. Nat. x. pp. 34–37 & 110, xi. pp. 14 & 15. In Germany and S. France ; Preudhomme de Borre, CR. Ent. Belg. xxiii. pp. clxxviii.–clxxxi. & clxxxix.–cxci. In Belgium, with notices of additions to the fauna ; CR. & Ann. Ent. Belg. xxiii. pp. cxvii., cxci.–cxciii. & 55–69. At Brostenii and in the Valley of the Bistrizza ; Montandon, Feuill. Nat. x. pp. 112–115 & 128–130. In Hungary ; Merkl & Dohrn, S. E. Z. xli. pp. 138–142.

New localities for various *Coleoptera* ; Schultz, Ent. Nachr. vi. p. 35.

Notes on various French *Coleoptera* ; Feuill. Nat. x. pp. 48 & 49, 66 & 93, Nouv. et faits, ii. p. 124.

Coleoptera from Terra di Lavora ; Baudi di Selve, Bull. Ent. Ital. xii. pp. 139 & 140.

Italy : see above, p. 12.

Kittel has continued his list of the *Coleoptera* of Bavaria, from *Cyphon* to *Lytta*, CB. Ver. Regensb. xxxiv. pp. 29–32, 35–48, 64–80, 89–96, 104–112, 127 & 128, 143–160, & 181–192, and describes the larvæ of *Lampyris noctiluca*, L., *Absidia pilosa*, Payk., *Malachius geniculatus*, Payk., *Dasytes niger*, L., *Byturus tomentosus*, Fabr., *Allonyx quadrimaculatus*, Schall., *Trichodes irkutensis*, Laxm., *Lymexylon navale*, L., *Hedobia regalis*, Duft., *Ptinus bidens*, Ol., *Sitodrepa paniceum*, L., *Xylotrogus brunneus*, Steph., *Tenebrio picipes*, Bechst., *Lagria hirta*, L., *Pyrochroa pectinicornis*, L., *Mordella aculeata*, L., *Meloe brevicollis*, Panz., and *Lytta vesicatoria*, L.

Additions to the *Coleoptera* of Mecklenberg (213 species); Brouns, Arch. Ver. Meckl. xxxii. pp. 58–74. To the *Coleoptera* of Thuringia; Kellner, Deutsche E. Z. xxiv. p. 229.

Additions to the *Coleoptera* of Nassau and Frankfort, inclusive of synonymic notes, &c.; Heyden, JB. Nass. Ver. xxxi. & xxxii. pp. 116–146.

List of *Coleoptera* of Rosenau, &c.; Geyer, JB. Karpath. Ver. vii. pp. 15–31.

General notes on the *Coleoptera* of the Balearic Islands; F. Will, Ent. Nachr. vi. pp. 132 & 133.

Africa.

Kraatz, Bourgeois, Wagener, Power, and Reitter publish lists of *Cetoniidæ*, *Lycidæ*, *Cassididæ*, *Brenthidæ*, *Histeridæ*, *Trogositidæ*, *Cucujidæ*, and *Endomychidæ*, from Ashanti; Deutsche E. Z. xxiv. pp. 145–164, pl. i.

On a collection of *Coleoptera* from Mhonda, E. Africa; R. Oberthür, Bull. Soc. Ent. Fr. (5) x. pp. cxviii.–cxx.

Angola: see above, p. 12.

America.

Notes on *Coleoptera*, for beginners; C. G. Siewers, Canad. Ent. xii. pp. 138 & 139.

List of *Coleoptera* described by Bland, Provancher, &c., with synonymic notes; Horn, Tr. Am. E. Soc, viii. pp. x.–xii., xvii., xix. & xx.

Notes on the synonymy and habits of various N. American *Coleoptera*; Leconte, *tom. cit.* pp. xxiii. & xxiv.

List of the *Coleoptera* of Cincinnati; Dury, J. Cincinn. Soc. ii. pp. 162–178.

Short notes on various *Coleoptera* in Illinois; McBride, Canad. Ent. xii. pp. 106 & 107.

Cuban *Coleoptera* taken in Florida; Horn, *l. c.* p. xvii.

Cicindelidæ.

Cicindela. Popular account of the common Canadian species; R. V. Rogers, Canad. Ent. xii. pp. 61–65, figs. 10–15. *C. trisignata*, var. *subsuturalis*, Souv., noticed, Kraatz & Narcillac, Bull. Soc. Ent. Fr. (5) x. pp. xxxi. & li.

New species:—

Styphloderma lævicolle, C. O. Waterhouse, Ann. N. H. (5) vi. p. 92, Mpwapwa, E. Africa.

Oxychila glabra, id. *l. c.* v. p. 285, Macas, Ecuador.

Cicindela obtusidentata, Angola, *villosa*, Huilla, p. 22, and *flavipes*, Braganza, p. 23, Putzeys, J. Sc. Lisb. xxix.; *C. beccarii*, Gestro, Ann. Mus. Genov. xv. p. 49, Sumatra; *C. pierroni*, Fairmaire, Le Nat. ii. p. 236, Ann. Soc. Ent. Fr. (5) x. p. 321, Nossi-Bé; *C. anthracina*, Horn, Tr. Am. Ent. Soc. viii. p. 139, New Mexico; *C. panamensis* and *chevrolati*, Boucard, Bull. Soc. Z. Fr. v. pp. 293 & 294, Panama, &c.; *C. huttoni* and *perhispida*, Broun, Man. N. Z. Col. pp. 2 & 4, New Zealand.

Odontochila erythropyga, Putzeys, *l. c.* p. 24, Angola.
Dromica suturalis, id. *l. c.* p. 25, Angola ?.
Therates sumatrensis, id. Notes Leyd. Mus. ii. p. 191, Sumatra.
Ctenostoma ibidion, Dohrn, S. E. Z. xli. p. 372, Costa Rica.

Carabidæ.

Food of ground-beetles; Am. Ent. iii. pp. 173, 251, & 277.

Cynindis basalis, Gyll., *Patrobus excavatus*, Payk., and *Nebria gyllenhali*, Schönh., = *Carabus mollis*, *atro-rufus*, and *rufescens*, Ström, respectively; *Patrobus clavipes* and *rubripennis*, Thoms., are varieties of *excavatus* and *septentrionalis* respectively; Schφyen, Ent. Tidskr. i. pp. 183-185, 212 & 213.

Elaphrides.

Elaphrus latipennis and *longicollis*, fig. 1, Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, pp. 10 & 11, N.W. Siberia: spp. nn.

Carabides.

Gehin, J. B. Lettres pour servir à l'histoire des insectes de la tribu des Carabides. 6me lettre.

Not seen by the Recorder; noticed in Le Nat. ii. p. 287.

Leistus rufo-marginatus, with a side branch springing from the second joint of the right antennæ. G. Schroeder, Ent. Nachr. vi. p. 94.

Carabus. The variations in the sculpture of the elytra are specially interesting when they occur frequently in the same locality, or when they are so considerable as to present the appearance of specific value. Two forms of *Carabus mœander* (*excatenatus*, fig. 2, and *excostatus*, fig. 3, are figured in illustration, as well as several other abnormal *Carabi*. Kraatz, Deutsche E. Z. xxiv. pp. 337 & 338, pl. ii. *C. cancellatus*, abnormal specimen described; De Bony, Bull. Soc. Ent. Fr. (5) x. pp. li. & lii. *C. favieri*, var. *piraticus*, from Larache, described; Fairmaire, Ann. Soc. Ent. Fr. (5) x. p. 246.

Calosoma calidum and *scrutator*, Fabr., noticed and figured; J. Fletcher, Canad. Ent. xii. pp. 34 & 35. *C. sycophanta*, with aborted left antenna; Lucas, Bull. Soc. Ent. Fr. (5) x. p. lxxiv.

Damaster. This genus is confined to Japan, and advancing from south to north the species become smaller, modified in form, and more highly coloured: no two species inhabit the same region. Lewis, Ent. M. M. xvi. pp. 159–161.

Calopachys, g. n., Haury, Le Nat. ii. p. 164. Intermediate between *Carabus* and *Calosoma*; mandibles above transversely striated; mentum with a sharp tooth in the middle, elytra globose, pointed. Type, *C. viridissimus*, sp. n., *ibid.*, Mexico ?.

Leistus amplicollis, sp. n., Fairmaire, Le Nat. ii. p. 190, Ann. Soc. Ent. Fr. (5) x. p. 245, Morocco.

Carabus alticola, sp. n. (? = *monilis*, var.), Bellier de la Chavignerie, Le Nat. ii. p. 301, Basses-Alpes. It is not distinct; Gehin, *tom. cit.* pp. 325 & 326, 331 & 332. (Gehin discusses the varieties of *monilis*, to several

of which he attaches names.) *Cf.* also Bull. S oc. Ent. Fr. (5) x. pp cx., cxxiii., & cxxiv.

Damaster viridipennis, sp. n., Lewis, Ent. M. M. xvii. p. 161, N. Nipon.

Calosoma procerum, sp. n., Harold, MB. Ak. Berl. 1880, p. 260, E Africa.

Od[ont]acanthides.

Od[ont]acantha nossibiana, sp. n., Fairmaire, Le Nat. ii. p. 236, Ann. Soc Ent. Fr. (5) x. p. 322, pl. xi. fig. 1, Nossi-Bé.

Stenidia spinipennis, sp. n., Putzeys, J. Sc. Lisb. xxix. p. 26, Angola.

Galeritides.

Galerita leptodera and *nigro-cyanea*, Chaud., noticed; Dohrn, S. E. Z. xli. pp. 290 & 291. *G. janus* and *lecontii* noticed, and larva of the latter figured; Am. Ent. iii. p. 153, fig. 57.

Drypta dimidiata, sp. n., Putzeys, Notes Leyd. Mus. ii. p. 191, Sumatra.

Calophæna albo-guttata, sp. n., C. O. Waterhouse, Ann. N. H. (5) v. p. 286, Copataza River, Ecuador.

Galerita peregrina, Dohrn, S. E. Z. xli. p. 291, Hongkong; *G. madecassa*, Fairmaire, Le Nat. ii. p. 236, Ann. Soc. Ent. Fr. (5) x. p. 322, Nossi-Bé: spp. nn.

Planetes lineolatus, sp. n., Putzeys, J. Sc. Lisb. xxix. p. 27, Angola.

Lebiides.

Wakefieldia, g. n., Broun, Man. N. Z. Col. p. 60. Placed between *Actenonyx* and *Agonochila*; type, *W. vittata*, sp. n., *l. c.*, New Zealand.

Demetrida ater, sp. n., *id*, *l. c.* p. 66, Otago.

Dromius proderus, Fairmaire, Ann. Soc. Ent. Fr. (5) x. p. 246, Morocco; *D. angusticollis*, Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, p. 22, fig. 4, Obi: spp. nn.

Lebia unicolor, sp. n., Putzeys, J. Sc. Lisb. xxix. p. 30, Angola.

Pericalides.

Eurydera obscurata, sp. n., Fairmaire, Le Nat. ii. p. 308, Ann. Soc. Ent. Fr. (5) x. p. 323, Nossi-Bé.

Graphipterides.

Graphipterus amabilis, Boh., noticed; Dohrn, S. E. Z. xli. pp. 156 & 157.

Anthiides.

Anthia convexipennis, sp. n., Putzeys, J. Sc. Lisb. xxix. p. 31, Angola.

Polyhirma chalcodera and *hamifera*, spp. nn., Harold, MB. Ak. Berl. 1880, p. 260, E. Africa.

Morionides.

Chaudoir, E. de. Essai monographique sur les Morionides. Bull. Mosc. lv. pp. 317–384.

The author has been able to examine nearly all the species of this group. He describes both genera and species in great detail.

Megameria, g. n., *id. l. c.* p. 323. Resembles a large *Morio*, but with some affinity to *Platynotus*. Type, *M. mniszechi*, Chaud.

Morionidius, g. n., *id. l. c.* p. 380. Appears to connect *Morio* with *Stercostoma*. Type, *M. doriæ*, sp. n., l. c. p. 383, Sarawak.

Morio dalbertisi, *stolidus*, New Guinea, p. 336, *subconvexus*, Java (?), p. 340, *submarginatus*, Borneo (?), p. 312, *cordicollis*, Borneo, p. 313, *intermedius*, p. 344, *angustus*, Philippines, p. 346, *humeratus*, New Guinea, p. 352, *pachysomus*, N. Australia, p. 358; *id. l. c.*, spp. nn.

Scaritides.

Chaudoir, E. de. Monographie des Scaritides (Scaritini). 2me partie. Ann. Ent. Belg. xxiii. pp. 5–130.

Includes descriptions of several new genera and species, in addition to those of known ones.

New genera and species:—

Pachyodontus, Chaudoir, *l. c.* p. 9. Allied to *Crepidopterus* and *Storthodontus*; but the labrum and the tooth of the mentum are differently formed, and the intramarginal carinæ are absent. Type, *Scarites languidus*, Wied.

Scaritodes, id. *l. c.* p. 60. Allied to *Scarites*, but resembles *Tæniolobus*, &c., by the transverse furrow which runs along the front edge of the three last segments of the abdomen. Types, *Scarites morio*, Dej., and *S. semicarinatus*, sp. n., *l. c.* p. 62, Bahia.

Menigius, id. *l. c.* p. 12. Allied to *Tæniolobus* (*corvinus*) but with no hook at the tip of the mandibles. Type, *M. schaumi*, sp. n., *l. c.* p. 13, Guinea.

Macrotelus, id. *l. c.* p. 14. Resembles *Tæniolobus reichii*, but much more shining. Type, *M. sulciger*, sp. n., *l. c.* p. 16, Zanzibar.

Scaris, id. *l. c.* p. 17. Allied to *Tæniolobus*, but the edge of the lobes of the mentum not carinated. Type, *Tæniolobus guerini*, Chaud.

Pasimachus tolucanus, p. lxxxv., *quadricollis*, Mexico, *P.* (*Molobrus*) *cardioderus*, p. lxxxvi., Guatemala, *P.* (*M.*) *intermedius*. Costa Rica, *P. aurocinctus*, p. lxxxvii., *P.* (*M.*) *metallicus*, Mexico, p. lxxxviii., *id.* Bull. Soc. Ent. Fr. (5) x.

Tæniolobus subcostatus, Para, p. 23, *rugatus*, Brazil, p. 25, *holcocranius*, Bahia, p. 26, *convexiusculus*, Brazil, p. 34, *reichei*, Cayenne, p. 35, *bonariensis*, Buenos Ayres, p. 37, *lucidus*, Lake N'Gami, p. 42, and *stygicus*, White Nile, p. 43; *id.* Ann. Ent. Belg. xxiii.

Distichus mœstus, Pampas, p. 44, *angustiformis*, Amazons, p. 46, *muticus*, Montevideo, p. 50, *trivialis*, Upper Amazons, p. 51, *striaticeps*, East Indies, *dicælus*, Singapore, p. 52, *pachycerus*, Nubia, p. 56, *lucidulus* and *modestus*, East Indies, p. 57; *id. l. c.*

Scarites similis, Eastern Asia ?, p. 83, *ceylonicus*, Ceylon, p. 85 *longiusculus*, Philippines, p. 86, *liopterus*, N. India, p. 87, *subproductus*, Portugal ?, Siam, p. 90, *illustris*, Venezuela, *subcrenatus*, Upper Amazons, p. 91, *lissopterus* (? = *quadriceps*, Chaud., var.), p. 93, *texanus*, Texas, p. 94, *subrugatus*, Upper Amazons, p. 95, *prædator*, Rangoon, p. 97, *denticulatus*, Cochin China, *simogonus*, Lake N'Gami, *boucardi*, locality unknown, p. 98,

epaphius, S. Africa, p. 106, *angulifrons*, Transvaal, p. 111, *cycloderus*, East Indies, p. 112, *quadricostis*, Rio Janeiro, p. 118, *id. l. c.*

Carenum nickerli, Ancey, Le Nat. ii. p. 221, Australia.

Panagœides.

Panagœus (*Epicosmus*) *michardi*, sp. n., Fairmaire, Le Nat. ii. p. 307, Madagascar.

Microcosmus pierroni, sp. n., id. *l. c.* p. 236, Ann. Soc. Ent. Fr. (5) x. p. 324, pl. xi. fig. 2, Nossi-Bé.

Chlœniides.

Chlœnius. Synoptical table of 62 species; Marseul, Nouv. Rep. pp. 182–185.

Chlœnius lineatus, Angola, p. 35, *porosus*, Braganza, p. 36, and *hostilis*, Humbe, p. 38, Putzeys, J. Sc. Lisb. xxix.; *C. scutellaris*, *improbus*, *hildebrandti*, and *maximiliani*; Harold, MB. Ak. Berl. 1880, p. 261, E. Africa: spp. nn.

Licinides.

Badister. North American species tabulated; Leconte, Tr. Am. Ent. Soc. viii. pp. 165 & 166.

Derostichus setosus, sp. n., Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, p. 40, N.W. Siberia.

Badister elegans and *albescens*, spp. nn., Leconte, *l. c.* pp. 165 & 166, North America.

Onemacanthides.

Percosoma sulcipenne, Bates, figured by C. O. Waterhouse, Aid to identific. of Ins. pl. i.

Agonoderus comma, Fabr., noticed and figured; Am. Ent. iii. pp. 153 & 154, fig. 58.

Oregus, Broun, g. n., Man. N. Z. Col. p. 13. Allied to *Mecodema* and *Metaglymma*: type, *Promecoderus œreus*, White.

Mecodema spinifer, sp. n., *id. l. c.* p. 10, New Zealand.

Anisodactylides.

Anisodactylus metallescens, p. 39, *obtusicollis*, Angola, and *planicollis*, Braganza, p. 40, Putzeys, J. Sc. Lisb. xxix., spp. nn.

Lecanomerus insignitus, p. 47, *fuliginosus*, and *fallax*, p. 48, Broun, Man. N. Z. Col. New Zealand, spp. nn.

Harpalides.

New species:—

Dichirotrichus angustulus, Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, p. 44, N.W. Siberia.

Pangus rotundicollis, Putzeys, J. Sc. Lisb. xxix. p. 41, Angola.

Hypolithus lugubris, Harold, MB. Ak. Berl. 1880, p. 260, E. Africa.

Ophonus cunii, Fairmaire, Ann. Soc. Ent. Fr. (5) x. p. 237, Catalonia.

O. aterrimus, Heyden, Deutsche E. Z. xxiv. p. 296, Arkansas.

Harpalus simulans, Sahlberg, *l. c.* p. 44, Yenissei; *H. obliquus*, Horn, Tr. Am. Ent. Soc. viii. p. 140, pl. iii. fig. 1, New Mexico.

Acupalpus posticalis, Putzeys, *l. c.* p. 42, Angola.

Trigonotomides.

Abacetus rufo-guttatus, sp. n., Fairmaire, Le Nat. ii, p. 308, Ann. Soc. Ent. Fr. (5) x. p. 324, Nossi-Bé.

Feroniides.

Preudhomme de Borre, A. Étude sur les espèces de la tribu des Féronides qui se rencontrent en Belgique. i^ière^ Partie. ii. Sphodriens. iii. Calathiens. Bull. Ent. Belg. xxiii. pp. 131–154.

Relates chiefly to geographical distribution.

Pterostichus cristatus, Duf., var. *cantabricus*, Schauf., described; Heyden, Deutsche E. Z. xxiv. p. 284.

Lyperopherus cancellatus, Motsch., = *schrencki*, Moraw., = *punctatissimus*, Randall, *id. l. c.* p. 304.

Feronia, subg. *Pseudocryobius*, Motsch. Table of species; Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, pp. 28 & 29, note.

Liocnemis rotundicollis, Solsky (*nec* Schauf.), renamed *solskii*, Heyden, *l. c.* p. 304.

Amara. Undetermined species from Seine-et-Oise described; Bedel, Ann. Soc. Ent. Fr. (5) x. App. p. 187, note. *A. sylvicola*, Zimm., recorded as new to Sweden; Neren, Ent. Tidskr. i. pp. 156–158. *A.* (*Cyrtonotus* ?) *strigicollis*, Sahlberg, redescribed and figured by him, *l. c.* xvii. p. 34, fig. 10.

New species :—

Haptoderus procerulus, Heyden, Deutsche E. Z. xxiv. p. 295, Asturias.

Platyderus dalmatinus, Miller, Verh. z.-b. Wien, xxx. p. 203, Dalmatia.

Holcaspis hispidulus and *H.* (*Rhytisternus*) *rugifrons*, Broun, Man. N. Z. Col. pp. 40 & 41, New Zealand.

Pterostichus (*Peristethus*) *maximiliani*, Pennsylvania, and *P. agonus*, pl. iii. fig. 2, Alaska, Horn, Tr. Am. E. Soc. viii. pp. 139 & 140.

Feronia (*Adelosia* ?) *sublævis*, fig. 5, *F.* (*A.*) *nordenskiœldi*, fig. 6, p. 24, *F.* (*A.*) *samojedorum*, fig. 7, p. 25, *F.* (*Abax* ?) *abnormis*, fig. 8, p. 27, *F.* (*Pseudocryobius*) *punctigera*, p. 29, *F.* (*P.*) *arctica* (= *infima*, Mäkl., *nec* Chaud.), and *F.* (*Argutor*) *longiuscula*, p. 31, Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4.

Trichosternus aucklandicus, p. 33, *prolixus*, p. 35, and *dentiferus*, p. 36, Broun, *l. c.*, New Zealand.

Zabrus deflexicollis, Fairmaire, Ann. Soc. Ent. Fr. (5) x. p. 246, Morocco. *Z. asturiensis*, Asturias, and *estrellensis*, Portugal, Heyden, Deutsche E. Z. xxiv. p. 296.

Amara (*Cyrtonotus*) *ruficornis*, p. 32, *A.* (*C.*) *subsulcata*, fig. 9, p. 33, *A.* (*Bradytus*) *trybomi*, fig. 11, p. 34, and *A. lævissima*, fig. 12, p. 36; Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, N. W. Siberia. *A.* (*Percosia*) *fortis*, Leconte, Tr. Am. Ent. Soc. viii. p. 164.

Anchomenides.

LECONTE, J. Synopsis of the North American species of *Platynus*. Bull. Brocklyn Soc. ii. pp. 45–58.

83 species tabulated, 5 new. The genus *Anchus*, Lec., which has been referred to *Platynus*, should be transferred from the *Platynini* to the *Anchonoderini*.

Pristonychus oblongus, Dej., noticed; Girard, Bull. Soc. Ent. Fr. (5) x. p. xv.

Anchomenidius, g. n., Heyden, Deutsche E. Z. xxiv. pp. 283 & 295. Section of *Anchomenus*; type, *A. astur*, Sharp, = *melanocephalus*, Dej.

New species :—

Calathus deformipes, Broun, Man. N. Z. Col. p. 19, New Zealand.

Dichrochile limbata and *maura*, id. *l. c.* pp. 17 & 18, New Zealand.

Anchomenus parabilis, p. 20, *batesi*, p. 21, *montivagus*, *politulus*, p. 22, *sub-orbithorax*, *per-rugithorax*, p. 24, *A.* (*Platynus*) *cheesemani*, p. 26, and *A.* (*P.*) *sulcitarsis*, p. 27, *id. l. c.*, New Zealand.

Platynus ardens, p. 43, *tropicalis*, p. 44, *regularis*, *urens*, p. 46, *calefactus* and *dichrous*, p. 47, Putzeys; J. Sc. Lisb. xxix. Angola. *P. piceolus*, Oregon, British Columbia, *erasus*, Vancouver's Island, p. 52, *deceptivus*, Nova Scotia, Lake Superior, *hardii*, Newfoundland, p. 53, and *gemellus*, Vancouver's Island, p. 54, Leconte, Bull. Brooklyn Soc. ii.

Olisthopus sibiricus, Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, p. 40, N.W. Siberia.

Tropopterus placens, Broun, *l. c.* p. 28, New Zealand.

Trechides.

Anophthalmus. Larva noticed; Tr. Am. Ent. Soc. viii. p. vii. *A. targionii*, Della Torre, described and figured by him; Bull. Ent. Ital. xii. pp. 253 & 254, pl. i.

Trechus curvatus, Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, p. 20, N.W. Siberia. *T.* (*Anophthalmus*) *lantosquensis*, p. cxxviii., *T.* (*A.*) *clairi*, Piedmont, and *T.* (*A.*) *simoni*, Herault, p. cxxix., Abeille de Perrin, Bull. Soc. Ent. Fr. (5) x.: spp. nn.

Anophthalmus reitteri, Miller, Verh. z.-b. Wien, xxx. p. 203, S. Croatia; *A. interstitialis*, Hubbard, Am. Ent. iii. p. 52, Mammoth Cave: spp. nn.

Bembidiides.

Bembidium. Table of Siberian species; Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, pp. 12–14, note.

Tachypus angulicollis, Stierl. (*nec* Moraw), renamed *stierlini*; Heyden, Deutsche E. Z. xxiv. p. 304.

Bembidium jenisseense (? = *lapponicum*, Thoms.), p. 14, *B.* (*Peryphus*) *frigidum* (? = *lævistriatus*, Motsch.), *B.* (*P.*) *sulcipenne*, fig. 2, *B.* (*P.*) *parvicolle* (? = *acuticollis*, Motsch.), p. 16, *B.* (*P.*) *macropterum*, fig. 3, p. 17, *B.* (*P.*) *sulcicolle*, p. 18, Sahlberg, *l. c.* N.W. Siberia: spp. nn.

DYTISCIDÆ.

CAMERANO, L. Richerche intorno alle solcature delle elitre dei Ditiscidi come carattere sessuale secondario. Atti Acc. Tor. xv. pp. 531–539.

SHARP, D. Avis préliminaire d'une nouvelle classification de la famille des *Dytiscidæ*. CR. Ent. Belg. xxiii. pp. cxlvii.–cli. [Abstr. Ent. M. M. xvii. p. 187.]

On sexual dimorphism in the females of *Dytiscidæ*; Sahlberg, Ent. Tidskr. i. pp. 166 & 167. In one form the elytra are smooth, as in the male, and in others punctured, or otherwise different.

L. Camerano notices the *Dytiscini* of Piedmont; Ann. Ent. Ital. xii. pp. 116–122.

Haliplus ruficollis and European allies (11 species, 2 new) tabulated, and briefly characterized; Wehncke, Deutsche E. Z. xxiv. pp. 223 & 224. *H. ruficollis*, *heydeni*, and *immaculatus* appear to be dimorphic forms; and *H. cinereus*, Aubé, is distinct from *affinis*, Steph.; Bedel, Ann. Soc. Ent. Fr. (5) x. App. pp. 222 & 223, note, & 226, note.

Hygrobia tarda, Herbst. Stridulating apparatus described; *id. l. c.* p. 229, note.

Hydroporus angularis and *signatellus*, Klug, = *thermalis*, Germ.; *H. angularis*, var. Klug, = *klugi*, Lepr.; Leprieur, Bull. Soc. Ent. Fr. (5) x. p. xxv.

Dytiscus. Shower of water-beetles in Kentucky; Am. Ent. iii. p. 248. *D. punctulatus*, aberration intermediate between the smooth and furrowed ♀ ♀; Leprieur, *l. c.* pp. cxxx. & cxxxi. *D. harrisi*, noticed and figured; W. Saunders, Rep. E. Soc. Ont. 1879, pp. 71 & 72, fig. 38. *D. marginalis* attacked by mites; Sci. Goss. xvi. p. 165.

New species:—

Haliplus multipunctatus, N. Germany, and *heydeni*, N. & Central Europe; Wehncke, Deutsche E. Z. xxiv. pp. 223 & 224. *H. samojedorum*, Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, p. 45, N.W. Siberia. *H. tumidus*, Leconte, Tr. Am. Ent. Soc. viii. p. 166. *H. natalensis*, Natal, p. 72, *syriacus*, Syria, *abbreviatus*, Mesopotamia, p. 73, *havaniensis*, Cuba, *sharpi*, China, Japan, p. 74, *brevis*, China, and *bistriatus*, Adelaide, p. 75; Wehncke, S. E. Z. xli.

Hyphydrus sumatræ, Régimbart, Notes Leyd. Mus. ii. p. 211, Sumatra.

Hydrovatus atricolor and *consanguineus*, id. *l. c.* p. 212, Sumatra.

Cœlambus ungicularis, Sahlberg, *l. c.* p. 47, fig. 14, N.W. Siberia.

Hydroporus intermedius, *sibiricus*, p. 49, *punctipennis* and *œnescens*, p. 50, *pectoralis*, p. 51, and *obovatus*, p. 52, *id. l. c.* N.W. Siberia. *H. dorso-plagiatus*, Algeria, p. 247, *cribratellus* and *productus*, Batna, p. 248, Fairmaire, Ann. Soc. Ent. Fr. (5) x. *H. strigicollis*, id. Le Nat. ii. p. 293, Bourbon. *H. strigosulus* and *H.* (?) *nitidicornis*, Broun, Man. N. Z. Col. pp. 72 & 73, New Zealand.

Hydrocanthus ritsemæ, Régimbart, *l. c.*, p. 213, Sumatra.

Laccophilus ritsemæ, id. *l. c.* p. 209, Sumatra.

Gaurodytes punctipennis, *nigripalpis*, p. 56, *amnicola*, p. 58, and *slovzovi* p. 59, Sahlberg, *l. c.*, N.W. Siberia.

Copelatus nigricollis, Oliviera, J. Sc. Lisb. xxvii. p. 152, Angola. *C tenebrosus*, Régimbart, *l. c.* p. 210, Sumatra.

Hydaticus litigiosus, id. *l. c.*, Sumatra. *H. sesquivittatus*, Fairmaire, Le Nat. ii. p. 164, Central China.

Gyrinidæ.

Orectochilus villosus, Müll. Habits; H. Kolbe, Deutsche E. Z. xxiv. p. 228.

Dineutes fulgidus, sp. n., Régimbart, Notes Leyd. Mus. ii. p. 213, Sumatra.

Orectochilus spiniger, p. 214, *subsulcatus* and *scalaris*, p. 215, *id. l. c.*, Sumatra; *O. pallido-cinctus*, Fairmaire, Le Nat. ii. p. 236, Ann. Soc. Ent. Fr. (5) x. p. 325, Nossi-Bé: spp. nn.

Hydrophilidæ.

Camerano, L. Nota sopra un caso di colorazione naturale delle trachee di un insetto (*Hydrophilus piceus*). Atti Ac. Tor. xv. pp. 703–706.

Chatin, J. Le courant de Dewar chez les Insectes. Bull. Soc. Philom. (7) iv. pp. 189–192.

On experimenting on the eyes of *Hydrophilus piceus*, the insect exhibited most uneasiness, and the galvanic angle reached its maximum of deviation, as in Vertebrates, under the stimulus of green and yellow light.

Bedel, Bull. Soc. Ent. Fr. (5) x. pp. lxxii., lxxiii., cxli., cxlii., cxlvii., & cxlviii., makes the following synonymic notes on this family: *Hydrophilus convexus*, Cast., = *paulinieri*, Guér.; *H. flavipalpis* and *mundus*, Boh., belong to *Hydrochares*; *H. oblongus*, Oliv., is omitted by Harold; *Hydrobius angustatus*, Villa, = *fuscipes*, Linn.; *H. assimilis*, Boh. (= *natalensis*, Gemm.), belongs to *Philhydrus*; *H. consputus* and *striatus*, Boh., belong to *Hydrochares*; *Limnebius granulum*, Mots., and *gyrinoides*, Aubé, belong to *Hydroscapha* (*Trichopterygidæ*); *Stagnicola*, Montr., = *Helochares*, Muls.; *Ochthebius fabricii*, Montr., belongs to *Cœlostoma*, Br. (= *Cyclonotum*, Er.); *Laccobius globosus*, Heer, = *minutus*, Linn.; *Hydrobius nitidus*, Heer, = *Anacæna limbata*, Fabr.; *Berosus corsicus*, Desbr., = *signaticollis*, Charp. (*æriceps*, Curt.); *B. geminus*, Reiche, is very close to the same species; *Cœlostoma senegalense*, Cast., is an *Amphiops*; *Cyprimorphus compressus*, Fairm., = ? *Amphiops lucidus*, Er.; *Hydrobius seriato-punctatus*, Perris, belongs to *Hemisphæra*; *Ochthebius pyrenæus*, Fauv., = *æratus*, Steph., and the genus *Sepidulum*, Lec., = *Epimetopus*, Lac.; *Sphæridium striolatum*, Heer, = *scarabæoides*, Linn.; *S. testaceum*, Heer, = *bipustulatum*, var. *marginatum*, Fabr.; *Cercyon pulchellum*, Heer, = *nigriceps*, Marsh. (= *centro-maculatum*, Sturm); and *C. castaneum*, Heer, = *Megasternum bolitophagum*, Marsh.

Hydrophilus piceus, habits; F. Chambolle, Feuill. Nat. x. p. 181. *H. triangularis*, Say, noticed and figured; Saunders, Rep. E. Soc. Ont. 1879, pp. 72 & 73.

Philhydrus. The 7 French species tabulated and described, and the spelling *Philydrus* advocated; Gezin, Feuill. Nat. x. pp. 138–140.

Berosus. Sexual characters of Greek and Egyptian species noticed; Leprieur, Bull. Soc. Ent. Fr. (5) x. p. cxxxi.

New species:—

Hydrophilus wenckii, Oliviera, J. Sc. Lisb. xxvii. p. 156, Angola.

Hydrochares olivescens, id. *l. c.* p. 157, Angola.

Hydrobius zealandicus and *nitidiusculus*, Broun, Man. N. Z. Col. pp. 77 & 78, New Zealand.

Philhydrus taitus and *variolorum* [*-larum*, vel *-losus*], id. *l. c.* pp. 78 & 79, New Zealand.

Helophorus niger, p. 61, *bergrothi* and *splendidus*, p. 62, Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, N.W. Siberia.

Asiobates obensis, id. *l. c.* p. 60, Obi.

Hydræna armata, Reitter, Verh. z.-b. Wien, xxx. p. 504, Caucasus.

Cyclonotum flavicorne, *gibbosum*, and *frontale*, Broun, *l. c.* p. 84, New Zealand.

Cycloma badium and *attalum*, id. *l. c.* p. 86, New Zealand.

Staphylinidæ.

Donckier de Doncel, H. Revision de Catalogue des Staphylinides de la Faune Belge. Ann. Ent. Belg. xxiv. pp. 70–113.

Eppelsheim, —. Synonymische Bemerkungen über Staphylinen. Ent. Nachr. vi. pp. 49–51.

Fauvel, A. Les Staphylinides des Moluques et de la Nouvelle Guinée. 2e Mémoire. Ann. Mus. Genov. xv. pp. 63–121.

Preceded by remarks on geographical distribution, and a table of the distribution of 89 species. Several new species are afterwards described, but the notes on known species are generally unimportant. The East Indian and Australian species of the following genera are enumerated: *Trogophlœus*, Mann, *Sunius*, Steph., *Stilicus*, Latr., *Cryptobium*, Mann, and *Silusa*, Erichs.

Heylaerts, —. Staphylinides trouvés à Breda et dans les environs. Ann. Ent. Belg. xxiv. pp. 114–117.

Lethierry, L. Liste des Staphylinides rencontrés jusqu'à ce jour dans le Département du Nord, classés d'après la Faune Gallorhénane de M. Fauvel. Ann. Ent. Belg. xxiv. pp. 118–133.

Sharp, D. On some *Coleoptera* from the Hawaiian Islands. Tr. E. Soc. 1880, pp. 37–54.

Descriptions of 29 new *Staphylinidæ*.

Aleocharides.

Leptusa fumida, Er., var. *xanthopyga*, from the Caucasus, described by Eppelsheim, Verh. z.-b. Wien, xxx. p. 504.

Cœnonica puncticollis, Kraatz, g. & sp. recharacterized; Fauvel, Ann. Mus. Genov. xv. pp. 112 & 113.

Aleochara anthomyiæ, Sprague. Habits; Barnard, Am. Ent. iii. pp. 199 & 200.

Dasynotus, g. n., Broun, Man. N. Z. Col. p. 93. Placed after *Gyrophæna*; to contain *D. flavescens*, l. c. p. 93, *optabilis*, *ærarius*, p. 94, *thoracicus* and *fulgens*, p. 95, spp. nn., *l. c.*, New Zealand.

Stilicioides [*-coides*], id. *l. c.* p. 95. Differs from *Stilicus* by the longer and more slender legs and antennæ. Type, *S. micans*, sp. n., *l. c.* p. 96, New Zealand.

New species :—

Falagria læviuscula, Eppelsheim, Verh. z.-b. Wien, xxx. p. 204, Dalmatia. *F. cavicollis*, Gilolo, and *formicaria*, New Guinea, Fauvel, Ann. Mus. Genov. xv. pp. 119 & 120. *F. currax*, Sharp, Tr. E. Soc. 1880, p. 37, Honolulu.

Bolitochara annularis, Fauvel, *l. c.* p. 118, Dorey.

Silusa papuana, id. *l. c.* p. 117, New Guinea.

Ocalea angulata, Eppelsheim, *l. c.* p. 205, S. Hungary.

Leptusa difficilis, id. *ibid.*, Herzegovina. *L. asturiensis* and *granulipennis*, id. S. E. Z. xli. pp. 282 & 283, Asturias.

Dinusa taygetana, id. *ibid.*, Mount Taygetus.

Tachyusa divisa, *usta*, p. 115, and *thoracica*, p. 116, Fauvel, *l. c.*, New Guinea. *T. pumila*, Sharp, *l. c.* p. 38, Maui.

Diestota plana, p. 38, *parva*, p. 39, *latifrons*, *palpalis*, p. 40, *puncticeps*, *carinata*, p. 41, and *rufescens*, p. 42, *id. l. c.*, Hawaiian Islands. (The generic characters of these aberrant species are noticed at p. 43.)

Oxypoda præcellens, Eppelsheim, Verh. z.-b. Wien, xxx. p. 206, Croatia. *O. ancilla*, Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, p. 86, N.W. Siberia.

Homalota capitulata, S. Hungary, and *H.* (*Geostiba*) *croatica*, Croatia, Eppelsheim, *l. c.* pp. 207 & 208. *H.* (*Liogluta*) *letzneri*, id. S. E. Z. xli. p. 285, Silesia, Bohemia. *H. lacrymosa*, Fauvel, *l. c.* p. 111, Dorey.

Thectura bicuspis, id. *l. c.* p. 112, Gilolo.

Gnypeta canaliculata, p. 84, *cavicollis* and *œnescens*, p. 85, Sahlberg, *l. c.* N.W. Siberia.

Hydrosmecta transversalis, id. *l. c.* p. 86, N.W. Siberia.

Alianta curta, id. *l. c.* p. 90, N.W. Siberia.

Atheta subplana, p. 90, *rivularis*, *trybomi*, p. 92, and *frigida*, p. 93, *id. l. c.* N.W. Siberia.

Geostiba abbreviata, id. *l. c.* p. 95, N.W. Siberia.

Phlœopora cingulata, Honolulu, and *diluta*, Kauai, Sharp, *l. c.* p. 44.

Oligota clavicornis, Honolulu, p. 44, *polita*, Oahu, p. 45, *glabra* and *mutanda*, Hawaii, p. 46, *id. l. c.*

Liophœna gracilipes and *flaviceps*, id. *l. c.* p. 47, Hawaii.

Encephalus angusticollis, Sahlberg, *l. c.* p. 82, N.W. Siberia.

Gyrophœna punctata, p. 87, *sternale* [*-lis*], *nugax*, p. 88, *densicorne* [*-nis*], *versicolor*, *atriceps*, p. 89, *socialis*, *puber*, p. 90, *philonthioides* [*-thoides*], *cornigera*, p. 91, *fuscicorne* [*-nis*], and *rufipenne* [*-nis*], p. 92; Broun, Man. N. Z. Col., New Zealand.

Myllæna vicina, Maui, *familiaris*, p. 48, *discedens*, Honolulu, and *curtipes*, Oahu, p. 49, Sharp, *l. c.*

Tachyporides.

New species :—

Cilea aspera and *partita*, Fauvel, Ann. Mus. Genov. xv. pp. 107 & 108, Dorey.

Tachinus bicuspidatus and *brevipennis*, Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, pp. 102 & 103, Arctic Siberia and Ochotsk.

Conurus ocellarius, Mysol, and *læviceps*, New Guinea, Fauvel, *l. c.* pp. 109 & 110. *C. largulus*, *austerus*, p. 97, *subruber*, *badius*, *flavithorax*, p. 98, *acerbus*, *atricapillus*, p. 99, *auricomus*, *nubilus*, and *maculosus*, p. 100; Broun, Man. N. Z. Col., New Zealand.

Bolitobius nigricollis, Sahlberg, *l. c.* p. 104, fig. 17, N.W. Siberia.

Mycetoporus ignidorsum, Herzegovina, and *picipennis*, Caucasus, Eppelsheim, Verh. z.-b. Wien, xxx. pp. 209 & 505.

Quediides.

Eppelsheim, —. Ueber vicarirende Flügeldeckenfärbung bei den Quedien. MT. schw. ent. Ges. v. pp. 577–586.

The elytra of several species may be either red or black.

Microsaurus ater, sp. n., Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, p. 72, N.W. Siberia.

Raphirus jenisseensis, sp. n., *id. ibid.*, N.W. Siberia.

Staphylinides.

Staphylinus cæsareus. Habits; L. Tessier, Feuill. Nat. x. p. 105.

Leucitus argyreus, Fauvel. Variation discussed by him; Ann. Mus. Genov. xv. p. 96.

Mysolius aurichalceus, Fauvel, var. β *diversipes* from Aru and New Guinea, described; *id. l. c.* p. 98.

Philonthus abdelkader, St. Farg., provisions its nest with bees; Bull. Soc. Ent. Fr. (5) x. pp. cxxxvii. & cxxxviii. *P. marginatus* of Fabr. & Ström are identical; Schφyen, Ent. Tidskr. i. pp. 182 & 212.

New species :—

Emus insularis, Batchian, Ceram, Sumatra, and *albertisi*, New Guinea; Fauvel, Ann. Mus. Genov. xv. pp. 94 & 95.

Leucitus paradiseus, id. *l. c.* p. 96, New Guinea.

Staphylinus huttoni, *litoreus*, p. 108, *maritimus*, and *ovicollis*, p. 109, Broun, Man. N. Z. Col., New Zealand.

Philonthus hyperboreus, Sahlberg, Sv. Ak. Handl. (2) xvii. p. 70, N.W. Siberia. *P. calidus*, Harold, MB. Ak. Berl. 1880, p. 262, E. Africa. *P. quadricolor*, p. 99, *discipennis*, p. 100, *sharpi*, p. 101, *picticollis*, p. 102, Amberbaki, *occipitalis*, New Guinea, p. 103, *longiceps*, New Guinea, Celebes, Borneo, Malacca, *erythropus*, New Guinea, Celebes, Manilla, China, India, Ceylon, p. 104, *squalidus*, New Guinea, p. 105, Fauvel, l. c. *P. impressifrons*, p. 110, *ruficornis*, *æneoceps*[*æneï-*], *enodis*, p. 111, *veteratorius*, *vividus*, and *arctifrons*, p. 112; Broun, *l. c.*, New Zealand.

Xantholinides.

Leptacinus and *Xantholinus*. Table of North American species; Leconte, Tr. Am. Ent. Soc. viii. pp. 168, 171, & 172.

New species :—

Pachycorynus discedens, Sharp, Tr. E. Soc. 1880, p. 50, Honolulu.

Belonuchus mutator, Fauvel, Ann. Mus. Genov. xv. p. 106, Gilolo, Celebes, Malacca.

Xantholinus ferox, Harold, MB. Ak. Berl. 1880, p. 262, E. Africa. *X. raffrayi*, Fauvel, *l. c.* p. 93, Gilolo. *X. sharpi*, p. 102, *cultus*, *arecæ*, p. 103, *mediocris*, *labralis*, p. 104, and *anthracinus*, p. 105 ; Broun, Man. N. Z. Col., New Zealand. *X. temporalis*, Florida, *picipennis*, California, p. 172, *dimidiatus*, California, *gularis*, Michigan, p. 173, *sanguinipennis*, Pennsylvania, and *nanus*, California, p. 174, Leconte, Tr. Am. Ent. Soc. viii.

Leptolinus rubripennis, United States, and *pusio*, South Carolina, p. 171, *id. l. c.*

Leptacinus brunnescens and *pallidulus*, California, *nigritulus* and *seriatus*, Michigan, Canada, p. 169, and *cephalicus*, South Carolina, p. 170; *id. l. c.*

Metoponcus floridanus, id. *l. c.* p. 170, Florida. *M. fulvipes* and *rufulus*, Broun, *l. c.* p. 106, New Zealand.

Othius stenocephalus, Eppelsheim, Verh. z.-b. Wien, xxx. p. 506, Caucasus. *O. adustus*, Broun, *l. c.* p. 101, New Zealand.

Pœderides.

Lathrobium and *Sunius*. Table of North American species; Leconte, Tr. Am. Ent. Soc. viii. pp. 174–177, 179, & 180.

Stilicus fragilis, Grav. Larva described ; Mulsant & Rey, Ann. Soc. L. Lyon, xxvii. pp. 416–418.

Pœderus fuscipes, Curt. (= *fennicus*, Sahlb., ? = *idæ*, Sharp). Variation discussed ; Gestro, Ann. Mus. Genov. xv. p. 90.

New species :—

Lathrobium bicolor, Michigan, *nitidulum*, Michigan, Florida, *finitimum*, Vancouver's Island, British Columbia, *puncticeps*, California, *subscriatum*, Vancouver's Island, California, *othioides*, Oregon, Massachusetts, p. 175, *simplex*, Lake Superior, Massachusetts, *divisum*, Vancouver's Island, *debile*, Michigan, *confusum*, Massachusetts, *parcum*, Florida, p. 176, *ambiguum*, United States, *ventrale*, Florida, Kansas, *anale*, *pallidulum*, United States, *lituarium*, Arizona, Texas, and *dimidiatum*, United States, p. 177 ; Leconte, Tr. Am. Ent. Soc. viii.

Achenium ustulatum (Fauvel, MS.), Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, p. 75, N.W. Siberia.

Cryptobium squalidipes and *lucidipes*, Fauvel, Ann. Mus. Genov. xv. pp. 91 & 92, New Guinea.

Stilicus hieroglyphicus, id. *l. c.* p. 86, Dorey. *S. quadriceps*, California, Massachusetts, *opaculus*, United States, and *bi-armatus*, Massachusetts, Leconte, *l. c.* p. 178.

Liparocephalus cordicollis, id. *l. c.* p. 177, California.

Scopæus dentiger, Massachusetts, and *brunnipes*, Vancouver's Island, California, *id. l. c.* p. 179.

Lithocharis brancsikii, Eppelsheim, S. E. Z. xli. p. 287, Styria, Slavonia. *L. immunis*, Fauvel, *l. c.* p. 87, New Guinea. *L. comptus*[*-ta*], *mandibularis*, p. 114, and *ventralis*, p. 115, Broun, Man. N. Z. Col., New Zealand.

Sunius misellus, Mulsant & Rey, Ann. Soc. L. Lyon, xxvii. p. 416, Var. *S. bicinctus*, Dorey, Mysol, Batchian, *strigiceps*, p. 84, and *rufus*, Dorey, p. 85, Fauvel, *l. c.*

Pæderus combustus, *cyanellus*, p. 88, and *doriæ*, p. 89, *id. l. c.*, New Guinea.

Pinophilides.

Palaminus limbifer, sp. n., Fauvel, Ann. Mus. Genov. xv. p. 82, New Guinea.

Stenides.

Evæsthetus ruficollis, Motsch. ?, described; Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, p. 97.

Nordenskiœldia, g. n., Sahlberg, *l. c.* p. 96. Allied to *Evæsthetus*, but tarsi five-jointed, and mandibles with a long tooth in the middle below. Type, *N. glacialis*, sp. n., *l. c.* fig. 15 *a*, N.W. Siberia.

Stenus latipennis, *sibiricus*, and *gibbicollis*, spp. nn., *id. l.* pp. 78–80, N.W. Siberia.

Oxytelides.

Oxyporus. Sexual characters noticed; Leconte, Tr. Am. Ent. Soc. viii. p. 180.

New species :—

Osorius discicollis, Fauvel, Ann. Mus. Genov. xv. p. 78, New Guinea.

Holotrochus minusculus, id. *l. c.* p. 79, Mysol, Sarawak, Java.

Bledius ignobilis, Eppelsheim, Verh. z.-b. Wien, xxx. p. 506, Caucasus.

Oxytelus aurantiacus, Fairmaire, Le Nat. ii. p. 236, Ann. Soc. Ent. Fr. (5) x. p. 325, Nossi-Bé. *O. advena*, Sharp, Tr. E. Soc. 1880, p. 50, Oahu.

Trogophlœus senilis, p. 51, *fontinalis* and *abdominalis*, p. 52, *id. l. c.* Oahu. *T. latipennis* and *papuensis*, Fauvel, *l. c.* p. 81, New Guinea.

Thinobius appendiculatus, Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, p. 100, fig. 16, N.W. Siberia.

Compsochilus procerus, Eppelsheim, *l. c.* p. 211, Dalmatia.

Homaliides.

[Mulsant, E., & Rey, C.] Tribu des Brévipennes. 11-12 familles Omaliens et Pholidiens. Ann. Soc. L. Lyon, xxvii. pp. 430, pl. vi.

The Omaliens are divided into 2 sections, and various sub-sections, as follows :—

I.—Omaliaires: Micralymmates, Lestévates, Omaliates, Anthobiates, Eugnathates.

II.—Boréaphilaires.

2 new genera and 5 new species are added.

Ancyrophorus bi-impressus, Märk., previously only known from Sitka, recorded from the French Pyrenees; Fauvel, Bull. Soc. Ent. Fr. (5) x. pp. lxxix. & lxxx.

New genera and species :—

Phaganthus, Mulsant & Rey, Ann. Soc. L. Lyon, xxvii. p. 42. Section of *Anthophagus*, head and thorax smooth between the points; head and at least the sides of the prosternum, rather strongly and closely punctured. To contain *A. scutellaris*, Er., *testaceus*, Grav., *præustus*, Müll., and *rotundicollis*, Heer.

Hypopycna, iid. *l. c.* p. 274. Allied to *Pycnoglypta*, antennæ thicker, club longer, commencing with and including joint 5; vertex distinctly bifoveolate; elytra more parallel, and hind tarsi longer. Types, *Homalium rufulum*, Er., and *distincticorne*, Baudi.

Lesteva curvipes and *villardi* (? = *luctuosus*, Fauv.), *iid. l. c.* pp. 78 & 413, France.

Olophrum puncticolle, Eppelsheim, Verh. z.-b. Wien, xxx. p. 212, S. Hungary.

Lathrimœum tenue, id. *l. c.* p. 507, Caucasus.

Deliphrum frigidum, Sahlberg, Sv. Ak. Handl. (2) xvii. p. 108, N.W. Siberia.

Arpedium puncticolle, id. *l. c.* p. 106, N.W. Siberia.

Phyllodrepa puella, id. *l. c.* p. 111, N.W. Siberia.

Homalium rugatum (? = *cæsum*, var.), Mulsant & Rey, *l. c.* p. 217, S. France; *H. hebes*, *sulcithorax*, p. 116, *agrestis* [*-te*], *spadix*, *tectum*, p. 117, *genalis* [*-le*], p. 118, *politulus* [*-lum*], *crenulatus* [*-tum*], p. 119, *pullus* and *tibiale*, p. 120, Broun, Man. N. Z. Col., New Zealand.

Anthobium subjectum, Mulsant & Rey, *l. c.* p. 352, Var.; *A. rufo-scutellatum*, Eppelsheim, *l. c.* p. 508, Caucasus.

Phlœocharides.

Olistherus megacephalus, Zett. Larva described; Sahlberg, Sv. Ak. Handl. (2) xvii. p. 105.

Phlœocharis umbratilis, sp. n., Eppelsheim, S. E. Z. xli. p. 288, Asturias.

Piestides.

Ancœus aruensis, Fauv., var. from Dorey noticed; Fauvel, Ann. Mus. Genov. xv. p. 75.

Lispinodes, g. n., Sharp, Tr. E. Soc. 1880, p. 53. Allied to *Glyptoma*, but depressed, and without sculpture. Type, *L. explicandus*, sp. n., *l. c.*, Oahu.

New species :—

Eleusis diversicollis, Fauvel, Ann. Mus. Genov. xv. p. 77, Mysol.

Chasolium impressicolle and *raoulti*, Fairmaire, Le Nat. ii. p. 236, Ann. Soc. Ent. Fr. (5) x. p. 326, Nossi-Bé.

Glyptoma blackburni and *brevipenne*, Sharp, Tr. E. Soc. 1880, p. 53, Oahu.

Hypotelus capito, Leconte, Tr. Am. Ent. Soc. viii. p. 181, Texas.

Lispinus quadrillum, Fauvel, *l. c.* p. 76, Dorey.

Leptochirus bifurcatus and *rugosus*, id. *l. c.* p. 74, New Guinea.

Micropeplides.

Micropeplus lævipennis, Eppelsheim, Verh. z.-b. Wien, xxx. p. 213, S. Hungary; *M. eppelsheimi*, Reitter, *tom. cit.* p. 514, Caucasus; *M. interstitialis*, Sahlberg, Sv. Ak. Handl. (2) xvii. No. 4, pp. 111, N.W. Siberia: spp. nn.

Pselaphidæ.

Schaufuss, L. W. Sechzig neue Pselaphiden (Der Société entomologique de Belgique zu Brüssel zur Feier ihres fünfundzwanzigsten Stiftungstages die herzlichsten Festgrüsse aus dem Museum Ludwig Salvator in Oberblasewitz-Dresden). Dresden-Oberblasewitz: Oct. 16, 1880, 8vo, pp. 35.

Bryaxis. Table of North American species; Leconte, Tr. Am. Ent. Soc. viii. pp. 181–183.

Bythinus monstripes, Reitt., = *œdipus*, Crotch; Reitter, Verh. z.-b. Wien, xxx. p. 216.

New genera and species:—

Gonatocerus, Schaufuss, *l. c.* p. 30. Resembles *Bryaxis*, but with the antennæ of *Rhexius*. Type, *G. communis*, sp. n., *ibid.*, Australia.

Byraxis[!], Reitter, Verh. Ver. Brünn, xviii. p. 166. Allied to *Bryaxis* (subg. *Reichenbachia*, Saulcy), head and thorax smooth, elytra not striated, antennæ thick, 10-jointed, joint 11 being fused with the preceding. Type, *B. monstrosa*, sp. n., *l. c.* p. 167, New Zealand.

Eutrichites, Leconte, Tr. Am. Ent. Soc. viii. p. 184. Allied to *Bryaxis*, antennæ less distant at base, 9th and 10th joints not enlarged, dorsal segments less broadly margined, more convex, and less unequal. Type, *E. zimmermanni*, sp. n., *l. c.*, District of Columbia to Texas.

Pselaptus, id. *l. c.* Allied to *Bryaxis*; head broadly excavated in front, obtusely elevated on each side above the antennal foveæ, which are distant; front convex, but not retuse. Elytra not striated; even the sutural stria wanting. Type, *P. belfragii*, sp. n., *l. c.* p. 185, Texas.

Scalenarthrus, id. *l. c.* p. 185. Differs from *Bryaxis* by the dorsal abdominal segments being more convex, almost ventricose, without impressions, and with the side margin extremely narrow, though distinct; first segment as long as the others united. Type, *S. horni*, sp. n., *l. c.*, p. 185, Arizona.

Pygoxyon, Reitter, Verh. z.-b. Wien, xxx. p. 508. Allied to *Tychus*; type, *P. scydmæniforme*, sp. n., *l. c.* p. 509, Caucasus.

Eutyphlus, Leconte, *l. c.* p. 185. Allied to *Euplectus*; eyes absent;

antennæ shorter and stouter; elytra with elongate, well impressed, dorsal stria. Type, *E. similis*, sp. n., Leconte, *l. c.* p. 186, Washington.

Articerus festivus, Amazon, and *selysi*, Swan River, Schaufuss, *l. c.* p. 5.

Rhexius putzeysi, id. *l. c.* p. 6, Montevideo.

Pselaphus ampliventris, Amazon, p. 6, *clavicornis*, p. 7, *brevipalpis* and var. *simplicior*, Gawler, Australia, *difformis*, Chili, p. 8, and *nanus*, Amazon, p. 9, *id.* l. c.; *P. pilistriatus*, Broun, Man. N. Z. Col. p. 123, New Zealand.

Tychus dalmatinus, p. 216, *monilicornis*, and *hirtulus*, p. 217, Reitter, Verh. z.-b. Wien, xxx., Dalmatia.

Bryaxis belfragii, Texas, p. 181, *gemmifer*, Michigan, *radians*, locality not stated, *divergens*, Massachusetts, p. 182, *trigona*, Missouri, *sagax*, California, *complectens*, Texas, Florida, *deformata*, California, and *tumida*, Texas, p. 183, Leconte, Tr. Am. Ent. Soc. viii.; *B. cochlearifer*, Mexico, p. 9, *pygmæa*, p. 10, *conveza*, *recens*, Amazon, p. 11, *singularis*, Chili, p. 12, *fraudatrix*, New Friburg, *cearae*, Para, p. 13, *cristata*, Mexico, p. 14, *denticornis*, Yucatan, *pusilla*, p. 15, *pubescens*, p. 16, *suturalis*, Mexico, p. 17, *excisa*, Cuba, *melanocephala*, p. 18, *sobrina*, *vitrea*, *laticlava*, p. 19, *talpa*, Tasmania, *aurora*, New South Wales, p. 20, *picta* (and varr. *frontalis*, p. 21, *verticalis*, *ebenifer*, and *ethiops*), *brevis*, Tasmania, *diversicolor*, p. 22, *chamæleon*, *bison*, p. 23, *isidoræ*, King George's Sound, p. 24, *ovalipennis*, New Zealand, *affinis*, New South Wales, *hyalinipennis*, Tasmania, p. 25, *hyalina*, Australia, *flavipes*, Sydney, p. 26, *breviuscula*, *læviceps*, p. 27, *pumilio*, Australia, *globulifer*, Melbourne, p. 28, and *ampliventris*, p. 29, Sydney, Schaufuss, l. c.; *B. sharpi*, p. 124, *abdominalis*, p. 125, *clavatus* [*-ta*], p. 126, *piciceps*, p. 127, *impressifrons*, p. 128, *mundus* [*-da*], *crassicornis*, p. 129, *altulus* [*-la*], p. 131, *nasutus* [*-ta*] and *sanguineus* [*-nea* ‖], p. 132, Broun, *l. c.*, New Zealand.

Dalma tuberculata, id. *l. c.* p. 134, New Zealand.

Sagola pulcher [*-chra*], *notabilis*, p. 137, *deformipes* and *denticolle* [*-lis*], p. 138, *id.* l. c.; *S. monstrosa*, Reitter, Verh. Ver. Brünn, xviii. p. 168: New Zealand.

Trichonyx longicollis, p. 168, *microcephalus*, p. 169, *brevicollis* and *rotundicollis*, p. 170, *id. l. c.*, *T. sordidus*, Schaufuss, *l. c.* p. 32, New Zealand.

Batrisus ursinus and *giraffa*, Schaufuss, *l. c.* p. 31, Australia.

Hamotus suturalis and *commodus*, id. *l. c.* pp. 32 & 33, Mexico.

Gerallus porcellus, Australia, *punctipennis*, New South Wales, p. 33, *subasper* and *perforatus*, Tasmania, p. 34, *id. l. c.*

Enoptostomus opacus, India, and *siamensis*, Siam, *id. l. c.* p. 35.

Bythinus cavifrons, p. 214, *kninensis*, N. Dalmatia, and *carniolicus*, Laibach, p. 215, *B. martkopius*, *abastumanus*, p. 510, and *steindachneri*, p. 511, Caucasus, Reitter, Verh. z.-b. Wien, xxx.

Euplectus tenebrosus, id. *l. c.* p. 218, Dalmatia; *E. grandicornis*, Schaufuss, *l. c.* p. 30, Chili; *E. cephalotes*, *trichon* [*ych*] *iformis*, p. 171, and *incertus*, p. 172, Reitter, l. c.; *E. trisulcicollis*, *asper*, p. 140, *longulus*, p. 141, *sculpturatus*, *frontalis*, p. 142, *brevitarsis*, *ovicollis*, and *foveolatus*, p. 143, Broun, *l. c.*, New Zealand.

Trimium puncticeps, Herzegovina, and *cavicolle*, Dalmatia, Reitter, *l. c.* p. 219.

Paussidæ.

Paussus pierroni, Fairmaire, Le Nat. ii. p. 236, Ann. Soc. Ent. Fr. (5) x. p. 327, pl. xi. fig. 3, Nossi-Bé ; *P.* (*Cerapterus*) *modicellus*, Dohrn, S. E. Z. xli. p. 151, Lagos : spp. nn.

Platyrrhopalus irregularis, sp. n., Ritsema, Notes Leyd. Mus. ii. p. 249, Java.

Scydmænidæ.

Scydmænus regalis, Reitter, Verh. z.-b. Wien, xxx. p. 511, Caucasus ; *S. ambiguus* and *puncticollis*, Broun, Man. N. Z. Col. pp. 145 & 146, New Zealand : spp. nn.

Euconnus kraussi, sp. n., Reitter, *l. c.* p. 512, Caucasus.

Leptomastax simonis, Stussiner, Verh. z.-b. Wien, xxx. p. 499, South Europe ; *L. stussineri*, Reitter, *l. c.* p. 220, Dalmatia : spp. nn.

Phagonophana picicolle[*-lis*] and *calva*, spp. nn., Broun, *l. c.* p. 147, New Zealand.

Euthia merkli, sp. n., H. Simon, Deutsche E. Z. xxiv. p. 96, Transsylvania.

Silphidæ.

Horn, G. H. Synopsis of the *Silphidæ* of the United States, with reference to the genera of other countries. Tr. Am. Ent. Soc. viii. pp. 219-321, pls. v.-vii.

The North American genera and species are described in detail, and a few new ones are characterized ; *Leptinus*, *Sphærius*, and *Brathinus* are excluded from the family. The author divides the *Silphidæ* into the following tribes :—

Posterior coxæ simple.
Anterior coxæ more or less transverse at base, and with trochantia. Anterior coxal cavities open behind.
Posterior coxæ contiguous.
Silphini.

Posterior coxæ separated.
Anterior coxæ prominent. Abdomen with 5 segments.
Lyrosomini.

Anterior coxæ not prominent. Abdomen with 6 segments.
Pinodytini.

Anterior coxal cavities closed behind.
Anisotomini.

Anterior coxæ cylindric-conic, without trochantia, the cavities closed behind, often widely.
Cholevini.

Posterior coxæ laminate.
Anterior coxæ with trochantia, the cavities closed behind.
Clambini.

On the classification of European *Silphidæ* ; all the European species previously referred to the American genus *Adelops* should be referred to *Bathyscia*, Schiödte. Horn, Bull. Soc. Ent. Fr. (5) x. pp. lxxxviii.–xc.

Silpha ramosa. Habits and transformations described; Gissler, Am. Ent. iii. pp. 265-267, fig. 145.

Colon. General remarks; G. Czwalina, Ent. Nachr. vi. pp. 245 & 246.

New genera and species :—

Pelates, Horn, Tr. Am. Ent. Soc. viii. p. 244. Allied to *Necrophilus* ; antennæ arising under a frontal margin, first joint short, robust, third scarcely longer than second. Type, *Necrophilus latus*, Mann (redescribed and figured, *l. c.* pl. v. fig. 6).

Platycholeus, id. *l. c.* p. 254. Allied to *Bathyscia* ; head broad, narrowed to a neck behind ; eyes present. Type, *Ptomaphagus leptinoides*, Crotch (redescribed and figured, *l. c.* pl. vi. fig. 2).

Pinodytes, id. *l. c.* p. 248. Type of the tribe *Pinodytini* (vide supra); type, *Catops cryptophagoides*, Mann (redescribed and figured, *l. c.* p. 249, pl. v. fig. 12).

Prionochæta, id. *l. c.* p. 260. Allied to *Choleva* ; tibial spurs very long, bipectinate ; type, *Catops opaca*, Say (redescribed and figured, *l. c.* p. 261, pl. v. fig. 14).

Mesocolon, Broun, Man. N. Z. Col. p. 153. Allied to *Colon* and *Choleva* ; to contain *M. clathrata*, p. 153, *liturata*, *puncticeps*, *undulata*, p. 154, *bicolor*, *nebulosus*, p. 155, *maculifer*, *hirtalis*, p. 156, *punctulata*, *torvus*, p. 157, and *domestica* [all should be neuter terminations], p. 158, spp. nn., *l. c.*, New Zealand.

Camiarus indiscretus and *concinnus*, id. *l. c.* pp. 149 & 150, New Zealand.

Necrophilus pettiti, Horn, *l. c.* p. 243, Canada to Kentucky.

Choleva egena, Alaska, and *decipiens*, Washington Territory, *id. l. c.* pp. 257 & 259 ; *C. antennalis* and *alacris*, Broun, *l. c.* p. 152, New Zealand.

Ptoma[to]phagus nevadicus, Horn, *l. c.* p. 263, Nevada.

Colon paradoxum, fig. 14, Pennsylvania, Columbia, *hubbardi*, fig. 13, Michigan, Tennessee, Columbia, p. 270, *celatum*, fig. 12, Nevada, p. 271, *putum*, Pennsylvania, Columbia, p. 272, *pusillum*, Maryland, Virginia, Columbia, Colorado, p. 273, *thoracicum*, fig. 7, Missouri, Columbia, *asperatum*, Michigan, Canada, Illinois, Columbia, p. 274, *nevadense*, W. Nevada, p. 275, *id. l. c.* pl. vi.

Anisotomidæ.

Anisotoma. Notes on French species ; Ducaux, Feuill. Nat. xi. pp. 24 & 25.

Isoplastus, g. n., Horn, Tr. Am. Ent. Soc. viii. p. 295. Differs from *Agathidium* by its 10-jointed antennæ with tri-articulate club. Type, *I. fossor*, sp. n., *l. c.* pl. vii. fig. 10.

New species :—

Triarthrum lecontii, Horn, *l. c.* p. 279, pl. vi. figs. 15 & 15 *a*, California.

Hydnobius strigilatus, id. *l. c.* p. 280, Nevada, Vancouver's Island.

Anisotoma humeralis, fig. 4, California, Oregon, p. 286, *valida*, figs. 2 &

2 *a*, White Mountains, Canada, Colorado, Vancouver, p. 287, *difficilis*, California, p. 289, and *ecarinata*, Nevada, p. 292, *id. l. c.* pl. vii.

Liodes larvatus, Canestrini, Atti Soc. Pad. iii. [1874] p. 163, Calabria; *L. blanchardi*, Massachusetts, *obsoleta*, Canada to Virginia, p. 298, *geminata*, pl. vii. fig. 4, Massachusetts to Virginia, *confusa* [masculine terminations required], Nevada, p. 299, Horn, *l. c.*

Agathidium dentigerum, Virginia, *californicum*, California, Nevada, Washington Territory, *sexstriatum*, p. 303, *bistriatum*, Nevada, *estriatum*, Colorado, and *repentinum*, White Mountains, p. 304, *id. l. c.*

Clambidæ.

Clambus seminulum, sp. n., Horn, Tr. Am. Ent. Soc. viii. p. 313, Arizona.

Scaphidiidæ.

Reitter, E. Die Gattungen und Arten der Coleopteren-Familie *Scaphidiidæ* meiner Sammlung. Verh. Ver. Brünn, xviii. pp. 35–49.

Includes tables of the genera and species, with descriptions of several new ones.

Table of genera and species of *Scaphidiidæ*; Marseul, Nouv. et faits, ii. pp. 130–132.

Scaphidium obliteratum, Lec., *piceum*, Mels., and *quadrinotatum*, Cast., are varieties or synonyms of *quadriguttatum*, Say; Reitter, *l. c.* p. 36, note.

Diatelium wallacii, Pasc. (= *Apoderus spectrum*, Voll.), noticed; Gestro, Ann. Mus. Genov. xv. pp. 58 & 59.

Scaphisoma tenellum, Pasc., = *Bœocera scutellaris*, Reitt.; Reitter, *l. c.* p. 172.

Alexi[*o*]*dia*, g. n., *id.* Verh. Ver. Brünn, xviii. p. 43. Shape of *Alexia globosa*; palpi as in *Bœocera*; legs as in *Scaphisoma*. Type, *A. rogenhoferi*, sp. n., *l. c.* p. 44, Colombia.

Scaphischema, g. n., *id.* Verh. z.-b. Wien, xxx. pp. 42 & 43. Differs from *Scaphisoma* in the absence of sutural striæ. Type, *S. poupillieri*, Reiche.

New species:—

Scaphidium rubicundum, Carthagena, *antennatum*, Texas (?), p. 37, *marginale*, Calcutta, *testaceum*, *fascipenne*, Brazil, p. 38, *philippense*[*-ppinense*, vel rectius—*narum*], Philippines, p. 39, *orbiculosum*, Borneo, *coronatum*, Australia, and *pulchellum*, Madagascar, p. 40, Reitter, Verh. Ver. Brünn, xviii., notes; *S. aterrimum*, id. Notes Leyd. Mus. ii. p. 41, Sumatra; *S. grande*, Sarawak, p. 50, *semiflavum*, p. 51, *picconii*, p. 52, *sondaicum*, Sumatra, p. 54, *inornatum*, Sarawak, *striatipenne*, Java, p. 55, *sulcipenne* and *chapuisi*, Sumatra, p. 57, Gestro, Ann. Mus. Genov. xv.

Scaphium ferrugineum, Reitter, Verh. Ver. Brünn, xviii. p. 41, note, Cape (?).

Cyparium piceum, Cape, p. 41, *substriatum*, Alabama, *anale*, St. Domingo, p. 42, and *submetallicum*, East Indies (?), p. 43, Reitter, *l. c.*, notes.

Homalosoma (?) *punctatissima*[*-mum*], id. *l. c.* p. 43, Celebes.

Bœocera rubripennis, Colombia, p. 44, *chilensis*, Chili, *bogotensis*, Bogota, *mexicana*, Mexico, p. 45, and *gyrinoides* (Chevr., MS.), Teapa, p. 46, *id. l. c.*, notes; *B. schirmeri*, id. Verh. z.-b. Wien, xxx. pp. 45 & 221, Dalmatia.

Scaphisoma subalpinum, id. *l. c.* p. 44, note, Hungary, &c.; *S. impunctatum*, Missouri, p. 46, *lœve*, N. America, *immundum*, Carthagena, p. 47, *humerosum*, Caraccas, *cubense*, Cuba, and *bilimeki*, Mexico, p. 48, Reitter, Verh. Ver. Brünn, xviii., notes; *S. concinna*[*-num*] and *apicella*[*-lum*], Broun, Man. N. Z. Col. pp. 158 & 160, New Zealand.

Scaphicoma longipes, Reitter, *l. c.* p. 49, Mysol.

Toxidium japonicum, id. *ibid.*, Japan.

Histeridæ.

Histeridæ frequently carnivorous; A. Puton, Feuill. Nat. xi. p. 30.

New genera and species:—

Homalister, Reitter, Verh. z.-b. Wien, xxx. p. 512. Allied to *Carcinops*; type, *H. ornatus*, sp. n., *l. c.* p. 513, Caucasus.

Peploglyptus, Leconte, Tr. Am. Ent. Soc. viii. p. 189. Allied to *Glymma*; antennal cavities under the front angles of the prothorax, costæ less developed, front tibiæ distinctly angulated on the outer side; under side not sculptured. Type, *P. belfragii*, sp. n., *l. c.*, Texas.

Hololepta alligans, Marseul, J. Sc. Lisb. xxv. p. 39, Angola.

Hister amphystrius, id. *l. c.* p. 41, Angola; *H.* (*Psiloscelis*) *perpunctatus*, Massachusetts, and *H. tornatus*, Florida, Leconte, Tr. Am. Ent. Soc. viii. p. 190.

Epierus rufescens, Reitter, Verh. Ver. Brünn, xviii. p. 172. *E. sylvanus*, and *purus*, Broun, Man. N. Z. Col. p. 163, New Zealand.

Saprinus punctulipennis, id. *l. c.* p. 165, New Zealand.

Teretrius placitus, W. Nevada, and *montanus*, Colorado, Horn, Tr. Am. Ent. Soc. viii. p. 143.

Abræus vividulus, Broun, *l. c.* p. 166, New Zealand. *A. bolteri*, Leconte, *l. c.* p. 190, California.

Nitidulidæ.

Nitidula antarctica and *lateralis*, White, are sexes of one species; Reitter, Verh. Ver. Brünn, xviii. p. 173.

Æthinopa (*Æthina*) *tumida*, Murr., noticed; *id.* Deutsche E. Z. xxiv. p. 163.

Meligethes noticed; Everts, Tijdschr. Ent. xxiii. pp. xci.–xciii.

Xanthopeplus, g. n., Fairmaire, Le Nat. ii. p. 181. Allied to *Halopeplus* and *Brachypeplus*; type, *X. brachy-elytrus*, sp. n., *ibid.*, Abyssinia.

New species :—

Brachypeplus agyzimbanus and *costalis*, Zanzibar, Fairmaire, Le Nat. ii. p. 181. *B.* (*Selis*) *fimbriatus*, Reitter, Ann. Mus. Genov. xv. p. 124, Ternate.

Adocinus nigripennis, id. *l. c.* p. 125, New Guinea.

Cillœus prolixus and *conurus*, Fairmaire, Le Nat. ii. p. 182, Zanzibar.

Ithyphanes gestroi and *cucujiformis*, Reitter, *l. c.* pp. 125 & 454, New Guinea.

Conotelus nitidissimus, id. Verh. Ver. Brünn, xviii. p. 1, Mexico.

Haptoneces literatus and *albertisi*, id. Ann. Mus. Genov. xv. pp. 127 & 455, New Guinea.

Haptoncura liliputana, id. *l. c.* p. 456, Australia.

Epurœa latissima, id. Notes Leyd. Mus. ii. p. 42, Sumatra; *E. signatum*[*-ta*], Broun, Man. N. Z. Col. p. 169, New Zealand.

Nitidula amœnum[*-na*], id. *l. c.* p. 171, New Zealand.

Soronia amphotiformis, Adelaide, and *oculata*, New Zealand; Reitter, Verh. Ver. Brünn, xviii. pp. 1 & 173.

Ischœna foveicollis, id. *l. c.* p. 2, Java. *I. interstitialis*, id. Ann. Mus. Genov. xv. p. 456, New Guinea.

Prometopia quadripunctata, id. *l. c.* p. 127, Cape York.

Omosita spinipes and *scutellare*[*-ris*], Broun, *l. c.* p. 173, New Zealand.

Thalycra striolata and *castanescens*, Fairmaire, *l. c.* p. 181, Zanzibar.

Lordites biplicatus, *sinuatipennis*, and *parallelus*, id. *l. c.* p. 181, Zanzibar.

Circopes adelopiformis, Reitter, *l. c.* p. 458, Australia.

Lasiodactylus monrovianus, Monrovia, and *vultur*, Java, Reitter, Verh. Ver. Brünn, xviii. pp. 2 & 3. *L. albertisi*, id. Ann. Mus. Genov. xv. p. 457, Australia.

Strongylus ruficeps, id. *l. c.* p. 459, New Guinea.

Ancyrona gestroi, id. *ibid.* Australia, New Guinea.

Amphicrossus simplex and *subopacus*, id. *l. c.* p. 458, Australia.

Pallodes limbicollis, Reitter, Verh. Ver. Brünn, xviii. p. 4, Australia. *P. bi-oculatus*, Fairmaire, *l. c.* p. 182, Abyssinia.

Cryptarcha marmorata and *testudinea*, id. *l. c.* pp. 181 & 182, Abyssinia.

Trogositidæ.

Peltoschema, g. n., Reitter, Verh. Ver. Brünn, xviii. p. 4. Allied to *Ostoma* and *Promanus*; antennæ 11-jointed, extending beyond the borders of the thorax, slender, basal joint slightly thickened, longer than broad, the joints beyond the second gradually thickened, the second as long as broad, the remainder longer, the last three scarcely thicker than the others; thorax narrowed in front, broad behind, bilobed at the base, and closely adpressed to the elytra. Type, *P. filicornis*, sp. n., *l. c.* p. 5, Australia.

Leperina ambiguum[*-gua*], sp. n., Broun, Man. N. Z. Col. p. 179, Auckland.

Narcisa bimaculata, sp. n., Gestro, Ann. Mus. Genov. xv. p. 59, Sumatra.

Acrops cicatricosa, Reitter, Verh. Ver. Brünn, xviii. p. 29, Himalaya.
Ancyrona simoni, sp. n., *id.* Deutsche E. Z. xxiv. p. 163, Ashanti.

Colydiidæ.

New genera and species :—

Rytinotus, Broun, Man. N. Z. Col. p. 204. Allied to *Enarsus*; type, *R. squamulosus*, sp. n., *l. c.* New Zealand.

Ablabus, id. *l. c.* p. 183. Intermediate between *Endophlœus* and *Ulonotus*. To contain *A. ornatus*, p. 184, *pallidipictus*, *scabra*[*-ber*], p. 185, *fervidulus* and *punctipennis*, p. 186, spp. nn., *l. c.*, New Zealand.

Acosmetus, id. *l. c.* p. 197. Intermediate between *Coxelus* and *Syncalus*; types, *A. oblongus* and *granulatus*, spp. nn., *l. c.* p. 198, New Zealand.

Adelostella, id. *l. c.* p. 212. Allied to *Philothermus*; type, *A. punctatum*[*-ta*], sp. n., *l. c.* p. 213, New Zealand.

Enarsus contractifrons, id. *l. c.* p. 200, New Zealand.

Syncalus politus, id. *l. c.* p. 201, New Zealand.

Epistranus sharpi and *fulvus*, Reitter, Verh. Ver. Brünn, xviii. pp. 173 & 174. *E. humeralis*, Broun, *l. c.* p. 203, New Zealand.

Tarphiomimus acuminatus, id. *l. c.* p. 183, New Zealand.

Ulonotus aberrans, p. 189, *atratus*, p. 190, *tuberculatus*, *insignis*, p. 191, and *salebrosus*, p. 192; *id. l. c.*, New Zealand.

Coxelus robustus, id. *l. c.* p. 197. *C. helmsi*, Reitter, *l. c.* p. 175, New Zealand.

Phormesa costicollis, id. *l. c.* p. 174, New Zealand.

Bitoma distincta and *discoidea*, Broun, *l. c.* pp. 194 & 195, New Zealand.

Penthelispa sulcatissima, Reitter, *l. c.* p. 5, New Zealand.

Pycnomerus simplex and *ellipticus*, Broun, *l. c.* pp. 209 & 210, New Zealand.

Philothermus sanguineus and *notabilis*, id. *l. c.* p. 211. *P. bicavus*, Reitter, *l. c.* p. 175, New Zealand.

Cerylon amplicolle, Fairmaire, Le Nat. ii. p. 236, Ann. Soc. Ent. Fr. (5) x. p. 327, Nossi-Bé.

Rhysodidæ.

Rhysodes aterrimus, p. 214, *pensus*, *eminens*, *orbitosus*, p. 215, and *proprius*, p. 216, Broun, Man. N. Z. Col. New Zealand, spp. nn.

Clinidium apertum, Himalaya, and *chevrolati*, Colombia, Reitter, Verh. Ver. Brünn, xviii. pp. 29 & 30, spp. nn.

Cucujidæ.

Hemipeplus marginipennis, Dej., discussed; Horn, Tr. Am. Ent. Soc. viii. pp. xii.–xv.

Telephanus procerulus, *argentatus*, *ornatus*, *niger*, and *paradoxus*, Reitt., redescribed and figured; Grouvelle, Ann. Soc. Ent. Fr. (5) x. pp. 169 & 170, 173–175, pl. v. figs. 1, 2, 8, 9, & 12.

New species:—

Hectarthrum lineicolle, Reitter, Verh. Ver. Brünn, xviii. p. 31, W. Africa.

Palæstes nigriceps, Chiguinda, and *tenuicornis*, Sarayacu; C. O. Waterhouse, Ann. N. H. (5) v. pp. 286 & 287.

Ino reclusa, Leconte, Tr. Am. Ent. Soc. viii. p. 186, Texas.

Parabrontes picturatus, Reitter, Verh. Ver. Brünn, xviii. p. 176, New Zealand.

Telephanus dubius, fig. 3, p. 170, *fallax*, fig. 4, *micans*, Colombia, fig. 5, p. 171, *signatus*, Cauca, fig. 6, *decoratus*, fig. 7, p. 172, *insignis*. Colombia, fig. 10, p. 174, and *terminatus*, Caracas, fig. 11, p. 175, Grouvelle, Ann. Soc. Ent. (5) x. pl. v.

Cryptamorpha curvipes and *lateritia*, Broun, Man, N. Z. Col. pp. 221 & 222, New Zealand.

Cryptophagidæ.

Cryptophagus ruficornis, Steph., is quite distinct from *C. umbratus*, and from *Cathartes advena*, Waltl, with *both* of which Reitter infers its identity; Rye, Nouv. et faits, ii. p. 129.

Atomaria nigricornis, Payk. (= *ruficollis*, Panz.): habits of larva; Lucas, Bull. Soc. Ent. Fr. (5) x. p. cxx.

Cryptophagus serricollis, Reitter, Verh. z.-b. Wien, xxx. p. 515, Caucasus. *C. rubellus*, p. 225, *rutilus*, *vestitus*, p. 226, *silvanus*, *angulifer*, p. 227, *ruficeps*, *hispidulus*, *fuliginosus*, p. 228, *substriatus*, *aciculatus*, *serratus*, p. 229, *punctulatus*, *adspersus*, p. 230, and *hispidella*, p. 231, Broun, Man. N. Z. Col., New Zealand, spp. nn.

Micrambina helmsi and *insignis*, spp. nn., Reitter, Verh. Ver. Brünn, xviii. p. 177, New Zealand.

Lathridiidæ.

Belon, M. J. Histoire Naturelle des Coléoptères de France, par E. Mulsant, Famille des Lathridiens (1ière partie). Ann. Soc. L. Lyon, xxvi. pp. 157–365.

The introductory and general observations, and the descriptions, are very elaborate. One new genus and three new species are described.

Corticaria. Full synonymy of the European species, pp. 67 & 68; *C. spinulosa*, Thoms., *nec* Mannerh., renamed *thomsoni*, p. 66; Reitter, Verh. z.-b. Wien, xxx. The genus *Melanophthalma*, Motsch., is recharacterized, remodelled, and renamed *Corticarina*, simply because it was ill-defined and badly characterized before [!]; *id. l. c.* pp. 58 & 68.

Neoploptera, g. n., Belon, Ann. Soc. L. Lyon, xxvi. p. 185. Allied to *Colovocera*, antennæ 8-jointed, inserted on the forehead; eyes globular, occupying all the side of the head; pronotum retracted at the front, broader at the base, which is bisinuated. Type, *N. peregrina*, sp. n., *l. c.* p. 186, Rouen (probably introduced from W. Africa).

New species :—

Anommatus kiesenwetteri, Reitter, Verh. z.-b. Wien, xxx. p. 47, Andalusia.

Holoparamecus tenuis, id. Verh. Ver. Brünn, xviii. p. 178. *H. lucidus*, Broun, Man. N. Z. Col. p. 232, New Zealand.

Lathridius bergrothi, Reitter, Verh. z.-b. Wien, xxx. p. 53, Finland. *L. laticeps*, Belon, Ann.. Soc. L. Lyon, xxvi. p. 271, Morgon. *L. sculpturatus*, *marginalis*, p. 233, *costulatus*, and *floridus*, p. 234, Broun, *l. c.*, New Zealand.

Cartodere schueppeli, Reitter, *l. c.* p. 57, Germany. *C. godarti*, Belon, *l. c.* p. 302, Algeria.

Metophthalmus obesus, Belon, *l. c.* p. 51, Corsica.

Corticaria concolor, Barneville, Ann. Soc. Ent. Fr. (5) x. p. 236, Corsica; *C. convexa*, p. 60, *kaufmanni*, p. 61, Algeria, *cucujiformis*, Corsica, and *rugipennis*, Egypt, p. 66, Reitter, l. c.; *C. angusticolle*[*-lis*], *puberum*[*-ra*], *fasciata*, p. 235, *hirtalis*, *finitimus*[*-ma*], *variegata*, *discoidea*, p. 236, *obesa*, *pudibunda*, and *alacer*[*-cris*], p. 237, Broun, *l. c.* New Zealand.

Corticarina illustris, p. 179, and *splendens*, New Zealand, *steinheili*, Bogota, p. 32, and *conferta*, Australia, p. 33, Reitter, Verh. Ver. Brünn, xviii.

Myrmecoxenus atomaroides, id. *l. c.* p. 179, New Zealand.

Mycetophagidæ.

Mycetophagus quadriguttatus, Müll., noticed; Hart, Ent. xiii. pp. 20 & 21.

Typhœa curvipes and *hirta*, spp. nn., Broun, Man. N. Z. Col. pp. 238 & 239, New Zealand.

Diplocœlus piliger, Reitter, Verh. Ver. Brünn. xviii. p. 6, Australia.

Symbiotes armatus, sp. n., *id.* Verh. z.-b. Wien, xxx. p. 227, Croatia.

Dermestidæ.

Dermestes lardarius cannot endure tallow ; C. E. Heustis, Rep. E. Soc. Ont. 1878, p. 18, figs. *D. vulpinus*: transformations described; Letzner, JB. schles. Ges. lvii. pp. 356–358.

Anthrenus scrophulariæ described and figured ; Rep. E. Soc. Ont. 1878, pp. 33–35, fig. 14, & 1879, pp. 30 & 31, fig. 1. Habits ; Am. Ent. iii. pp. 53–55, fig. 15.

Anthrenops, g. n., Reitter, Verh. z.-b. Wien, xxx. p. 86. *Anthrenus*, with 9-jointed antennæ; types, *A. coloratus*, Attica, and *albido-flavus*, Algeria, spp. nn., *l. c.* p. 91.

New species :—

Attagenus calabricus and *simplex*, Reitter, Verh. z.-b. Wien, xxx. pp. 77 & 79, Italy, &c.

Hadrotoma tristis, id. *l. c.* p. 84, Greece.

Trogoderma nobile, Cyprus, and *megatomoides*, Mexico (?), *id. l. c.* p. 85; *T. mœsta* [*-tum*], Broun, Man. N. Z. Col. p. 241, New Zealand.

Florilinus oberthueri, Europe, and *caucasicus*, Caucasus, Reitter, *l. c.* pp. 92 & 93.

Byrrhidæ.

Curimus submaculatus and *rudis*, Fairm., belong to *Byrrhus*; Fairmaire, Le Nat. ii. p. 150, and Ann. Soc. Ent. Fr. (5) x. pp. 237 & 238.

Chelonarium beauvoisi, Latr., and *undatum*, Cast., recharacterized; Chevrolat, Le Nat. ii. p. 260.

New species:—

Nosodendron ovatum, Broun, Man. N. Z. Col. p. 242, New Zealand.

Curimus anomalus and *striatus*, id. *l. c.* pp. 243 & 244, New Zealand.

Morychus setarius and *orbicularis*, id. *l. c.* p. 245, New Zealand.

Limnichus decorus and *punctatus*, id. *l. c.* p. 247, New Zealand.

Pedilophorus helmsi, Reitter, Verh. Ver. Brünn, xviii. p. 180, New Zealand.

Chelonarium pilosellum, Guadulpia, *yucatanum*, Yucatan, *succinctum*, Teapa, *ruficolle* (Dej., Cat.), *albo-sparsum*, *fasciato-punctatum*, *bicolor*, *gyrinoides*, Brazil, p. 260, *ventricosa* [*-sum*], Colombia, and *adspersum*, Malacca, p. 261, *bipunctatum*, p. 267, and *subpubescens*, Brazil, p. 268, Chevrolat, Le Nat. ii.; *C. orientale*, Reitter, Notes Leyd. Mus. ii. p. 43, Sumatra.

Parnidæ.

Psephenus lecontii, Lec. Habits; Detroit, Am. Ent. iii. p. 73.

Parnida, g. n., Broun, Man. N. Z. Col. p. 249. Placed after *Pomatinus*; type, *P. agrestis*, sp. n., *l. c.*, New Zealand.

Psephenus darwini, sp. n., C. O. Waterhouse, Cist. Ent. ii. p. 563, Rio Janeiro.

Lucanidæ.

Descriptions and remarks on the habits, &c., of the Belgian species; L. Mélise, Ann. Ent. Belg. xxiv. pp. 41–54.

Lucanus cervus. Pupation; A. Cottam, Tr. Hertford Soc. i. pp. 82 & 83.

Passalus cornutus without elytra; Hagen, Canad. Ent. xii. p. 173.

Cylindrocaulus, g. n., Fairmaire, Le Nat. ii. p. 164. Form of *Aulacocyclus*, but with a very distinct intercostal plate on the prosternum, as in *Solenocyclus*; type, *C. bucerus*, sp. n., *l. c.*, Central China.

New species:—

Dorcus planus, Broun, Man. N. Z. Col. p. 252, New Zealand.

Eurytrachelus arfakianus, Lansberge, CR. Ent. Belg. xxiii. p. cxviii., New Guinea.

Figulus lansbergii, Ritsema, Notes Leyd. Mus. ii. p. 217, Sumbawa.

Ceratognathus zealandicus and *foveolatus*, Broun, *l. c.* p. 253, New Zealand.

Passalus sansibaricus, Harold, MB. Ak. Berl. 1880, p. 262, E. Africa.

Scarabæidæ.

The Canadian *Scarabœidæ* discussed, and some typical species figured; J. Fletcher, Rep. E. Soc. Ont. 1879, pp. 65–71, figs. 32–37.

Coprides.

Ateuchus cornifrons, Cast., noticed from Egypt; Leprieur, Bull. Soc. Ent. Fr. (5) x. p. lxxx.

Macroderes, Westw. Preudhomme de Borre redescribes *M. bias*, Oliv., and *greeni*, Kirb., which are distinct, and describes 3 new species; *M. nitidus*, Har., is unknown to him. CR. Ent. Belg. xxiii. pp. vii.–xi.

Heliocopris sturleri, Har., noticed; Harold, Notes Leyd. Mus. ii. p. 197.

Xynophron, g. n., *id. l. c.* p. 199. Allied to *Pedaria* and *Aulonocnemis*; type, *X. ritsemæ*, sp. n., *l. c.* p. 201, Sumatra.

New species:—

Sisyphus penicillatus, Harold, MB. Ak. Berl. 1880, p. 263, E. Africa.

Canthon plagiatus and *steinheili*, id. S. E. Z. xli. pp. 15 & 16, Colombia.

Deltochilum punctatum, id. *l. c.* p. 17, Colombia.

Saphobius nitidulus, Broun, Man. N. Z. Col. p. 256, New Zealand.

Macroderes westwoodi (Reiche, MS.), *undulatus*, Cape of Good Hope, *politulus*, Caffraria, pp. x. & xi., Preudhomme de Borre, Ann. Ent. Belg. xxiii. pp. ix.–xi.; *M. fornicatus*, Cape, p. xxxvii., *pilula*, Grahamstown, and *pristinus*, Diamond Fields, p. xxxviii., Sharp, CR. Ent. Belg. xxiii.

Uroxys sulcicollis and *corniculatus*, Harold, *l. c.* p. 18, Colombia.

Onthocharis cupraria, id. *l. c.* p. 19, Colombia.

Trichillum externe-punctatum, Preudhomme de Borre, CR. Ent. Belg. xxiii. p. xxvii., Colombia.

Canthidium steinheili and *calidum*, Harold, *l. c.* pp. 19 & 20, Colombia.

Pinotus alyattes, *belus*, and *fallax*, id. *l. c.* pp. 24–26, Colombia.

Catharsius brutus, id. MB. Ak. Ber 1880, p. 263, E. Africa.

Phanæus mimæformis [*mimif-*], Ancey, Le Nat. ii. p. 205, Costa Rica; *P. perseus* and *auricollis*, Harold, S. E. Z. xli. pp. 27 & 28, Colombia.

Eurysternus plebeius, id. *l. c.* p. 14, Colombia.

Onthophagus acuminatus, p. 30, *marginicollis*, p. 31, *steinheili* and *landolti*, p. 34, *id. l. c.*, Colombia; *O. rugicollis* and *lævis*, id. Notes Leyd. Mus. ii. pp. 193 & 194, Sumatra; *O. kraatzi*, New Guinea, p. 349, *planicollis*, Somerset, Australia, *nietneri* [Ceylon?], p. 350, *falcifer*, Burma, &c., p. 351, and *cupreus*, Senegal, p. 352, *id.* Deutsche E. Z. xxiv.

Aphodiides.

Atœnius monstrosus, Har., noticed; Harold, Notes Leyd. Mus. ii. p. 198.

Psammodius alleonis, Fairm., = *Atœnius lepidulus*, Har.; Fairmaire, Le Nat. ii. p. 150.

Aphodius (*Melinopterus*) *mosulensis* and *A. beloni*, Mulsant & Godart, Ann. Soc. L. Lyon, xxvi. pp. 121 & 123, Mosul; *A. candens* and *communis*, Broun, Man. N. Z. Col. pp. 258 &. 260, New Zealand; *A. columbicus* and *pocatus*, Harold, S. E. Z. xli. pp. 36 & 37, Colombia.

Saprosites convexus, id. *l. c.* p. 38, Colombia.

Atœnius columbicus, *œqualis*, and *nugator*, id. *l. c.* pp. 39–41, Colombia.

Orphnides.

Hybalus. Rough table of the males of 8 species; Marseul, Nouv. et faits, ii. pp. 119 & 120.

Ægidium steinheili, sp. n., Harold, S. E. Z. xli. p. 42, Colombia.

Geotrupides.

Bolboceras bonariense, Klug, redescribed; Arribalzaga, Nat. Arg. v. p. 148.

Geotrupes. Table of N. American species; Horn, Tr. Am. Ent. Soc. viii. p. 145.

Athyreus flavithorax, Arribalzaga, Nat. Arg. v. p. 146, Buenos Aires; *A. vulpinus*, Harold, S. E. Z. xli. p. 44, Colombia: spp. nn.

Geotrupes occidentalis, sp. n., Horn, Tr. Am. Ent. Soc. viii. p. 144, California.

Trogides.

Trox. Various species destructive to *Acrydium paranense*; Conil, Periód. Zool. Argent. iii. pp. 237–241.

Liparochrus derasus, sp. n., Harold, Notes Leyd. Mus. ii. p. 195, Sumatra.

Glaphyrides.

Chasmatopterus hirtulus, Ill., and *hispidulus*, Graells, are distinct; Von Heyden, Deutsche E. Z. xxiv. p. 288.

Melolonthides.

Hoplia. Table of North American species, and revision of synonymy; Leconte, Tr. Am. Ent. Soc. viii. pp. 191–194.

Plectrodes pubescens, Horn, figs. 7 *a* & 7 *d*, and *carpenteri*, Lec., figs. 7 *b* & 7 *e*, redescribed and details figured; Horn, Tr. Am. Ent. Soc. viii. p. 145.

Lachnosterna fusca. Note on larvæ; Howard, Rep. E. Soc. Ont. 1879, p. 35. Larva attacked by fungus; Riley, Am. Ent. iii. pp. 137–139, figs. 53–56.

Ancylonycha (*Phyllophaga*), sp. Fungus (*Cordyceps raveneli*, Berk.) noticed as occurring on dead larvæ; Hagen, Canad. Ent. xii. p. 89.

Amphimallus cantabricus, Heyd., = *angulicollis*, Fairm., = *lusitanicus*, Gyll.; Von Heyden, Deutsche E. Z. xxiv. p. 289.

Anoxia villosa, Fabr., noticed; Herber, Ent. Nachr. vi. pp. 241 & 242.

Melolontha vulgaris, black variety; Clément, Bull. Soc. Ent. Fr. (5) x. p. lxiii. With an additional pair of legs; Preudhomme de Borre, CR. Ent. Belg. xxiii. p. lxxxvi. Its comparative abundance in various years; Heyden, JB. nass. Ver. xxxi. & xxxii. pp. 122–127.

Cœlothorax, g. n., Ancey, Le Nat. ii. p. 212. Belongs to the first division of the *Pachypodides*; type, *C. oberthueri*, sp. n.; *l. c.*, S. Australia.

New species :—

Hoplia sackeni, *dispar*, California and Nevada, p. 192, *hirta*, Nevada, and *equina*, Massachusetts, p. 193, Leconte, Tr. Am. Ent. Soc. viii.

Odontria suavis, *punctulata*, p. 266, *sylvatica*, p. 268, *costella*, p. 269, and *brunneum*[*-nea*], p. 270, Broun, Man. N. Z. Col., New Zealand.

Plectrodes palpalis, Horn, Tr. Am. Ent. Soc. viii. p. 146, pl. iii. figs. 7 *c* & 7 *f*, California.

Apogonia papua, Lansberge, CR. Ent. Belg. xxiii. p. cxix., New Guinea.

Enaria rufo-fulva, Fairmaire, Le Nat. ii. p. 308, Ann. Soc. Ent. Fr. (5) x. p. 327, Nossi-Bé.

Rhizotrogus variolatus, Sierra Morena, and *carthagenæ*, Carthagena, *id.* Ann. Soc. Ent. Fr. (5) x. p. 239. *R. longicollis*, H. W. Bates, Biol. Centr. Am. Col. v. p. 41, Chontales.

Rutelides.

Anisoplia austriaca. Ravages in Russia: Ent. M. M. xvii. pp. 139 & 140, Hor. Ent. Ross. xv. pp. x.–xiii.

Spilota riedeli, Celebes, and *insignis*, spp. nn., Sumatra, Lansberge, CR. Ent. Belg. xxiii. p. cxx.

Spodochlamys mirabilis, sp. n., C. O. Waterhouse, Ann. N. H. (5) v. p. 287, Chiguinda.

Adoretus senatorius, sp. n., Harold, MB. Ak. Berl. 1880, p. 263, E. Africa.

Dynastides.

Michels, H. Beschreibung des Nervensystems von *Oryctes nasicornis* im Larven-, Puppen-, und Käferzustande. Z. wiss. Zool. xxxiv. pp. 641–702, pls. xxxiii.–xxxvi.

Consists of an elaborate anatomical description of the nervous and tracheal systems of the insect, in all its stages.

Pericoptus sulcatus. Larva fully described; Broun, Tr. N. Z. Inst. xii. pp. 288–290.

Oryctes rhinocerus, L. Variations in structure noticed; Dohrn, S. E. Z. xli. p. 297.

Phileurus, Latr. North American species tabulated; Horn, Tr. Am. Ent. Soc. viii. p. 147.

Endebius, g. n., Lansberge, CR. Ent. Belg. xxiii. p. cxxii. Facies of *Xylotrupes*; elytra of ♀ not punctuated. Type, *X. florensis*, Lansb.

Oryctoderus candezei, sp. n., *id. l. c.* p. cxxi., New Guinea.

Pycnoschema scrofa, sp. n., Harold, MB. Ak. Berl. 1880, p. 263, E. Africa.

Pericoptus nitidulus, sp. n., Broun, Man. N. Z. Col. p. 273, New Zealand.

Lycomedes buckleyi, sp. n., C. O. Waterhouse, Ann. N. H. (5) v. p. 288, Chiguinda.

Cetoniides.

Kraatz, G. Genera Cetonidarum Australiæ. Deutsche E. Z. xxiv. pp. 177–214.

The following groups are dealt with: *Schizorrhinidæ*, *Diaphoniidæ*, *Lomapteridæ*, *Cetoniidæ*, and *Macrotomidæ*. The bulk of the Australian species belong to the first group, which is subdivided into *Hemipharidæ* and *Eupœcilidæ*, according to whether the thorax is lobed or not. Many new genera are described.

——. Nova Genera *Cetonidarum*. 2tes Stück. *L. c.* pp. 305–320.

Contains the characters of 20 genera (mostly new) from Madagascar. The known genera are as follows: *Dirrhina*, Burm. & Schaum, *Pantolia*, Burm. & Kraatz (= *Pantolia*, sect. B, a, Burm.), *nec* Burm. & Schaum; *Tetraodorrhina*, Blanch. (= *Pantolia*, sect. B, b., Burm.), restricted to *Cetonia scapha*, Gory & Perch.

Kraatz, *l. c.* pp. 145–153, pl. i., remarks on the following known *Cetoniidæ*: *Taurrhina nireus*, Schaum, *Cœlorrhina 4-maculata*, Fabr., *Aphelorrhina guttata*, Ol., *A. simillima*, Waterh., *Asthenorrhinella leonina*, Westw.; *Phonotania scalaris*, Gory & Perch. (var. *late-fasciata*, from Ashanti, figured (fig. 9); and *Hæmatonotus fritschi*, Kraatz, is figured (fig. 8).

Aphelorrhina julia, Waterh., = *simillima*, Westw.; *simillima*, Waterh., is renamed *westwoodi*; *Cœlorrhina excavata*, Har., = *Aph. bella*, Waterh.; *id. l. c.* pp. 165–167, pl. i. figs. 11 & 12 (hind tibiæ of the two first species).

Hypselogenia, Burm., will form a new group, intermediate between the *Goliathidæ* and *Dynastidæ*; id. *l. c.* pp. 168–170, pl. i. figs. 13 & 14 (hind tarsi of *Hypselogenia* and *Goliathus*).

Goliathus. Thomson notices the genus *Goliathus* and its immediate allies: as *Goliathinus*, Westw., = *Fornasinius*, Bert., he proposes to restrict the former name to *G. higginsi*, Westw. Bull. Soc. Ent. Fr. (5) x. pp. cvi. & cvii.

Westwoodia, Cast., *nec* Kaup, renamed *Theodosia*; id. *l. c.* p. ci.

Ceratorrhina, Westw., restricted to *C. derbyana*, Westw. (type), and *oberthueri*, Deyr.; *id.* Le Nat. ii. p. 293.

Eudicella gralli, Buq., var. *mechowi*, from Angola, and *smithi*, Macl., var. *trilineata*, from Bagamoyo, described; Quedenfeldt, Deutsche E. Z. xxiv. pp. 346 & 347.

Neptunides polychrous, *purpurascens*, *fasciicollis*, and *abundans*, Thoms.,

are all varieties of one species; Thomson, Bull. Soc. Ent. Fr. (5) x. pp. cxxxi. & cxxxii.

Ranzania bertolonii, Luc., redescribed and figured by him; Lucas, Ann. Soc. Ent. Fr. (5) x. pp. 165–168, pl. iv. figs. 1, 1*a*, 1*b*, 1*c*.

Rhomborrhina resplendens, Swartz, is common to Sumatra, Java, and China; Ritsema, Tijdschr. Ent. xxiii. p. xiv.

Lomaptera diaphonia and *pygmæa*, Kraatz, are distinct from *cinnamomea*, Thoms., and *rugata*, Blanch.; Kraatz, Deutsche E. Z. xxiv. p. 320.

Chalcothea bocki, Lansb., = *virens*, Rits.; Ritsema, Tijdschr. Ent. xxiii. p. xiv.

Glycyphana viridi-opaca, Motsch. (= *amurensis*, Thoms.), = *Cetonia aurata*, Linn.; *C. bensoni* probably = *C.* (*G.*) *pilifera*, Motsch., which is a good species; *C. submarmorea*, Burm., = *ærata*, Er., var.; *C. floricola*, Herbst. (1790) = *C. metallica*, Fuessl. (1782); Harold, CR. Ent. Belg. xxiii. pp. iv–vi.

Cetonia aurata. Westwood alludes to Kraatz and Harold's opinions relative to the various forms of this species, and expresses his conviction that his *Protætia bensoni* is perfectly distinct; Tr. E. Soc. 1880, pp. 81 & 82. A specific for hydrophobia; Am. Ent. ii. p. 50. *C. floricola*, var. *metallica*, with malformed thorax; L. Camerano, Bull. Ent. Ital. xii. p. 231.

Pachnoda flaviventris, Gory. Varieties described, including *sinuata*, Gory, *calceata*, Har., and *puncticollis* and *lineatollis* [sic]; Kraatz, Deutsche E. Z. xxiv. pp. 174–176.

Valgus hemipterus noticed; Fallou, Bull. Soc. Ent. Fr. (5) x. pp. lii. & liii.

New genera and species:—

Helionica, Thomson, Bull. Soc. Ent. Fr. (5) x. p. cii. Allied to *Theodosia*, Thoms. (= *Westwoodia*, Cast.); head without lateral horns in front, median horn shorter and thicker, prothoracic horn prominent and carinated below; hind tarsi shorter and thicker. Type, *H. westwoodi*, sp. n., *l. c.*, N. Borneo.

Cyprolais, id. Le Nat. ii. p. 294. Allied to *Ceratorrhina*; type, *C. hornimanni*, Bates; add *C. chloropyga*, Thoms. (= *viridipyga*, Lew.).

Platynocnema, id. *l. c.* Allied to *Aphelorrhina*; type, *A. tibialis*, Waterh.

Oraniola, id. *l. c.* Allied to *Naryciana*; type, *N. algoensis*, Westw.

Isandula, id. *l. c.* Allied to *Heterorrhina*; type, *Cetonia africana*, Drury.

Evanides, id. *l. c.* Allied to *Dilochrosis*; type, *bakewelli*, White.

Ablacopous, id. *l. c.* Allied to *Hemichrosis*; type, *trapezifera*, Thoms.

Lesosesthes, id. *l. c.* Allied to *Hemichrosis*; type, *nigerrima*, Vollenh.

Camilla, id. *l. c.* Allied to last; type, *decorticata*, Macl.

Melobastes, id. *l. c.* Allied to last ♀; type, *xanthopyga*, Germ.

Tapinoschema, id. *l. c.* Allied to last ♀; type, *impar*, Macl.

Eutelesmus, C. O. Waterhouse, Ann. N. H. (5) vi. p. 92. Next to

Rhanzania, clypeus concave above, with the anterior margin tridentate; club of antennæ very large. Type, *E. simplex*, sp. n., *l. c.* p. 93, Dar-es-Salaam, E. Africa.

Platynocnemis, Kraatz, Deutsche E. Z. xxiv. p. 148. Allied to *Astenorrhina*; type, *P. marginicollis*, sp. n., *l. c.* pl. i. fig. 1, Ashanti.

Eccoptocnemis, id. *l. c.* p. 150, pl. i. fig. 10 (hind femur). Type, *Tmesorrhina thoreyi*, Schaum. (*T. barthi*, Har., probably also belongs to this genus.)

Cyclophorus, id. *l. c.* p. 152. Affinities uncertain; head and prosternum as in *Dymusia*, but front tibiæ bidentate in both sexes. Type, *C. cincticollis*, sp. n., *l. c.* p. 153, pl. i. fig. 4, Ashanti.

Balsameda, Thomson, *l. c.* p. 268. Facies of *Amithaus*, Thoms., but much smaller. Type, *Cotinis pulverulenta*, Burm.

Melasictes, id. *l. c.* Allied to *Cotinis*; type, *C. erythropus*, Burm.

Latemnis, id. *l. c.* Allied to *Cotinis*; type, *Cetonia antonii*, Dugés.

Badelina, id. *l. c.* Allied to *Marmarina*, but mesosternal appendage prominent, nearly smooth, not pointed downwards. Type, *Gymnetis aterrima*, Gory.

Hoplopyga, id. *l. c.* Allied to last; prothorax elongated; elytra produced into 2 spines on each side; mesosternal appendage small, short, nearly smooth, and rounded at the tip; front tibiæ unarmed.

Tinclirea, id. *l. c.* Allied to *Clinteria*, mesosternal appendage short. rather broad, subtriangular, and obtuse at the tip. Type, *C. hilaris*, Burm.

Moscheuma, id. *l. c.* Allied to *Stethodesma*; type, *S. reichii*, Thoms.; add *S. sculptilis*, Thoms., and *lobata*, Ol.

Aurelia, id. *l. c.* p. 277. Type, *Macronota thoracica*, Wall.

Ixorida, id. *l. c.* Type *Macronota mouhoti*, Wall.

Carolina, id. *l. c.* Type, *Macronota annæ*, Wall.

Euselates, id. *l. c.* Allied to *Macronota*; type, *E. magna*, sp. n., *l. c.*, Cochin China.

Oncosterna, id. *ibid.* Type, *Macronota celebensis*, Wall.

Polydomia, id. *l. c.* p. 278. Type, *Macronota marmorata*, Wall.

Meroloba, id. *l. c.* Type, *Macronota antiqua*, Gory (*M. lugubris*, Mohn, probably also belongs to this genus).

Linotarsia, Kraatz, *l. c.* p. 306. Allied to *Stenotarsia*; thorax rather long, much narrower than the elytra, nearly truncated at the base; anterior angles acute; posterior angles obtusely rounded; front tibiæ tridentate. Type, *Stenotarsia discoidalis* and *picta*, Waterh., and *scotti*, Jans.

Ischnotarsia, id. *l. c.* p. 307. Allied to *Stenotarsia*, thorax broader, elytra more convex, legs generally shorter, and thorax strongly concave in the middle before the scutellum. Type, *Sten. scapulata*, Coq.

Micropeltis ‖ (Blanch, MS.), *id. l. c.* p. 308. Allied to *Anochilia*; thorax produced behind in the middle beyond the scutellum. Type, *Cetonia cingulata*, Gory & Perch.

Epistalagma, Fairmaire, Le Nat. ii. p. 236, Ann. Soc. Ent. Fr. (5) x. p. 328. Allied to *Liostraca* and *Epixanthis*; type, *E. multi-impressa*, sp. n, *l. c.* p. 329, pl. xi. fig. 4, Nossi-Bé.

Pseudepixanthis, Kraatz, *l. c.* p. 309. Allied to *Epixanthis*, hind tibiæ shorter, hind margin of the thorax less produced, and scutellum broader at the base. Type, *Ep. stella*, Gory & Perch.

Chilamblys, id. *l. c.* p. 307. Allied to *Parachilia*; front tibiæ simple in the male, elytra sub-bicostate, the sides not costulate. Type, *P. bufo*, Burm.

Pareuchilia, id. *l. c.* p. 310. Allied to *Euchilia*; thorax narrower and longer, scarcely emarginate before the scutellum, which is likewise longer. Type, *E. tarsalis*, Waterh. (redescribed, *l. c.*).

Cratomolops, id. *l. c.* p. 311. Allied to *Pygora*; thorax gradually narrowed in front; upper side dull, punctured; elytra punctate-striate, with a strong marginal carina. Type, *P. costifer*, Waterh. (= *Euchilia quadrata*, Burm.)

Pyrrhopoda, id. *l. c.* Allied to *Euchilia*, &c.; upper side hairy, and elytra more gradually sloped; types, *P. mantis* and *cyanescens*, spp. nn., *l. c.* p. 312, Madagascar; *Pygora hirsuta*, Waterh., and *Anochilia pratensis*, Gory & Perch., also belong to the genus.

Hyphelithia, id. *l. c.* p. 313. Allied to *Parachilia* by its dull greenish elytra; differs from *Anochilia* in its rather short clypeus, with very short, obtuse lobes; all the tarsi are half as long again as the tibiæ. Type, *Cetonia stupida*, Gory & Perch.

Moriaphila, id. *ibid.* Allied to *Anochilia*; clypeus less deeply excised, and elytra differently sculptured. Type, *A. princeps*, Burm.

Coquerelia, id. *l. c.* p. 314. Allied to *Anochilia*, thorax coarsely and strongly punctured, process of the mesosternum triangularly produced, and moderately sloping, &c. Type, *A. republicana*, Coq. (var. n. *fusci-pennis* defined, *l. c.*).

Hemilia, id. *l. c.* p. 316 (= *Pantolia*, sect. B. b. β, Burm.). Intermediate between *Pantolia* and *Stygnochræa*. Type, *P. striata*, Gory.

Stygnochræa, id. *l. c.* p. 317. Differs from *Euchræa* in colour, sculpture, and in the wings not being narrowed behind. Type, *Cetonia desmaresti*, Gory.

Percnobapta, id. *l. c.* p. 319. Allied to *Tetraodorrhina*; thorax emarginate at the base above the scutellum, and with all the angles rounded off. Type, *Pantolia ebenina*, Schaum.

Meso[*r*]*rhaga*, id. *l. c.* Allied to *Tetraodorrhina*; thorax excised before the scutellum, and elytra only slightly concave behind the shoulder. Type, *Pantolia polita*, Waterh.

Eccoptomia, id. *l. c.* p. 320. Allied to *Coptomia*, but flatter, and of more uniform breadth; clypeus subquadrate, scarcely emarginate at the tip, the sides raised, and the front angles obtusely rounded. Type, *E. sex-sulcata*, sp. n., *l. c.*, Madagascar.

Adonides, Thomson, *l. c.* p. 278. Allied to *Coptomia*; type, *C. crassa*, Waterh.

Pogoniotarsus, Kraatz, *l. c.* p. 306. Allied to *Pogonotarsus*; hind tarsi with shorter hairs; thorax not carinated. Type, *Pog. vescoi*, Coq.

Pœcilopharis, id. *l. c.* p. 182. Allied to *Hemipharis*; type, *H. buruensis*, Wall. (= *whitii*, Thoms., = *emiliæ*, Thoms.); add *H. emilia*, White, and *aruana*, Wall.

Phœopharis, id. *l. c.* p. 184. Allied to *Hemipharis*; types, *Schizorrhina browni*, Kirb., and *Hem. brunoni*, Burm.

Panglaphyra, id. *l. c.* p. 185. Allied to last; type, *Neophonia duboulayi*, Thoms.

Dysdiatheta, id. *l. c.* p. 187. Allied to *Hemipharis*; type, *Diaphonia vicina*, Jans.

Dysectoda, id. *l. c.* Allied to last; types, *Diaphonia dispar*, Newm. (= *penelope* and *ulysses*, Newm.), *digglesi*, Jans., and *cælata*, Gestro.

Lyraphora, id. *l. c.* p. 190 (= *Schizorrhina*, sect. 2, Thoms.). Allied to *Eupœcila*; type, *Schizorrhina obliquata*, Westw. (= *S. ocellata*, Macl., and *Diaphonia gratiosa*, Blanch.).

Polystigma, id. *l. c.* p. 191 (= *Eupœcila*, sect. B. a, Burm.). Allied to *Neophonia*; type, *Schizorrhina punctata*, Don.

Micropœcila, id. *l. c.* p. 192 (= *Eupœcila*, sect. A. a, Burm.). Type, *Cetonia cincta*, Gory & Perch.

Cacochroa, id. *l. c.* p. 194 (= *Eupœcila*, sect. B. b. Burm.). Type, *Schizorrhina gymnopleura*, Macl. (with var. *concolor*, Hope, and *rugicollis*, var. n., *l. c.*); add *Neophonia variabilis*, Macl., and *pullata*, Jans.

Aphanesthes, id. *l. c.* p. 195. Allied to last; type, *Eupœcila pullata*, Jans.

Chlorobapta, id. *ibid.* (= *Diaphonia*, sect. 1, Thoms.). Type, *Schizorrhina besti*, Westw.

Trichaulax, id. *l. c.* p. 196. Next to *Clithria*; type, *Schizorrhina philipsi*, Schreib.

Platedelosis, id. *l. c.* p. 198 (= *Diaphonia*, sect. 5, Thoms.). Type, *Schizorrhina bassi*, White.

Hemichnoodes, id. *l. c.* p. 201. Allied to *Pœcilocephala*; type, *Diaphonia mniszechi*, Jans.

Pœcilocephala, id. *l. c.* p. 202. Allied to *Diaphonia*; type, *D. succinea*, Hope.

Metallesthes, id. *ibid.* (= *Schizorrhina*, sect. 6, Thoms.). Type, *S. metallescens*, White.

Chondropyga, id. *l. c.* p. 203 (= *Schizorrhina*, sect. 4, Thoms.). Type, *Diaphonia gulosa*, Jans.

Dysephicta, id. *l. c.* p. 208, note. Allied to *Schizorrhina*; type, *S. bifida*, Ol.

Niphobleta, id. *l. c.* p. 172. Allied to *Elaphinis*; type, *N. niveo-sparsa*, sp. n., *ibid.*, Ashanti.

Macrelaphinis, id. *l. c.* p. 173. Allied to last; type, *Cetonia dominula*, Har.

Eucosma, id. *l. c.* p. 154. Allied to *Glycyphana*, Burm. (*nec* Lac.), but clypeus truncated and thorax more strongly emarginate. Type, *E. viridula*, sp. n., *l. c.* pl. i. fig. 5, Ashanti.

Cosmethes, id. *l. c.* p. 155. Next to last; type, *C. lineatocollis*[*-tic-*], sp. n., *l. c.* pl. i. fig. 3, Ashanti.

Achromisetes, id. *l. c.* p. 156. Allied to *Discopeltis*; type, *A. simonis*, sp. n., *l. c.* p. 157, pl. i. fig. 2, Ashanti.

Philhelena, Thomson, *l. c.* p. 278. Allied to *Cetonia*; type, *C. afflicta*, Gory.

Oxyperas, Thomson, *ibid.* Allied to *Protœtia*; type, *P. spectabilis*, Schaum.

Progaster, id. *ibid.* Allied to *Protœtia* ; type, *P. basalis*, Burm.

Paleopragma, id. *ibid.* Allied to *Pachnoda*; type, *P. petersi*, Gerst.

Lydinodes, id. *ibid.* Allied to *Pachnoda*; type, *Cetonia cincta*, De Geer.

Marmylida, id. *ibid.* Allied to *Pachnoda*; type, *P. hilaris*, Westw.

Pseudinca, Kraatz, *l. c.* p. 158. Aberrant, ? next *Diplognatha*. Type, *D. admixta*, Hope, redescribed, p. 159, pl. i. fig. 6.

Periphanesthes, id. *l. c.* p. 213. Allied to *Macroma*; type, *M. aurora*, Motsch.

Goliathus (*Goliathinus*) *pluto*, Raffray, Bull. Soc. Ent. Fr. (5) x. p. cxxiii. Bogos.

Ceratorrhina (*Eudicella*) *thomsoni*, Ancey, Le Nat. ii. p. 317, Zanzibar.

Eudicella darwiniana, Kraatz, Deutsche E. Z. xxiv. p. 170, Ashanti (pl. i. figs. 15 & 16, details of this species, and head of *E. frontalis*, Westw.).

Mecynorrhina haroldi (= *harrisi*, Harr. *nec* Westw.), Thomson, Bull. Soc. Ent. Fr. (5) x. p. cxi., Interior of Angola, Congo.

Cotinis malinus and *senex*, O. E. Janson. Cist. Ent. ii. p. 575, Mexico.

Gymnetis spurca, *fumata*, p. 576, *fabaria*, *scapularis*, Ecuador, p. 577, *cupriventris*, Peru, p. 578, *dispersa*, *discolor*, p. 579, and *balzarica*, Ecuador, p, 580, *id. l. c.*

Agestrata punctato-striata, Lansberge, C. R. Ent. Belg. xxiii. p. cxxii. Sumbawa, Flores, Sula.

Ischiopsopha bruyni, id. *l. c.* p. cxxiii., New Guinea.

Lomaptera adolphinæ, p. cxxiv., *distincta*, p. cxxv., *dichropus*, *humeralis*, p. cxxvi., and *angulicollis*, p. cxxvii., *id. l. c.*, New Guinea. *L. tristis*, Sumbawa, and *castanea*, Timor, Ritsema, Notes Leyd. Mus. ii. pp. 241 & 243. *L. rufa*, *diaphonia*, p. 215, and *pygmæa*, p. 216, Kraatz, *l. c.*, New Guinea.

Digenethle raffrayi, Lansberge, *l. c.* p. cxxviii., New Guinea.

Parachilia compacta, C. O. Waterhouse, Ann. N. H. (5) v. p. 409, Fianarantsoa.

Pantolia brevicollis, id. *l. c.* vi. p. 399, Madagascar.

Coptomia celata, id. *l. c.* p. 461, Antananarivo. *C. rufo-varia*, id. Tr. E. Soc. 1880, p. 60, Madagascar.

Diaphonia semi-nigra, Kraatz, *l. c.* p. 208, note, S. Australia.

Eupœcila neglecta (Dej. Cat.), Thomson, Bull. Soc. Ent. Fr. (5) x. p. xc., Perth, W. Australia.

Celidota splendens, C. O. Waterhouse, *l. c.* p. 59, Madagascar.

Glycyphana plicata, Lansberge, *l. c.* p. cxxix., Sumbawa, Flores. *G. fallaciosa*, Kraatz, *l. c.* p. 322, New Guinea.

Cetonia rœlofsi, Japan, p. v., *crassa* and *mimula*, Pekin, *dohrni*, N. India, p. vi., Harold, CR. Ent. Belg. xxiii. *C.* (*Protœtia*) *collfsi*, Sumbawa, p. cxxix., *C.* (*P.*) *candezii*, Flores, and *C.* (*P.*) *sangirensis*, Sangir Islands, p. cxxx., Lansberge, *l. c.*

Pachnoda pygmæa, Kraatz, *l. c.* p. 157, pl. i. fig. 7, Ashanti.

Isopedus plicatulus and *nodifer*, Asturias, p. 299, and *berytensis*, ibid. note, Beyrout; Kraatz, *l. c.*

Goniochilus haroldi, Witte, Deutsche, E. Z. xxiv. p. 230, Zanzibar.

Buprestidæ.

Fletcher, J. An outline sketch of the Canadian *Buprestidæ*. Rep. Ent. Soc. Ont. 1878, pp. 46–64, fig. 37.

Waterhouse, C. O. On *Buprestidæ* from Madagascar. Tr. E. Soc. 1880 pp. 179–200.

The following known species are noticed, in addition to new ones:— *Amphisbetis impressipennis*, Lap. & Gory (varr.), *Laconides chalybeo-ventralis*, Thoms. ? = *aureo-pilosa*, Guér., var., *Phobetodes vespertilio*, Thoms., ? = *goryi*; *Enkarpya chaotica* and *amorpha*, Thoms., are probably sexes; *Carcinias spectralis*, Thoms., ? = *scapularis*, Guér.; *Coccinellopsis lafertæi*, Gory, sexes noticed; *C. quadrispilata*, L. & G., *schœnherri*, Chevr., and *mystica*, Thoms., probably = *auro-picta*, L. & G., vars.; *Pycnobothris subsilphoides*, Thoms., is distinct from *Coccinellopsis mystica*, Th.; *P. obscurella*, Th., and *cuprifera*, L. & G., are redescribed.

Chrysochroa birmanensis, Lansberge, redescribed by him; CR. Ent. Belg. xxiii. p. cxxxi.

Sphenoptera lamellata. Larva noticed; Lamey, Nouv. et faits, ii. p. 113.

Belionota intermedia and *hilæ*, Lansberge, = *fallaciosa* and *mniszechi*, Deyr., respectively; Ritsema, Tijdschr. Ent. xxiii. p. xcv.

New species:—

Sternocera fischeri, Quedenfeldt, Deutsche E. Z. xxiv. p. 347, Bagamoyo.

Chrysodema florensis, Lansberge, CR. Ent. Belg. xxiii. p. cxxxii., Flores.

Iridotœnia riedeli, id. *l. c.* p. cxxxv., Timor.

Cyphogastra ronensis, p. cxxxii., *bruyni*, p. cxxxiii., *caudata*, New Guinea, and *flavimana*, Timor, Flores, p. cxxxiv., *id.* l. c.; *C. lansbergii*, Gestro, Ann. Mus. Genov. xv. p. 61, Timor.

Alampetis (?) *scintillans*, Waterhouse, Tr. E. Soc. 1880, p. 180, Madagascar.

Hemisobothris parallela, id. *l. c.* p. 182, Antananarivo.

Laconides æqualis, id. *l. c.*, Madagascar.

Carcinias an[*n*]*ulifer*, Antananarivo, and *cœruleipes*, Madagascar, *id. l. c.* p. 184.

Erebodes fulgidiventris, id. *l. c.* p. 185, Fianarantsoa.

Coccinellopsis (? ?) *cribraria*, p. 185, *lateralis*, p. 186, *punctiventris*, p. 187, *ovalis*, *dejecta*, p. 188, *multiguttata*, *elliptica*, p. 189, *propinqua*, *sodalis*, p. 190, *plagiata*, p. 191, *bistrigata* and *terminalis*, p. 192, *id. l. c.*, Madagascar.

Pycnobothris compacta, p. 194, *truncatella*, p. 195, and *crassa*, p. 196, *id. l. c.*, Antananarivo.

Melobasis variabilis, Sumbawa, and *modesta*, New Guinea, Lansberge, *l. c.* p. cxxxvi.

Castalia mœrens, id. *l. c.* p. cxxxvii., Timor.

Acmœodera lanata, Horn, Tr. Am. Ent. Soc. viii. p. 148, Utah.

Eucnemidæ.

Thambus frivaldskii, Bonv., noticed; Hopffgarten, Ent. Nachr. vi. p. 58.

Henicocerus angusticollis, Bonv., var. from Sumatra, Bonvouloir; Notes Leyd. Mus. ii. p. 56.

Dromœolus inopinatus, sp. n., *id. l. c.* p. 54, Sumatra.

Fornax subflabellatus and *subquadricollis*, spp. nn., Fairmaire, Le Nat. ii. p. 246, and Ann. Soc. Ent. Fr. (5) x. pp. 329 & 340, Nossi-Bé.

Elateridæ.

Candèze, E. Liste des Élaterides décrits postérieurement au Catalogue de Munich. CR. Ent. Belg. xxiii. pp. lii.–lvii., lxxvii.–lxxxiii., lxxxvii.–xcviii., cx.–cxiv.

——. Addition au relève des Élaterides Malais. Ann. Mus. Genov. xv. pp. 188–198.

Notes on various species from both sides of Torres Straits, and from Sumatra.

A popular introductory article on *Elateridæ*; Harrington, Rep. E. Soc. Ont. 1879, pp. 77–84, figs. 51–54.

Luminous larva, supposed to be that of a *Melanactes* or *Asaphes*; Am. Ent. iii. pp. 201 & 202, fig. 108.

Elater ochropterus, Küst., var. *straminipennis*, from Asturias, described; Heyden, Deutsche E. Z. xxiv. p. 289.

Limonius minutus and *nigripes*. Tenacity of life; Troostembergh, Feuill. Nat. x. p. 93.

Pyrophorus causticus, Cand. Habits; Ramsden, P. E. Soc. 1880, p. xxxi.

Corymbites hæmapterus, Ill. Heyden (*l. c.* p. 290) remarks on its variation, and suggests the possibility of two species being confounded under the name.

Asaphes. Monograph of N. American species (10 described, none new); Horn, Tr. Am. Ent. Soc. viii. pp. 69–75.

Agriotes segetis, Bierk. [*lineatus*]. Habits and transformations noticed; Feuill. Nat. x. pp. 134, 135, & 161.

Plastocerus schaumi, Lec. Generic characters discussed; it belongs to a different division of the *Elaterides* to *Callirrhipis angulosus*, Germ., which has been incorrectly made the type of *Plastocerus*. Horn, Bull. Soc. Ent. Fr. (5) x. p. cx.

Telesus, g. n., Candèze, Notes Leyd. Mus. ii. p. 9. Allied to *Monocrepidius*; front protruding, the part bent towards the labrum large, and provided with two foveolæ; coxal laminæ dilated on the inner side, but

square; fifth joint of the tarsi short, claws very small. Type, *T. ritsemæ*, sp. n., *l. c.* p. 10, Congo.

New species :—

Agrypnus gestroi, Candèze, Ann. Mus. Genov. xv. p. 188, New Guinea.

Lacon beccarii, id. *l. c.* p. 192, Sumatra; *L. hydropicus*, Fairmaire, Le Nat. ii. p. 293, Bourbon.

Melantho candezii, id. *l. c.* p. 175, Madagascar.

Alaus velutinus, Candèze, *l. c.* p. 189, New Guinea.

Chalcolepidius candezii, Dohrn, S. E. Z. xli. p. 295, Ega.

Psephus semiculus, Candèze, Notes Leyd. Mus. ii. p. 7, Zanzibar.

Candezia basalis, Harold, MB. Ak. Berl. 1880, p. 269, E. Africa.

Elius elegans, Candèze, *l. c.* p. 8, Borneo.

Melanthoides nitidus, id. *l. c.* p. 1, Sumatra.

Monocrepidius cristatus, New Guinea, and *torresi*, Australia, *id.* Ann. Mus. Genov. xv. p. 190; *M. subrufus*, Broun, Man. N. Z. Col. p. 294, New Zealand.

Anchastus albertisi, New Guinea, and *nigripennis*, Candèze, *l. c.* pp. 191 & 193; *A. spectabilis*, Sumatra, *id.* Notes Leyd. Mus. ii. p. 1.

Megapenthes basalis and *infumatus*, id. Ann. Mus. Genov. xv. pp. 193 & 194, Sumatra.

Melanoxanthus cylindricus, id. *l. c.* p. 194, and *M. confusus*, id. Notes Leyd. Mus. ii. p. 2, Sumatra.

Betarmon vittatus, id. Deutsche E. Z. xxiv. p. 297, Asturias.

Panspœus tenebrosus, Broun, *l. c.* p. 288, New Zealand.

Smilicerus belti, Sharp, Ent. M. M. xvii. p. 111, Chontales.

Hypolithus prolixus, Putzeys, J. Sc. Lisb. xxix. p. 41, Angola.

Arraphes nigriceps, Candèze, Ann. Mus. Genov. xv. p. 194, Sumatra.

Cardiophorus getschmanni, id. Deutsche E. Z. xxiv. p. 297, Asturias; *C. rubiginosus*, id. Notes Leyd. Mus. ii. p. 2, Sumatra.

Melanotus hepatesus, id. *l. c.* p. 3; *M. brevicornis* and *atractodes*, id. Ann. Mus. Genov. xv. pp. 195 & 196, Sumatra.

Athous langsdorffi, Stierlin, MT. schw. ent. Ges. v. p. 590, Riviera; *A. cervicolor*, Heyden, Deutsche E. Z. xxiv. p. 289, Asturias.

Penia stictica, Candèze, Notes Leyd. Mus. ii. p. 3, Sumatra.

Aphanobius discoidalis, id. Ann. Mus. Genov. xv. p. 197, Sumatra.

Agonischius montanus, id. *l. c.* p. 197; *A. lateralis*, p. 3, *fasciatus* and *bimaculatus*, Sumatra, p. 4, and *ornatus*, New Guinea, p. 10, Candèze, Notes Leyd. Mus. ii.

Glyphonyx frontalis, id. *l. c.* p. 5; *G. ruficaudis* and *subopacus*, id. Ann. Mus. Genov. xv. pp. 197 & 198, Sumatra.

Silesis sanguinolentus, id. Notes Leyd. Mus. ii. p. 5, Sumatra.

Parhemiops angustus, id. *l. c.*, Sumatra.

Cebrionidæ.

Cebrio alleonis, sp. n., Fairmaire, Le Nat. ii. p. 150, and Ann. Soc. Ent. Fr. (5) x. p. 240, Corfu and Albania.

Rhipidoceridæ.

Callirrhipis dejeani, Latr. Transformations described; Lucas, Bull. Soc. Ent. Fr. (5) x. pp. cxxv. & cxxvi.

Dascyllidæ.

Horn, G. H. Synopsis of the *Dascyllidæ* of the United States. Tr. Am. Ent. Soc. viii. pp. 76–114, pl. i. (illustrating generic details).

The following subdivisions are proposed:—

A. Anterior coxæ with large trochantia . . . Dascyllidæ.
Epistoma prolonged, concealing the greater part of the labrum and mandibles; posterior coxæ narrowly separated. *Macropogonini.*
Epistoma short, labrum and mandibles visible, posterior coxæ contiguous, rarely slightly separated . . *Dascyllini.*

B. Anterior coxæ without trochantia . . . Helodidæ.
Tarsi with 4th joint very small, 3rd lobed beneath. *Ptilodactylini.*
Tarsi with 4th joint as large or larger than the 3rd.
Posterior coxæ very large . . . . *Eucinetini.*
Posterior coxæ at most moderately dilated internally.
Claws without membranous appendage.
Front moderately broad, prosternum very short before, and very narrow between the coxæ. *Helodini.*
Front narrowed by the insertion of the antennæ, prosternum distinct before and between the coxæ . . . . . *Eubriini.*
Claws with membranous appendage arising from the base of each claw, and as long as the claw; front narrowed by the insertion of the antennæ. *Placonychini.*

New genera and species:—

Allopogon, Horn, Tr. Am. Ent. Soc. viii. p. 80. Allied to *Macropogon*; prosternum not prolonged, nor meeting the metasternum; in front convex, without raised lines; antennæ serrate. Type, *A. villosus*, sp. n., *l. c.* p. 81, Middle California.

Anchycteis, id. *l. c.* p. 87. Allied to *Anchytarsus*; head more deflexed, with a frontal suture; antennæ pectinate (♂) or serrate (♀); hind coxæ contiguous. Type, *A. velutina*, sp. n., *l. c.*, Nevada, California.

Acneus, id. *l. c.* p. 97. Allied to *Ectopria*; but prosternum narrow, and slightly depressed between the coxæ. Type, *A. quadrimaculatus*, sp. n., *l. c.* p. 98, pl. i. fig. 10, California.

Placonycha, id. *l. c.* p. 111. Type of tribe *Placonychini* (suprà); type, *Dicranopselaphus edwardsi*, Lec.

Schinostethus, C. O. Waterhouse, Cist. Ent. ii. p. 563. Differs from

Eubria by the absence of impressed lines on the elytra, and in its more simple palpi. Type, *S. nigricornis*, sp. n., *l. c.* p. 564, N. China.

Homœogenus, id. *l. c.* p. 565. Allied to last; apex of the apical joint of the maxillary palpi arcuate instead of emarginate. Type, *H. punctatum*, sp. n., *l. c.* p. 565, China.

Cophœsthetus, id. *l. c.* p. 266. Allied to *Schinostethus*; apical joint of the maxillary palpi elongate, subparallel, the apex flattened, and almost truncate; præsternal process obtuse. Type, *C. opacus*, sp. n., *l. c.*, Java.

Macropogon rufipes, Horn, *l. c.* p. 79, White Mountains and Illinois.

Eurypogon californicus, id. *l. c.* p. 80, California.

Dascyllus plumbeus, id. *l. c.* p. 84, California.

Ptilodactyla angustata, id. *l. c.* p. 91, Florida.

Dicranopselaphus variegatus, id. *l. c.* p. 97, Illinois, Maryland.

Helodes maculicollis, id. *l. c.* p. 104, Canada, New Hampshire, and Pennsylvania.

Cyphon exiguus, id. *l. c.* p. 107, California; *C. amplum*[*-plus*] and *viridipenne*[*-nis*], Broun, Man. N. Z. Col. p. 322, New Zealand.

Scirtes nigricans, China, *elegans*, Penang, p. 567, *maculatus*, India, *quadrimaculatus*, Burma, *costulatus*, Penang, p. 568, *æqualis* and *cuniformis*, Borneo, *irregularis*, Java, p. 569, *sericeus*, Siam, *marginatus*, India, p. 570, *elongatus*, Hong Kong, *difficilis*, p. 571, *pallidus*, Penang, *pellucidus* and *lutescens*, Java, p. 572, *exoletus*, W. Australia, p. 573, C. O. Waterhouse, Cist. Ent. ii.

Cyphanus capax, p. 309, *granulatus* and *medius*, p. 311, Broun, *l. c.*, New Zealand.

Atopida hirta and *testacea*, id. *l. c.* pp. 313 & 314, New Zealand.

Veronatus sharpi, p. 315, *frontalis*, *scabiosus*, and *capito*, p. 316, *id. l. c.*, New Zealand.

Telephoridæ.

Lycides.

Gorham, H. S. Biologia Centrali-Americana [*cf.* General Subject, *sub* Godman & Salvin], *Coleoptera*, iii. pt. 2.

Includes the commencement of *Lycidæ*, as far as the genus *Plateros*. The following known species are figured: *Lycus schœnherri*, Chevr., fig. 3, *Lycostomus lineicollis*, Chevr., fig. 4, *loripes*, Chevr., fig. 8, *semiustus*, Chevr., fig. 9, pl. i., *Calopteron corrugatum*, Cand., pl. ii. fig. 3, *affine*, Luc., fig. 13, *melanopterum*, Luc., fig. 15, *reticulatum*, Fabr. (= *typicum*, Newm., = *duplicatum*, Fald.), fig. 17, *flavipes*, Blanch., fig. 18, *juvenile*, fig. 16, pl. i., *pennatum*, Bourg., figs. 11 & 12, *obliquum*, Say, fig. 13, pl. ii., *Cœnia scapularis*, Newm., pl. i. fig. 23, *Plateros bogotensis*, Kirsch, pl. ii. fig. 18.

Lycus. Bourgeois discusses the following known species: *constrictus*, Fabr. (= *cuspidatus*, Klug, = *œolus*, Murr.), *præmorsus*, Dalm. (= *latissimus*, Fabr.), *trabeatus*, Guér. (table of varr. added), *rostratus*, Linn., *semiamplexus* and *aspilatus*, Murr., and *haagi*, Bourg.; J. Sc. Lisb. xxvii. pp. 142–150.

Metriorrhynchus bourgeoisi, Har., amended description; Bourgeois, Bull. Soc. Ent. Fr. (5) x. p. cxlix.

Cœnia and *Celetes*, Newm., are distinct genera ; Bourgeois, Le Nat. ii. pp. 163 & 164.

New species :—

Lycus thomsoni, p. 143, *bellicosus*, p. 144, *olivierœ*, p. 145, *subtrabeatus*, p. 146, and *murrayi*, p. 149, Bourgeois, J. Sc. Lisb. xxvii., Angola ; *L. aculeatus*, id. Deutsche E. Z. xxiv. p. 160 ; *L. carmelitus*, fig. 1, p. 2, *godmani*, fig. 2, *scutellatus*, *sallœi*, Mexico, &c., p. 3, and *fuliginosus*, Guatemala, fig. 5, p. 4, Gorham, Biol. Centr. Am. *Col.* iii. (2) pl. i.

Lycostomus tabidus, Mexico, p. 4, *sordidus*, fig. 6, Guatemala, Nicaragua, Costa Rica, *championi*, fig. 7, pl. i., Guatemala, *deustus*, Panama, p. 5, *sommeri*, pl. ii. fig. 2, Mexico, Nicaragua, and *carnifex*, Mexico, p. 6 ; *id. l. c.*

Lygistopterus nobilis, *amabilis*, pl. i. fig. 10, Chontales, p. 7, *sulcicollis* and *hæmatopterus*, pl. ii. fig. 1, Mexico, p. 8, *id.* l. c. ; *L. puniceus*, Costa Rica, and *elegans*, Brazil, Bourgeois, Le Nat. ii. p. 163.

Calopteron bifasciatum, figs. 11 & 12, Mexico, Guatemala, p. 8, *pallidum*, fig. 14, Costa Rica, p. 9, pl. i., *divergens*, Chontales, p. 11, pl. ii. fig. 4, *scapulare*, Mexico, Guatemala, p. 12, pl. i. fig. 25, & pl. ii. fig. 5, *triste*, Guatemala, pl. i. fig. 21, *rufulum*, figs. 8 & 9, Mexico, Guatemala, Costa Rica, p. 13, *lineare*, fig. 14, Guatemala, *terminale*, Guatemala, Nicaragua, p. 14, *ichnoides*, fig. 21, Guatemala, *mimicum*, fig. 22, Guatemala, *belti*, fig. 19, Chontales, p. 15, *miniatum*, Costa Rica, *matutinum*, fig. 7, Mexico, Guatemala, *difficile*, Guatemala, Nicaragua, p. 16, *tricostatum*, fig. 6, Mexico, Guatemala, pl. ii. p. 17, Gorham, l. c. ; *C. gorhami*, Bourgeois, Bull. Soc. Ent. Fr. (5) x. p. cxlviii., Equatorial America ; *C. insignis*, id. Le Nat. ii. p. 163, Peru.

Cœnia baillii, Fairmaire, Ann. Soc. Ent. Fr. (5) x. p. 331, Nossi-Bé ; *C. kirschi*, Bourgeois, Le Nat. ii. p. 163, Costa Rica ; *C. cardinalis*, Costa Rica, and *interrupta*, Guatemala, Gorham, *l. c.* pp. 17 & 18, pl. i. figs. 24 & 22.

Plateros seminiger, pl. ii. fig. 15, Mexico, *bourgeoisi*, pl. i. fig. 20, & pl. ii. fig. 10, British Honduras, Guatemala, p. 19, *letourneuri*, fig. 17, Mexico, British Honduras, Guatemala, *evanidus*, Mexico, Guatemala, Nicaragua, Costa Rica, *apicalis*, Nicaragua, *luridus*, Nicaragua, Panama, p. 20, *lateritius*, fig. 16, Mexico, *thoracicus*, Nicaragua, Panama, Colombia, *isthmianus*, Guatemala, Panama, p. 21, *terminalis*, Guatemala, Nicaragua, *parallelus*, fig. 19, pl. ii., Mexico, British Honduras, Guatemala, Nicaragua, *striatus*, Mexico, Guatemala, Panama, p. 22, *flavicollis*, Guatemala, *nicaraguensis*, Chontales, *ochraceus*, Guatemala, p. 23, *rubricatus*, Guatemala, *mexicanus* and *roseicollis*, Mexico, p. 24 ; *id. l. c.*

Ditoneces obscurus, C. O. Waterhouse, Ann. N. H. (5) v. p. 213, Malabar.

Lyropœus biguttatus, id. *l. c.*, Malabar.

Lampyrides.

Bellesme, J. de. Recherches expérimentales sur la phosphorescence de Lampyre. C. R. xc. pp. 318–321 ; Ann. N. H. (5) v. pp. 345–347 ; Ent. M. M. xvi. pp. 244-246 ; Kosmos, vii. pp. 476–479.

The large granulous protoplasmic cellules in the glow-worm, constitut-

ing the parenchyma of the phosphorescent apparatus, produce a substance which becomes luminous on contact with the air emitted from the tracheæ which traverse the apparatus. This substance is probably phosphoretted hydrogen; phosphorescence due to the disengagement of this gas being apparently a property of protoplasm.

GORHAM, H. S. Materials for a revision of the *Lampyridæ*. Tr. E. Soc. 1880, pp. 1–36 & 83–112, pl. i.

In addition to new species, many known species are briefly noticed, and in a few cases redescribed. The luminous parts are patches, or even whole ventral and sometimes dorsal plates, deprived of pigment, and hence often white, and vitrified in a peculiar manner, which the writer calls eburnated. With two exceptions, the figures represent only the dorsal and ventral surface of the apex of the abdomen.

——. On the Structure of the *Lampyridæ*, with reference to their Phosphorescence. Tr. E. Soc. 1880, pp. 63–67.

The eyes of *Lampyridæ* are developed in magnitude according to the amount of luminosity of the species considered. The highest degree of luminosity is found in those species in which the females are apterous and the eyes of the males are highly developed. In other cases, both sexes are winged and luminous, and are doubtless mutually attracted by the light. In a third group, the light emitted is slight, and the eyes are but slightly developed, while the antennæ are highly developed instead. The external white vitreous-looking parts are probably not the source of the light, which is within the body of the insect, and can be pressed against these windows, or withdrawn at pleasure. (Discussion, P. E. Soc. 1880, pp. vi.–viii.)

Notes on the structure of *Lampyridæ*; Gorham, Ent. M. M. xvi. p. 261.

Discussion on luminous *Lampyridæ*, &c.; P. E. Soc. 1880, pp. i.–iii.

Popular notes on N. American *Lampyridæ*; Le Conte, Canad. Ent. xii. pp. 174–184. Phosphorescence; Am. Ent. iii. p. 146.

Lamprocera castelnaui, Kirsch, and *blattina*, Perty, redescribed; Gorham, Tr. E. Soc. 1880, pp. 4 & 5.

Alychnus xanthorrhaphus, Kirsch, ♀ figured; *id. l. c.* pl. i. fig. 20.

Pleotomus pallens, Lec. Transformations described and phosphorescence noticed; H. S. King, Psyche, iii. pp. 51–53.

Photinus. Various known species are noticed, especially *P. mœstus*, Germ., and the varieties of *P. pennsylvanicus*, De Geer; Tr. E. Soc. 1880, pp. 106–111; *cf.* also Riley, Am. Ent. iii. p. 254, fig. 123. *P. suturalis*, Guér., MS., *nec* Schönh., = *Alychnus xanthorrhaphus*, Kirsch; Gorham, *l. c.* p. 25.

Lamprophorus tenebrosus, Walk., redescribed, and *nipalensis*, Gray, *diffinis*, Walk., and *boyei*, Mots., noticed; Gorham, *l. c.* pp. 88 & 89.

Lampyris noctiluca observed as late as Oct. 8th; Gosse, Ent. xiii. p. 20. Its intermittent phosphorescence; Parfitt, Ent. M. M. xvii. p. 94.

Luciola italica, habits; Swinton, P. E. Soc. 1880, p. xxix. *L. lusitanica*; intermittent phosphorescence, Sharp, Ent. M. M. xvii. p. 69, & Eaton,

pp. 94 & 95. *L. picticollis* and *vitticollis*, Kies., and *cruciata*, Mots., are three distinct species; Gorham, Tr. E. Soc. 1880, pp. 102 & 103.

New genera and species:—

Phœnolis, Gorham, Tr. E. Soc. 1880, p. 10. Allied to *Lamprocera* (*latreillii*); type, *P. liciniatus*, p. 10. Add *P. ochraceus*, Chontales, and *ustulatus*, Guatemala, p. 13, spp. nn.

Pyrocœlia, id. *l. c.* p. 91. Allied to *Diaphanes*; eyes comparatively small; thorax without diaphanous areolets, antennæ differently formed; ♀ apterous. To contain *Photinus bicolor*, Fabr. (? = *Lampyris lutescens*, Walk.), and *P. lateralis*, Ceylon, *terminata*, p. 92, *plagiata*, India, *fumigata*, Malacca, Siam, *foochowensis*, Foochow, p. 93, and *pekinensis*, Pekin, p. 94, spp. nn., *l. c.*

Lamprocera tristior, Brazil, *præusta*, p. 4, *brevicollis*, Buenos Ayres, and *picta*, Nicaragua, p. 5; Gorham, Tr. E. Soc. 1880.

Hyas bipunctatus, Brazil ?, *rhomboides*, Chontales, p. 6, and *angularis* (Chevr. MS.), pl. i. fig. 19, Mexico, p. 7, *id. l. c.*

Cladodes stellata, Rio Janeiro, *ventralis*, locality unknown, *nigricollis*, Ecuador, p. 8, and *plumosa*, Nicaragua, p. 9, *id. l. c.*

Æthra despecta, Chontales, Colombia, *concolor*, Costa Rica, p. 12, and *brunnipennis*, locality unknown, p. 13, *id. l. c.*

Vesta saturnalis, India, p. 13, *proxima*, India ?, and *basalis*, locality unknown, p. 14, *id.* l. c. (*V. chevrolati*, Cast, is indicated as the type of the genus, which Gorham restricts to the Eastern species, p. 13.)

Lucidota proxima, Cayenne, p. 16, *californica*, California, *exstincta*, Guatemala, p. 17, *boliviana*, Bolivia, *bella*, Guatemala, *silphoides*, British Honduras, p. 18, *apicalis*, Costa Rica, *rubricollis*, Chontales, *fulgurans*, Brazil, p. 19, *apicicornis*, *limbata*, Chontales, p. 20, *tricolor*, Brazil, and *quadriguttata*, Bahia, p. 21, *id. l. c.*

Photinus cinctellus (Chevr. MS.), Mexico, Guatemala, Nicaragua, *coronatus* (Chevr, MS.), p. 24, *guatemalæ*, p. 26, *lunicollis*, *ruficollis*, p. 27, *fumigatus*, *affinis*, p. 28, *plumbeus*, *perlucens*, *pulchellus*, p. 29, *concinnus*, Guatemala, *sanguinicollis*, *aurora*, *amabilis*, Costa Rica, p. 30, *perelegans*, Guatemala, British Honduras, p. 31, *id.* l. c. (*P. coruscus*, L., is indicated as type of the genus.)

Pyrectomena striatella, id. *l. c.* p. 33, Guatemala.

Cratomorphus bifenestratus, Bahia, p. 34, *elongatus*, Huanao (?), *insignis*, Brazil ?, p. 35, and *parmatus*, Cayenne, p. 36, *id. l. c.*

Aspidosoma ægrotum, Guatemala, Chontales, Rio Janeiro, p. 84, *depictum*, Costa Rica, p. 85, *diaphana*, *pulchellum*, Honduras, *bilineatum*, Mexico, p. 86, and *costatum*, Panama, Honduras, p. 87, *id. l. c.*

Lamprophorus crassus, id. *l. c.* p. 88, Pondicherry.

Diaphanes limbatus, India, *guttatus*, Bengal, p. 90, and *javanus*, Java, p. 91, *id. l. c.*

Lampyris huddi, id. *l. c.* p. 96, Bombay.

Amythetes fastigiata (Ill., MS.), *id. l. c.* p. 97, Brazil.

Megalophthalmus guatemalæ, id. *l. c.* p. 98, Guatemala.

Luciola amplipennis, Fairmaire, Le Nat. ii. p. 246, Ann. Soc. Ent. Fr. (5) x. p. 330, pl. xi. fig. 5, Nossi-Bé. *L. substriata*, Bombay, p. 100, *affinis*,

Madras, Bombay, Bengal, *malaccæ*, Malacca, Madras, *tabida*, Fernando Po, p. 101, *pallescens*, Java, *costipennis*, Foochow, p. 102, *xanthura*, Neilgherry Hills, p. 103, *carinata*, Java, *spectralis*, New Zealand, and *discoidea*, Senegal ?, p. 104, Gorham, *l. c.* (Most of the known allied species are also briefly characterized.)

Photuris tristissima, *fumosa*, Brazil, p. 106, *collaris*, Guatemala, Mexico, *ruficollis*, locality unknown, *lucidicollis*, Guatemala, Costa Rica, p. 107, *mexicana*, Mexico, *amœna*, Guatemala, p. 108, *scutellata*, *funestis*, Colombia, p. 109, and *mollis*, Guatemala, p. 111, *id. l. c.*

Telephorides.

Chauliognathus pennsylvanicus. Habits of larva, &c., Hubbard, 2nd Rep. U. S. Commission on the Rocky Mountain Locust, pp. 261 & 262, Am. Ent. iii. pp. 240 & 241, fig. 122.

Rhagonycha rhætica, Stierl., = *atra*, L., *R. scopolii*, Gredl., = *R. femoralis*, Brullé, var. *nigripes*, Redt., and *fugax*, Mannerh., *alpicola*, Heer, and *alpestris*, Dej., are also synonyms or varieties of *R. femoralis*; Heyden, Deutsche E. Z. xxiv. p. 227.

Aclytia, g. n., Broun, Man. N. Z. Col. p. 326. *Telephoridæ*; affinities not stated. Types, *A. fulvithorax*, sp. n., *l. c.* p. 326, *nigricans*, *subnuda*, *tenuiculus*, p. 327, and *striata*, p. 328, spp. nn., *l. c.*, New Zealand.

Rhagonycha cantabrica, sp. n., Heyden, Deutsche E. Z. xxiv. p. 298, Asturias.

Malachiides.

Chætocælus, g. n., Leconte, Tr. Am. Ent. Soc. viii. p. 194. Allied to *Endeodes*; type, *C. setosus*, sp. n., *l. c.*, Texas.

Laius politus and *anomalipus* (Ann. pl. xi. fig. 6), Fairmaire, Le Nat. ii. p. 246, Ann. Soc. Ent. Fr. (5) x. pp. 331 & 332, Nossi-Bé, spp. nn.

Malachius semimarginatus, Lambessa, p. 5, and *pallitarsus*, Biskra, p. 6, *id. l. c.*, spp. nn.

Troglops exophthalmus, sp. n., *id. l. c.* p 6, Biskra.

Melyrides.

Dasytes subcyaneus, p. 328, *cinereo-hirtus*, p. 329, *obscuricollis* and *laticeps*, p. 330, Broun, Man. N. Z. Col. New Zealand, spp. nn.

Dolichosoma tenuiforme, sp. n., Horn, Tr. Am. Ent. Soc. viii. p. 150, Texas.

Danacæa fusco-ænea, sp. n., Fairmaire, Ann. Soc. Ent. Fr. (5) x. p. 241, Spain.

Pelecophora marginalis, sp. n., *id.* Le Nat. ii. p. 293, Bourbon.

Cleridæ.

Cymatodera atra, Lec., = *cylindricollis*, Chevr.; Horn, Tr. Am. Ent. Soc. viii. p. 149.

Epiphlœus velutinus, Gorham, figured by C. O. Waterhouse, Aid, pl. ii.

Cymatodera gigantea, sp. n., Horn, Tr. Am. Ent. Soc. viii. p. 148, Texas.

Cleronomus ornaticollis, sp. n., Leconte, *op. cit.* p. 194, Cincinnati.

Taneroclerus girodi, sp. n., Chevrolat, Bull. Soc. Ent. Fr. (5) x. p. xxxi., Cuba.

Trogodendrum edwardsi, sp. n., Horn, *l. c.* p. 149, pl. iii. fig. 8, South Arizona.

Balcus signatus, sp. n., Broun, Man. N. Z. Col. p. 333, New Zealand.

Phymotophœa fulvipalpis, sp. n., *id. l. c.* p. 336, New Zealand.

Ptinidæ.

Ptinus fur found in cayenne pepper, Nat. Canad. xii. pp. 84–87, 117, & 118, fig. 5.

Anobium tessellatum. Habits, &c.; Stopher, Sci. Goss. xvi. pp. 249–251. On the sound which it produces; Nylander, Feuill. Nat. x. pp. 92 & 93. Destroying a house; Reiche, Bull. Soc. Ent. Fr. (5) x. p. lxxiv.

Euderia, g. n., Broun, Man. N. Z. Col. p. 344. Allied to *Dorcatoma*; type, *E. squamosa*, sp. n., *l. c.*, New Zealand.

New species :—

Ptinus (*Gynopterus*) *basicornis*, Croatia, and *P. kaufmanni*, Zara, Reitter, Verh. z.-b. Wien, xxx. pp. 222 & 223. *P. speciosus*, Broun, Man. N. Z. Col. p. 338, New Zealand.

Anobium amplicolle, p. 339, *ruficorne*,¦ *notata*[*-eum*], p. 340, *granulata*[*-tum*], and *sericea*[*-tum*], p. 341, *id. l. c.*, New Zealand.

Ochina vulgatum[*-ta*], id. *l. c.* p. 342, New Zealand.

Mesocœlopus creticus, Fairmaire, Ann. Soc. Ent. Fr. (5) x. p. 241, Crete.

Dorcatoma oblonga and *illustris*, Broun, *l. c.* p. 343, New Zealand.

Bostrychidæ.

Apate hamaticollis, Fairm., probably = *zickeli*, Mars.; Fairmaire, Ann. Soc. Ent. Fr. (5) x. pp. 10 & 11.

Amphicerus bicaudatus, Say, noticed and figured; Riley, Am. Ent. iii. pp. 50 & 51, figs. 11 & 12.

Apate confossa, Fairmaire, Le Nat. ii. p. 308, Ann. Soc. Ent. Fr. (5) x. p. 332, Nossi-Bé. *A. inurbanus*[*-na*], Broun, Man. N. Z. Col. p. 346, New Zealand, spp. nn.

Xylopertha pierroni, sp. n., Fairmaire, Le Nat. ii. p. 246, Ann. Soc. Ent. Fr. (5) x. p. 333, pl. xi. figs. 7 *a*, *b*, Nossi-Bé.

Cioidæ.

Cis undulatus, *assimilis*, ¦p. 347, *rufulus*, *lineicollis*, *flavitarsis*, p. 348, *asperrimus*, *cornuticeps*, *illustris*, p. 349, *perpinguis*, and *anthracinus*, p. 350, Broun, Man. N. Z. Col.; *C. zeelandicus*, Reitter, Verh. Ver. Brünn, xviii. p. 181, New Zealand : spp. nn.

Enneartbrum bœttgeri and *obsoletum*, *id. l. c.* pp. 181 & 182, New Zealand, spp. nn.

TENEBRIONIDÆ.

Tentyriides.

Rhyti[do]nota, Esch. Species enumerated, and several new ones described; Kraatz, Deutsche E. Z. xxiv. pp. 91–95.

Pachychila violantis, sp. n., Gestro, Ann. Mus. Genov. xv. p. 416, woodcut, Tunis.

Rhyti[do]nota rugipennis, Bombay, *lævis*, Zanzibar, p. 92, *haagi*, East Indies, p. 93, *fossulata*, White Nile, *foveolata*, N. Africa, and *undulata*, Niger, p. 95, Kraatz, *l. c.*, spp. nn.

Epitragides.

Himatismus justi, sp. n., Fairmaire, Le Nat. ii. p. 246, Ann. Soc. Ent. Fr. (5) x. p. 333, pl. xi. fig. 8, Nossi-Bé.

Zopherides.

Nosoderma cordicolle, sp. n., C. O. Waterhouse, Ann. N. H. (5) v. p. 214, & Aid, pl. iii., Usambara Hills, E. Africa.

Stenosides.

Stenosis ravasinii, sp. n., Gestro, Ann. Mus. Genov. xv. p. 417, Tunis.

Scaurides.

Scaurus contractus, sp. n., Fairmaire, Ann. Soc. Ent. (5) x. p. 13, Mogador.

Blaptides.

ALLARD, E. Essai de Classification des Blapsides de l'ancien monde. Ann. Soc. Ent. Fr. (5) x. pp. 269–320.

After giving a table of the genera *Tagona*, *Gnaptor*, *Dila*, *Cœlocnemodes*, *Prosodes*, *Leptomorpha*, and *Blaps*, the author redescribes the species belonging to the first six genera, generally with outline figures, and adds a table of species belonging to *Blaps*, which he divides into 10 subgenera.

Leptocolena, g. n., *id. l. c.* p. 320. Subgenus of *Blaps*; anterior femora not thicker than the others, or club-shaped; elytra oval, widened to the middle, and strongly depressed above; prothorax comparatively small, and somewhat heart-shaped. Types, *B. mucronata*, Latr., *japonensis*, Mars., and 2 new species.

Blaps, Allard, *l.* c., includes the following species (presumably new) in a table, but without publishing descriptions or localities at present: —*B.* (*Uroblaps*) *spinosa*, *batesi*, p. 304, *tingitana*, *antennalis*, and *heydeni*, p. 305, *B.* (*Rhizoblaps*) *pubescens*, p. 307, and *pinguis*, p. 309, *B.* (*Blapisa*) *juliæ*, p. 311, *B.* (*Platyblaps*) *ocreata*, p. 314, *B.* (*Blaps*) *brunnea*, p. 316, *B.* (*Dineria*) *puella*, p. 317, *B.* (*Agroblaps*) *amurensis*, p. 318, *mœrens*, p. 319, and *bipunctata*, *B.* (*Leptocolena*) *emoda* and *foveicollis*, p. 320.

Prosodes vestita, Astrabad, and *transverso-sulcata*, Himalaya (?), fig. 13, *id. l. c.* pp. 289 & 292, spp. nn.

Dila mniszechi, sp. n., *id. l. c.* p. 277, fig. 5, Persia.

Asidides.

Asida favieri, p. 249, and *tenue-costata*, p. 250, Fez, *acuticosta*, p. 250, Wazan, Fairmaire, Ann. Soc. Ent. Fr. (5) x. & Le Nat. ii. p. 190; *A. quadricollis*, Horn, Tr. Am. Ent. Soc. viii. p. 151, pl. iii. fig. 9, New Mexico : spp. nn.

Pimeliides.

Pimelia anomala and *latourneuxi*, Algeria, pp. xxiv., 261, & 263, *damasci*, Syria, and *theveneti*, Egypt, Suez, pp. xlviii., xlix., 265, & 267, Senac, Bull. & Ann. Soc. Ent. Fr. (5) x., spp. nn.

Coniontides.

Crypticus pubens, Carthagena, p. cxxxii. and *punctato-lineatus*, Fez, p. 251, Fairmaire, Bull. & Ann. Soc. Ent. Fr. (5) x., spp. nn.

Opatrides.

Miedel, J. Observations sur les *Opatrum*. Deutsche E. Z. xxiv. pp. 136–140.

34 species noticed with full synonymy. The variation of *O. verrucosum*, Germ., is specially described.

Pseudolamus seriatoporus, Fairm., ? = *pusillus*, Baud. ; Fairmaire, Ann. Soc. Ent. Fr. (5) x. pp. 18 & 19.

Paraphylax, g. n., Broun, Man. N. Z. Col. p. 354. Placed next to *Syrphetodes*; to contain *P. squamiger*, *varius*, p. 355, and (*P.* ?) *volutithorax*, p. 356, spp. nn., *l. c.*, New Zealand.

Opatrum insidiosum, sp. n., Fairmaire, Ann. Soc. Ent. Fr. (5) x. p. 16, Mogador.

Micrositus compactus, sp. n., *id. l. c.*, Algeria.

Syrphetodes crenatus and *decoratus*, Broun, *l. c.* pp. 352 & 353, New Zealand, spp. nn.

Trachyscelides.

Chærodes lætus, sp. n., Broun, Man. N. Z. Col. p. 358, New Zealand.

Bolitophagides.

Bolitophagus borbonicus, sp. n., Fairmaire, Le Nat. ii. p. 293, Bourbon.

Diaperides.

Hoplocephala inæquidens and *cercyonoides*, spp. nn., Fairmaire, Le Nat. ii. p. 308, Ann. Soc. Ent. Fr. (5) x. pp. 334 & 335, Nossi-Bé.

Menimus puncticeps, p. 361, *oblongus*, p. 362, *crinalis*, *dubius*, p. 363, *obscurus* and *thoracicus*, p. 364, Broun, Man. N. Z. Col., New Zealand, spp. nn.

Ulomides.

Latheticus, g. n., C. O. Waterhouse, Ann. N. H. (5) v. p. 147. Allied to *Tribolium*; type, *L. oryzæ*, sp. n., *l. c.* p. 148, Calcutta, Arabia, England (introduced) in rice (*cf.* also Perkins, Ent. xiii. p. 95).

Hypophlœus rufo-sellatus and *dimidiatipennis*, spp. nn., Fairmaire, Ann. Soc. Ent. Fr. (5) x. p. 335, Nossi-Bé.

Helœides.

Cilibe buchanani, sp. n., Broun, Man. N. Z. Col. p. 377, New Zealand.

Eutelus decurtatus, sp. n., Fairmaire, Le Nat. ii. p. 308, Madagascar.

Tenebrionides.

Kraatz, G. Die Arten der Tenebrioniden-Gattung *Zophobas* in Dr. Haag's Sammlung. Deutsche E. Z. xxiv. pp. 121–135.

The genera *Zophobas*, *Proderops*, and *Exerestus* are discussed, and the following known species described:—*Z. maculicollis*, Kirsch, *bifasciatus*, Erichs., *quadrimaculatus*, Oliv., *morio*, Fabr., *opacus*, Sahlb., *rugipes*, Kirsch, and *lugubris*, Boh,. *Proderops foraminosus*, Fairm., and *Exerestus jansonii*, F. Bates.

Zophobas haagi, Colombia, Brazil, *spectabilis*, p. 123, *tridentatus* (Dej.), *spectabilis* [bis!], *ambiguus* (Dej.), Brazil, p. 124, *quadrifasciatus*, locality not stated, *quadrinotatus*, Para, p. 125, *tibialis* (= *4-maculatus*, Lac., *nec* Oliv.), Rio Janeiro, *klingelhœfferi*, Mexico, p. 126, *erosicollis*, Brazil, *kirschi*, Venezuela, p. 127, *macretus*, p. 130, *alternans*, Mexico, and *laticollis*, Brazil, p. 131, *id. l. c.*, spp. nn.

Proderops foveolatus, sp. n., *id. l. c.* p. 133, Mexico.

Exerestus peruanus, Peru, *elegans*, St. Carlos, p. 134, and *helopoides*, Oaxaca, p. 135, *id. l. c.*, spp. nn.

Lorelus pubescens and *crassicornis*, Broun, Man. N. Z. Col. pp. 381 & 382, New Zealand, spp. nn.

Cnodalonides.

Kraatz, G. Beitrag zur Kenntniss der asiatischen Cnodaloniden (Tenebrioniden, Coh. ii. Trib. xl. Lacord.). Deutsche E. Z. xxiv. pp. 97–120.

Relates to the genera *Scotœus*, Hope, *Eucyrtus* (Dej.), Pasc. (including *Platycrepis*, Esch.), *Gauromaia*, Pasc, and *Œdematus*, Pasc. Several new genera and species are described, as well as *Eucyrtus pretiosus* (Dej.), Lac., and var. *impunctipennis* from Java; *E. splendens*, Lac., and *E.* (*Platycrepis*) *violaceus* (Esch.), Lac.

Camarimena vicina, Mäkl., noticed; Dohrn, S. E. Z. xli. p. 380.

New genera and species:—

Pseudabax, Kraatz, *l. c.* p. 107. Allied to *Eucyrtus*; front angles of the thorax strongly projecting; elytra much less convex, legs more slender. To contain *P. formosus*, p. 108, *opacus*, Luzon, and *viridipennis*, locality not stated, p. 109, spp. nn.

Tearchus, id. *l. c.* p. 110. Next to last; thorax quadrangular, the front angles projecting beyond the front border of the eyes; elytra with smooth, raised, longitudinal striæ. Type, *T. annulipes*, sp. n., *l. c.*, Assam.

Pseudeumolpus, Kraatz, *l. c.* p. 111. Next to *Gauromaia*, but with a superficial resemblance to the *Eumolpidæ*. To contain *P. bicolor*, Sarawak, p. 114, *analipennis*, Menado, *pretiosus*, Malacca, p. 113, and *superbus*, Manilla, Pulo Penang, p. 114, spp. nn.

Eucyrtus nigripes, Luzon, *deyrollii*, Malacca, *gloriosus*, Borneo, Manilla, p. 100, *semi-opaculus*, Malacca, *semicyaneus*, p. 101, *cupricollis*, Java, *opacus*, Himalaya, *anthracinus*, Sumatra, Malacca, p. 102, *annulipes*, Java, p. 103, *E.* (*Platycrepis*) *magnificus*, Sarawak, *wallacii*, Malacca, p. 104, *lina*, Sarawak, *lisæ*, Manilla, Malacca, p. 105, *rutilans*, Malacca, p. 106, *id. l. c.*

Camarimena nietneri, Dohrn, S. E. Z. xli. p. 380, Colombo.

Xanthothopia schweizeri, id. *l. c.* p. 381, Monrovia.

Helopides.

Helops. Table of N. American species; Horn, Tr. Am. Ent. Soc. viii. pp. 152 & 153.

New species :—

Adelium aucklandicum, p. 387, *æratum*, p. 388, *lentum*, p. 389, and *alienum*, p. 391, Broun, Man. N. Z. Col., New Zealand.

Læna marthæ, Reitter, Verh. z.-b. Wien, xxx. p. 224, Herzegovina.

Œdemutes viridulus, Kraatz, Deutsche E. Z. xxiv. p. 114, Philippines.

Nalassus latiusculus, id. *l. c.* p. 300, Asturias.

Helops perforatus, Texas, and *spretus*, W. Nevada, Horn, Tr. Am. Ent. Soc. viii. p. 153. *H. expolitus*, Broun, *l. c.* p. 392, New Zealand.

Amarygmides.

Rygmodus incertus, oblongus, p. 81, and *opimus*, p. 82, Broun, Man. N. Z. Col., New Zealand, spp. nn.

Strongyliides.

Strongylium erythrocephalum, Fabr., *clathratum*, Mäkl., and *dichromum*, Thoms., var. discussed ; Dohrn, S. E. Z. xli. pp. 374, 377, & 379.

Pseudostrongylum, g. n., Kraatz, Deutsche E. Z. xxiv. p. 114. Allied to *Strongylium*, to contain *P. semperi*, Luzon, p. 116, *viride*, locality uncertain, p. 117, *æneum*, Java, *aberrans*, Luzon, p. 118, *cyaneum*, Moluccas, p. 119, *viridipenne*, Queensland, p. 120, and *P.* (?) *brasilianum*, Brazil, p. 115, spp. nn.

Strongylium simulator, p. 373, *pallidicauda*, Burma, p. 375, *sobrinum*, p. 376, *metallescens*, Darjeeling, *vexativum*, Assam, p. 377, *nigrum*, p. 378, and *monrovianum*, Monrovia, Guinea, p. 380, Dohrn, S. E. Z. xli., spp. nn.

Cistelidæ.

Tanychilus rufescens, White, var. *rufescens* described; Broun, Man. N. Z. Col. p. 395.

Xylochus, g. n., Broun, Man. N. Z. Col. p. 398. Allied to *Tanychilus*; types, *X. substriata*[*-tus*] and *tibialis*, spp. nn., *l. c.* p. 397, New Zealand.

Tanychilus sophoræ, sp. n., *id. l. c.* p. 396, New Zealand.

Pythidæ.

Salpingus perpunctatus, *bilunatus*, p. 398, *angusticollis*, *unguiculus*, p. 399, and *lautus*, p. 400, Broun, Man. N. Z. Col., New Zealand, spp. nn.

Melandryidæ.

Hylobia, g. n., Broun, Man. N. Z. Col. p. 403. Placed next to *Chalcodrya*; to include *H. velox*, *undulata*, *nubeculosa*, p. 404, *pullum*[*-la*], *nigricorne*[*-nis*], *calida*, p. 405, *bifasciata*, *minor*, *cylindrata*, p. 406, *usitatus*[*-ta*], and *nigellus*[*-la*], p. 407, spp. nn., *l. c.*, New Zealand.

Ctenoplectron ornatum and *fuliginosa*[*-sum*], Broun, Man. N. Z. Col. pp. 401 & 402, New Zealand, spp. nn.

Lagria elliptica, Fairmaire, Ann. Soc. Ent. Fr. (5) x. p. 242, Central Spain; *L. simoni*, p. 253, *subcostata*, *macrocephala*, p. 254, *subseriata*, Ashanti, *ventralis*, p. 255, *conspersa*, Darjeeling, *distincticornis*, Khas, Himalaya, p. 256, and *dichroa*, Darjeeling, p. 257, Reitter, Deutsche E. Z. xxiv.: spp. nn.

Anthicidæ.

Xambeu, —. Notes et observations sur les Anthicides de France. Feuill. Nat. x. pp. 126–128.

30 species noticed, they appear at all seasons of the year, but are most numerous in spring. They generally feed on decomposing vegetable substances, but are occasionally carnivorous.

Anthicus hamicornis, Marseul, Ann. Mus. Genov. xv. p. 418, Tunis. *A. obscuricornis*, p. 411, *pellucidipes* and *crispi*, p. 412, Broun, Man. N. Z. Col., New Zealand, spp. nn.

Pyrochroidæ.

Dendroides canadensis and *concolor*, *Pyrrhochroa flabellata* and *Schizotus cervicollis*. Larvæ noticed; Moody, Psyche, iii. p. 76.

Dendroides picipes, sp. n., Horn, Tr. Am. Ent. Soc. viii. p. 154, California.

Mordellidæ.

Mordellistena, g. n. [but surely by accidental error], Broun, Man. N. Z. Col. p. 415. Allied to *Mordella*; type, *M. neglectum* [*-ta*], sp. n., *l. c.*, New Zealand.

Mordella tibiale [*-lis*] and *tairuense* [*-sis*], spp. nn., *id. l. c.* p. 414, New Zealand.

Rhipidophoridæ.

Myodites, Latr. Table of N. American species; Leconte, Tr. Am. Ent. Soc. viii. p. 210. *M. subdipterus* is parasitic on *Halictus sexcinctus*; Fabre, Ann. Sci. Nat. Zool. (6) ix. No. 4, p. 27.

Sharpia, g. n., Broun, Man. N. Z. Col. p. 417. Allied to *Rhipi*[*do*]*stena*; type, *S. hirtella*, sp. n., *l. c.* p. 418, New Zealand.

Myodites popenoi, Colorado, p. 210, *nevadicus*, Nevada, *californicus*, California, *zeschii*, Buffalo, and *schwarzi*, Florida, p. 211, Leconte, Tr. Am. Ent. Soc. viii., spp. nn.

Cantharidæ.

Fairmaire, L. Revision des *Zonitis* d'Australie. S. E. Z. xli. pp. 261–282.

Includes descriptions of 31 species of *Zonitis*, 4 of *Tmesidera*, and 5 of *Palæstra*, several being described as new.

Haag-Rutenberg, —. Beiträge zur Kenntniss der Canthariden. Deutsche E. Z. xxiv. pp. 15–90.

89 species, mostly new, are described under *Lytta*; for although the antennæ vary very much, and many authors have established genera on these variations, yet they pass into one another by insensible gradations. The following known species are redescribed:—*L. lugubris*, and *geniculata*, Klug, *ochropus*, *albovittata*, and *corallifera*, Dej., *bipuncticollis*, Chevr., *plumbea*, Klug, *fumosa*, Sturm, *carmelita*, Chevr., *nobilis*, Dej., *plagiata*, Sturm, *nigro-vittata*, Hopff., *vitticollis*, Gory, *neglecta*, Chevr., *angusticollis*, Koll., and var. (?) *suturella* from Arabia (p. 63), *lucida*, Dej., *semilineata*, Chevr., *bilineata*, and *brevipennis*, Dej. (= *oculata*, Fabr.), and var. (?) *mutillata*, from S. Africa (p. 69), *marginicollis*, Dej., *flavipennis*, Motsch., *æneiventris*, Dohrn, *laticornis*, Buq., *tetragramma*, Chevr., *villipes*, Reiche, *divisa*, Chevr., and *audouini*, Dup. A few allied species unknown to the writer are mentioned in footnotes.

Müller, H. Ein Käfer mit Schmetterlingsrüssel. Kosmos, vi. pp. 302–304, woodcuts.

In the genus *Nemognatha* the maxillæ are metamorphosed into a long proboscis, not unlike that of a butterfly.

Meloe violacea, Marsh. Its proceedings before coupling resemble those of some *Poduridæ*. Schφyen, Ent. Tijdskr. i. pp. 177–179, 211 & 212.

Mylabris. Marseul mentions varieties of the following species:—*M. tricolor*, Gerst., *oculata*, Thunb., varr. *moufleti* and *ophthalmica*, Mars., *dicincta*, Bert., *myops*. Chevr., *liquida*, Er., *hybrida*, Mars., *dentata*, Ol.; J. Sc. Lisb. xxv. pp. 43–52. On the larva of a species of this genus; Becker, Bull. Mosc. lv. pp. 155 & 156.

Cantharis bivittata, Mars., var. *getschmanni* from Asturias noticed; Heyden, Deutsche E. Z. xxiv. p. 291.

Lytta. Notes on the N. American species; Claypole, Canad. Ent. xii. pp. 245 & 246.

Epicauta vittata three years in larva state; Am. Ent. iii. p. 196.

Nemognatha. Table of N. American species; Leconte, Tr. Am. Ent. Soc. viii. pp. 212–215.

New species:—

Mylabris lactimala, p. 44, *opacula*, p. 45, *discrepens*, p. 46, *carinifrons*, p. 47, *paulinii* and *bifucata*, p. 48, *lanigera*, p. 48, *bissexguttata*, p. 50, *tristriguttata*, p. 51, *rufitarsis*, p. 52, *jacob*, p. 53, *phelopsis*, p. 54, *trispila*,

p. 55, *bilineata*, p. 56, *atro-chalybea* and *benguelana*, p. 57; Marseul, J. Sc. Lisb. xxv., Angola.

Iletica rugiceps, Ancey, Le Nat. ii. p. 205, Zanzibar.

Cantharis (*Ancistronycha*) *astur*, Heyden, Deutsche E. Z. xxiv. p. 298, Asturias. *C. notifrons*, p. 59, *seminitens*, p. 60, *hemicrania*, *cinctifrons*, and *strigilis*, p. 61, Marseul, *l. c.*, Angola.

Lytta fissiceps, Brazil, p. 21, *kraatzi*, locality unknown, p. 22, *albicincta*, Merida, p. 23, *nattereri*, p. 24, *kraussi*, Brazil, p. 25, *assimilis*, Rio Grande, *hieroglyphica*, p. 26, *vicina*, Brazil, p. 27, *brunneipennis*, Buenos Ayres, p. 29, *leopardina*, Cordova, p. 30, *flavo-grisea*, Argentine Republic, p. 31, *steinheili*, Mendoza, *talpa*, Cordova, p. 32, *latitarsis*, p. 33, *sanguinithorax*, Peru, p. 34, *sanguinea*, p. 35, *proteus*, Mexico, p. 37, *koltzii*, Panama, Mexico, p. 38, *humilis*, Panama, p. 39, *sanguineo-guttata*, Guatemala, p. 40, *forticornis*, p. 41, *diversicornis*, Mexico, p. 42, *candezii*, Guatemala, *curvicornis*, Mexico, p. 43, *haroldi*, Costa Rica, p. 44, *dohrni*, Panama, p. 45, *niveo-lineata*, p. 46, *subvittata*, p. 47, *basimacula*, p. 48, *clavipalpis*, Mexico, p. 50, *decorata*, Guatemala, p. 51, *modesta*, p. 53, *mus*, p. 55, *sartorii*, Mexico, *intermedia*, Colombia, p. 56, *gestroi*, Bogos, p. 58, *iridescens*, Zanzibar, p. 59, *amabilis*, Nyassa, &c., p. 60, *cœlestina*, Bechuanaland, p. 61, *nyassensis*, Nyassa, p. 62, *discolor*, Senegal, p. 63, *hildebrandti*, Zanzibar, p. 64, *pallidipennis*, Cape, p. 66, *nigro-notata*, Cordofan, p. 67, *grandiceps*, Abyssinia, Bogos, p. 68, *picticollis*, Zanzibar, p. 70, *beccarii*, Kursi, Aden, *apicalis*, Himalaya, Darjeeling, Assam, p. 71, *heydeni*, Asia Minor, Siberia ?, p. 73, *tricolor*, Persia, p. 76, *badeni*, China, p. 77, *hirticornis*, Assam, *waterhousii*, Formosa, p. 79, *insularis*, Philippines, p. 80, *textilis*, Mesopotamia, Kurdistan, p. 82, *suavis*, Persia, Hedjaz, p. 83, *griseo-vittata*, E. Indies, *niveo-lineata*, Himalaya, p. 85, *hæmatocephala*, Ceylon, p. 86, *cognata*, locality not stated, p. 87, *mœklini*, Siam, p. 88, and *coromandelensis*, Coromandel, p. 90. Haag-Rutenberg, Deutsche E. Z. xxiv.

Sybaris flaveola and *picta*, Marseul, *l. c.* pp. 62 & 63, Angola.

Palæstra platycera, p. 280, *rufo-cincta* and *quadrifoveata*, p. 281, Fairmaire, S. E. Z. xli., Australia.

Zonitis pallicolor, W. Australia, *nigro-apicata*, Rockhampton, p. 264, *limbipennis*, Swan River, p. 265, *opaco-rufa*, Adelaide, *tenuicornis*, Sydney, Victoria, p. 269, *cylindracea*, Richmond River, p. 270, *nigro-plagiata*, Gantheaume Bay, p. 271, *ventralis*, Australia, p. 272, *semirufa*, W. Australia, p. 274, *rugata*, Swan River, p. 275, *indigacea*, p. 276, *janthinipennis*, Champion Bay, and *sedilloti*, Gantheaume Bay, p. 277, *id. l. c.*

Criolis (?) *hilaris*, Marseul, *l. c.* p. 64, Angola.

Nemognatha annulicornis, *ciconia*, and *scapularis*, id. *l. c.* pp. 65–67, Angola; *N. punctipennis*, Leconte, Tr. Am. Ent. Soc. viii. p. 214, Arizona.

ŒDEMERIDÆ.

Nacerdes melanura. Transformations noticed; Moody, Psyche, iii. p. 68.

Baculipalpus, g. n., Broun, Man. N. Z. Col. p. 423. Placed next to *Thelyphassa*; type, *B. rarus*, sp. n., *l. c.*, New Zealand.

Opsimea, g. n., Miller, Verh. z.-b. Wien, xxx. p. 224. Allied to *Œdemera*, &c.; type, *O. ventralis*, sp. n., *l. c.* p. 225, S. Croatia.

Sessinia latiuscula, sp. n., Broun, *l. c.* p. 421, New Zealand.

Thelyphassa obscura, sp. n., *id. l. c.* p. 422, New Zealand.

Techmessa picticornis, sp. n., *id. l. c.* p. 424, New Zealand.

Curculionidæ.

Roelofs, W. Additions à la Faune du Japan. Nouvelles espèces de *Curculionides* et familles voisines : Observations sur les espèces déjà publiées. Ann. Ent. Belg. xxiv. pp. 5–31.

Chiefly consists of detailed descriptions of species which have already been briefly characterized by the author in CR. Ent. Belg. xxii., &c.

Microcerides.

Microcerus annuliger, sp. n., Harold, MB. Ak. Berl. 1880, p. 265, E. Africa.

Brachyderides.

Tanymecus palliatus, Fabr., and *Bothynoderes betivorus*, Chevr. Ravages in Russia ; Girard, Bull. Soc. Ent. Fr. (5) x. pp. lxviii. & lxix., lxxviii. & lxxix.

Catapionus argentatus, Ball. (*nec* Gebl.), renamed *ballioni*; Heyden, Deutsche E. Z. xxiv. p. 304.

Sitones sulcifrons, Thunb., destructive to peas at Autun; Girard, *l. c.* p. xciii.

Polydrosus micans, F., = *mollis*, Ström ; *P. fulvicornis*, F., = *fasciatus*, Müll. & Ström ; Schφyen, Ent. Tidskr. i. pp. 179–181, 212.

Diaprepes lepidopterus, Schönh., does not occur in Guadeloupe; Chevrolat, Le Nat. ii. p. 197.

Artipus. List of known species, and descriptions of new ones; *id.* Ann. Soc. Ent. Fr. (5) x. pp. 253 & 254.

Epicærus imbricatus, Say, noticed and figured ; Am. Ent. iii. p. 200, fig. 106.

New genera and species :—

Copanopachys, Roelofs, Ann. Ent. Belg. xxiv. p. 7. Allied to *Piazomias* ; types, *P. tigrinus* and *griseus*, Roel.

Cyphopsis, id. *l. c.* p. 34. Allied to *Cyphus* ; types, *C. jekeli* and *clathratus*, spp. nn., *l. c.* pp. 35 & 36, Brazil.

Curiades, Pascoe, Ann. N. H. (5) v. p. 420. Allied to *Platyomus*; hairy ; rostrum only slightly emarginate at the tip, and deeply and broadly excavated as far as the eyes, the boundaries of the hollow on each side being raised into a prominent ridge or crest. Type, *P. boisduvali*, Boh.

Trichaptus (Germ., MS.), *id. l. c.* p. 422. Allied to *Cyphus* ; the scrobe begins near the mouth, takes a sudden bend, and passes transversely beneath the eye. Type, *Rhigus myrmosarius*, Perty.

Ericydeus, id. *l. c.* Allied to *Cyphus* ; anterior tibiæ mucronate as in

Compsus; lower and hind margin of the 4 hinder tibiæ grooved and densely ciliated. Type, *Cyphus hancocki*, Kirb.

Clæoteges, id. *l. c.* p. 427. Allied to *Compsus*, &c.; type, *C. virosus*, sp. n., *l. c.* p. 428, Chontales.

Blosyrus nossibianus, Fairmaire, Le Nat. ii. p. 316, and Ann. Soc. Ent. Fr. (5) x. p. 336, Nossi-Bé.

Cneorrhinus martini, id. Bull. & Ann. Soc. Ent. Fr. (5) x. pp. xliii. & 242, Lisbon.

Catoptes compressus, Broun, Man. N. Z. Col. p. 429, New Zealand.

Pandeletius minax, Dohrn, S. E. Z. xli. p. 157, Bogota.

Polydacrys mœstus and *nigro-sparsus*, Chevrolat, Le Nat. ii. p. 190, Guadeloupe.

Metallites brevipennis, Kirsch, Deutsche E. Z. xxiv. p. 302, Asturias.

Polydrosus curtulus, Brisout, Bull. & Ann. Soc. Ent. Fr. (5) x. pp. xxiii. & 232, Carthagena; *P. dichrous*, Fairmaire, Bull. Soc. Ent. Fr. (5) x. p. xxvii., Spain.

Tanymecus oculatus, Gaboon, and *vagabundus*, Algeria, Portugal, Chevrolat, Bull. Soc. Ent. Fr. (5) x. p. xxxviii.

Cyphus marginicollis and *viridis*, Martinique, p. 197, *strangulatus* and *leucocephalus*, Guadeloupe, p. 213, *id.* Le Nat. ii.; *C. olivieræ* and *elegans*, Roelofs, *l. c.* pp. 32 & 33, Brazil; *C. effusus*, Macas, and *sugillatus*, Para, Pascoe, Ann. N. H. (5) v. p. 421.

Platyomus ostracion, id. *l. c.* p. 420, Brazil.

Compsus vestalis, Macas, *mirandus*, Colombia, *virgineus*, Trinidad (Peru), p. 423, *vespertinus* and *euchlorus*, Sarayacu, p. 424, *id.* l. c.; *C. scutellarius*, Chevrolat, *l. c.* p. 197, Martinique.

Eustales stellaris, Panama, *coruscus*, *cometes*, p. 425, *interruptus*, Macas, *sejunctus*, Brazil, p. 426, and *impositus*, Chontales, p. 427, Pascoe, *l. c.*

Diaprepes interruptus, Guadeloupe, *variegatus*, *reticulatus*, Martinique, and *revestitus*, Cuba, p. 165, *marginicollis*, *lineicollis* (is a *Lachnopus*, cf. p. 191), and *foveicollis*, p. 175, *quadritœnia*, Guadeloupe, p. 190, and *hemigrammus*, Martinique, p. 197, Chevrolat, *l. c.*

Exophthalmus mixtus, *sulphuratus*, and *gundlachi*, Cuba, and *chrysopus*, Hayti, *id. l. c.* p. 165.

Lachnopus adspersus, id. *l. c.* p. 191, Guadeloupe.

Cratopus coquereli, Fairmaire, Le Nat. ii. p. 293, Bourbon.

Eupholus arfaki, New Guinea, *celebesus*, Celebes, Chevrolat, *l. c.* p. 333; *E. raffrayi* (= *magnificus*, Kirsch, *cf.* p. xc.) and *guerini*, New Guinea, p. xvi., *desmaresti*, Amboina, p. xvii., *raffrayi* [bis!], New Guinea, and *thomsoni*, Moluccas, pp. xc. & xci., *id.* Bull. Soc. Ent. Fr. (5) v.

Ladoice viridisparsa, [New?] Hebrides, and *funebris*, New Guinea, *id. l. c.* pp. cii. & ciii.; *L. consuetus*, id. Le Nat. ii. p. 333, New Guinea.

Artipus grisescens, Jamaica, p. 253, *porosicollis*, *unguiculatus*, Cuba, and *albo-scutellatus*, Guadeloupe, p. 254, *id.* Ann. Soc. Ent. Fr. (5) x.

Brachyomus metallescens, Pascoe, *l. c.* p. 427, Sarayacu.

Epicœrus similis, Costa Rica, p. lxi., *luctuosus*, Yucatan, and *carteri*, Guatemala, p. lxii., Chevrolat, Bull. Soc. Ent. Fr. (5) x.

Synthlibonotus tristis, *viator*, p. xli., and *albo-squamosus*, p. xlii., *id. l. c.*, Mexico, &c.

Apocyrtus rælofsi (Vollenh., MS.), Ancey, Le Nat. ii. p. 205, New Guinea.

Otiorrhynchides.

Elytrurus. 9 known species from Fiji redescribed in full; Fairmaire, S. E. Z. xli. pp. 207–213.

Curculio salicis, Ström, = *Otiorrhynchus lepidopterus*, Fabr., not *O. nigrita*, which does not occur in Norway; *O. maurus*, Gyll., = *dubius*, Ström: Schφyen, Ent. Tidskr. i. pp. 181, 182, & 212.

Otiorrhynchus signatipennis and allies discussed; Stierlin, MT. schw. ent. Ges. vi. pp 60–62. *O. noui* and *prælongus*, Fairm., are distinct; Fairmaire, Ann. Soc. Ent. Fr. (5) x. p. 243.

Phyllobius alneti and *calcaratus*, Fabr., are distinct; Flack & Von Heyden, Deutsche E. Z. xxiv. pp. 225 & 226.

Ceratocrates, g. n., Harold, MB. Ak. Berl. 1880, p. 264. Allied to *Episomus*; second joint of the funiculus not longer than the first, scutellum wanting, base of elytra not arched, and claws shorter. Types, *C. hildebrandti*, l. c., and *dubius*, p. 265, E. Africa, spp. nn.

New species:—

Cathormiocerus attophilus, Brisout, Bull. & Ann. Soc. Ent. Fr. (5) x. pp. xxiv. & 233, Belle-île-en-Mer.

Aomus (?) *ventricosus*, Chevrolat, Bull. Soc. Ent. Fr. (5) x. p. v., Syria.

Otiorrhynchus getschmanni and *protensus*, Stierlin, Deutsche E. Z. xxiv. pp. 300 & 301, also MT. schw. ent. Ges. v. pp. 560 & 562, Asturias; *O. venustus*, p. 563, *clairi*, Mentone, p. 564, *deformis*, Constantinople, p. 565, *hirsutus*, Crete, p. 567, *bosphoranus*, Constantinople, p. 568, *merkli*, Rhilo Dagh. p. 569, *id. l. c.* v.; *O. simplex*, Altai, p. 52, *strebloffi*, West Siberia, p. 53, *hopffgarteni*, Dalmatia, p. 54, *herzegowinensis*, Herzegovina, p. 55, *horridus*, locality not stated, p. 57, *stussineri*, Istria, p. 58, and *calabrus*, Calabria, p. 59, *id. l. c.* vi.

Stomodes convexicollis, Miller, Verh. z.-b. Wien, xxx. p. 226, Herzegovina.

Systates vulgaris and *œneolus*, Harold, MB. Ak. Berl. 1880, p. 264, E. Africa.

Embrithes suturalis, id. *l. c.*, E. Africa.

Barypithes asturiensis, Kirsch, Deutsche E. Z. xxiv. p. 303, Asturias.

Ptochus lateralis, Chevrolat, *l. c.* p. cxxxv., Lenkoran.

Trachyphlœus clarus and *corpulentus*, Broun, Man. N. Z. Col. p. 431, New Zealand.

Pholicodes argentatus, Syria, p. clxix., *persica*, Persia, and *murinus*, Smyrna, p. clxx., *id.* l. c.; *P. semicalvus*, Reitter, Verh. z. b. Wien, xxx. p. 516, Caucasus.

Myllocerus scapularis, Roelofs, Notes Leyd. Mus. ii. p. 207, Sumatra.

Leptopides.

Stierlin, —. Beiträge zur Kenntniss der *Tropiphorus*-Arten. MT. schw. ent. Ges. vi. pp. 71–79.

11 species described, 4 new.

Tropi[do]phorus pedemontanus, Piedmont, p. 73, *longicollis*, Macugnaga, *cæsius*, Asia Minor, p. 75, and *abbreviatus*, Austria, Silesia, p. 77, *id. l. c.* spp. nn.

Catastygnus costulipennis, sp. n., Fairmaire, Le Nat. ii. p. 175, Madagascar.

Brachycerides.

Brachycerus tuberculosus, Gyll., discussed; Dohrn, S. E. Z. xli. pp. 293–295.

Rhyparasomatides.

Ditrachclus; cf. STIERLIN (*Coleoptera*, General Subject, *anteà*, p. 16).

Ditrachelus arbutus (Tourn., MS.), sp. n., Stierlin, MT. schw. ent. Ges. v. p. 544, Bella Tola.

Styphlus extensus, Asturias, *pilosus* (Motsch., MS. ?), S. Russia, *lederi*, Caucasus, Chevrolat, Bull. Soc. Ent. Fr. (5) x. p. cxxxiv., spp. nn.

Phrynixus celatus, p. 433, *modicus*, and *longiusculus*, p. 434, Broun, Man. N. Z. Col., New Zealand, spp. nn.

Erymneus scabiosus, *castaneus*, p. 436, and *granulatus*, p. 437, *id. l. c.*, New Zealand, spp. nn.

Cecyropa maritima and *brevipenne*[*-nis*], id. *l. c.* p. 438, New Zealand, spp. nn.

Cylindrorrhinides.

Eurynotia, g. n., Broun, Man. N. Z. Col. p. 440. Allied to *Empœotes*; type, *E. pulcherrima*, sp. n., *l. c.* p. 441, New Zealand.

Inophlœus breviusculus, sp. n., *id. l. c.* p. 440, New Zealand.

Empœotes aculeatus and *perniciosus*, spp. nn., *id. l. c.* p. 442, New Zealand.

Irenimus albicans, sp. n., *id. l. c.* pp. 443, New Zealand.

Lithinides.

Rhytidophlœus nigro-perlatus, sp. n., Fairmaire, Le Nat. ii. p. 175, Madagascar.

Molytides.

Anchonus reticulatus, *plicaticollis*, *alveolatus*, *denticulatus*, *simplex*, *piliger*, p. 213, *hispidus*, *trossulus*, and *cirriger*, p. 214, Chevrolat, Le Nat. ii., Guadeloupe, spp. nn.

Tanyrrhynchides.

Trachodes simulator, sp. n., Horn, Tr. Am. Ent. Soc. viii. p. 149, Arizona.

Hyperides.

Hypera biglobosa, sp. n., Kirsch, Deutsche E. Z. xxiv. p. 303, Asturias.

Diabathrariides (?).

Geophilus‖, g. n., Broun, Man. N. Z. Col. p. 445. Type, *G. inæqualis*, sp. n., *l. c.* p. 446, New Zealand.

Cleonides.

Larinus melliferus, Hanl., = *nidificans*, Guib. ; Heyden, Le Nat. ii. p. 237.

Hylobiides.

Pissodes strobi, Peck, noticed and figured ; Fuller, Am. Ent. iii. pp. 5 & 6, fig. 2.

Hylobius abietis using the hook on the tibia as a tooth-pick ; E. A. Ormerod, Ent. xiii. p. 166.

Pimelocerus (Dej.), g. n., Roelofs, Deutsche E. Z. xxiv. p. 143. Allied to *Hylobius* ; type, *P. cinctus* (Dej.), sp. n., *l. c.*, Java.

Pileophorus procerus, sp. n., Pascoe, Ann. N. H. (5) v. p. 490, Cayenne.

Iratus tetricus and *versutus*, spp. nn., Broun, Man. N. Z. Col. p. 447, New Zealand.

Hilipus tripunctatus, sp. n., Chevrolat, Le Nat. ii. p. 229, Guadeloupe.

Erirrhinides.

Bagous binodulus. Habits noticed ; Lancelevée, Nouv. et faits, ii. pp. 129 & 130.

New genera and species :—

Philacta, Broun, Man. N. Z. Col. p. 448. Allied to *Erirrhinus* ; type, *P. testacea*, sp. n. *l. c.* p. 449, New Zealand.

Praolepra (Pasc., MS.), *id. l. c.* p. 454. Placed next to *Dorytomus* ; type, *P. squamosa* (Pasc., MS.), p. 454, add *P. infuscus* [*-ca*], p. 455, spp. nn., *l. c.*, New Zealand.

Erirrhinus fusco-notatus, *discoideus*, *flavitarsis*, p. 451, *fasciatus*, *rubricalis*, and *viridipennis*, p. 452, Broun, Man. N. Z. Col., New Zealand.

Dorytomus rufirostris, id. *l. c.* p. 453, New Zealand.

Hypotagea testaceipenne[*-nis*] and *variegata*, id. *l. c.* p. 456, New Zealand.

Neomycta rubida, id. *l. c.* p. 457, New Zealand.

Eugnomus interstitialis and *discolor*, id. *l. c.* p. 460, New Zealand.

Stephanorrhynchus crassus, id. *l. c.* p. 464, New Zealand.

Mecinus reichii and *fairmairii*, Tournier, Ann. Soc. Ent. Fr. (5) x. pp. 27 & 28, Algeria ; *M. sublinecllus*, Fairmaire, Ann. Soc. Ent. Fr. (5) x. p. 27, Algeria.

Ambatides.

Ambates elegans, Macas, and *cretifer*, Chontales, Pascoe, Ann. N. H. (5) vi. pp. 176 & 177, spp. nn.

Belides.

Agathinus, g. n., Broun, Man. N. Z. Col. p. 470. Placed next to *Pachyura* ; type, *Rhinaria sextuberculata*, White.

Pachyura rubicunda and *sumptuosa*, spp. nn., id. *l. c.* pp. 469 & 470, New Zealand.

Crocidura (*Pachyura*) *coquereli*, sp. n., Trouessart, Le Nat. ii. p. 197, Madagascar.

Apionides.

Apion. Habits of various species; Le Nat. ii. pp. 150, 155, 173 & 174.

Apion lemoroi, France, Italy, and *bonvouloiri*, Switzerland, Brisout, Bull. & Ann. Soc. Ent. Fr. (5) x. pp. xxiii. & 231 & 232; *A. metrosideros*, Broun, Man. N. Z. Col. p. 466, New Zealand: spp. nn.

Attelabides.

Apoderus cruentatus and *A.* (*Hoplapoderus*) *spiniferus*, Roelofs, Notes Leyd. Mus. ii. pp. 227 & 228, Sumatra, &c., spp. nn.

Rhinomacerides.

Rhynchites seminiger, Reitter, Verh. z.-b. Wien, xxx. p. 516, Caucasus; *R. velatus*, Leconte, Tr. Am. Ent. Soc. viii. p. 216, Sierra Nevada: spp. nn.

Diodyrrhynchus byturoides, sp. n., *id. l. c.* p. 215, Sierra Nevada, California.

Rhinomacer rufula[*-lus*], sp. n., Broun, Man. N. Z. Col. p. 467, New Zealand.

Scolopterides.

Scolopterus æquus and *pectoralis*, spp. nn., Broun, Man. N. Z. Col. pp. 473 & 474, New Zealand.

Ancistropterus pilosus, id. *l. c.* p. 476, New Zealand.

Erodiscides.

Hamma[*to*]*cerus delauneyi*, sp. n., Chevrolat, Bull. Soc. Ent. Fr. (5) x. p. xxvi., Guadeloupe.

Anthonomides.

Anthonomus bituberculatus, Thoms., = *pyri*, Boh. (*cinctus*, Redt.); Letzner, JB. schles. Ges. lvii. p. 354.

Hoplocneme squamosa, sp. n., Broun, Man. N. Z. Col. p. 462, New Zealand.

Prionomerides.

Themeropis divergens, Pascoe, Ann. N. H. (5) vi. p. 177, Parana.

Camptochirus abstersus, Para, *ornatus*, p. 178, and *angustus*, Colombia, p. 179, *id. l. c.*; spp. nn.

Prionomerus triangulifer, sp. n., Chevrolat, Le Nat, ii. p. 229, Guadeloupe.

Cionides.

Cionus scrophulariæ attacking *Buddlea globosa*; Perkins, Ent. xiii. p. 67. Pupation and cocoon described; Osborne, Sci. Goss. xvi. p. 209.

Nanophyes duriæi bred from galls on *Umbelicus pendulinus*; Marseul, Bull. Soc. Ent. Fr. (5) x. p. lxxviii.

Microphyes alutaceus, sp. n., Reitter, Verh. z.-b. Wien, xxx. p. 516, Caucasus.

Alcidides.

Alcides humerosus, Harold, MB. Ak. Berl. 1880, p. 265, E. Africa. *A. exornatus*, Chevrolat, Le Nat. ii. p. 333, New Guinea, spp. nn.

Dialtates dispar, sp. n., *id. ibid.*, New Guinea.

Nerthopides.

Cholomus, g. n., Roelofs, CR. Ent. Belg. xxiii. p. xl. To follow *Amphyorramphus*; differs from *Cholus*, &c., in the projecting mesosternum, and in the carinated shoulders. Type, *C. villei*, sp. n., *l. c.* p. xli., Ecuador.

Rhinastus granulatus, sp. n., *id. l. c.* p. xxxix., "Indios Garayos."

Cholides.

Erethistes fasciato-maculatus, sp. n., Chevrolat, Bull. Soc. Ent. Fr. (5) x. p. cxlii., Brazil.

Callinotus protensus, Brazil, and *discoideus*, Quito, *id. l. c.*, spp. nn.

Cryptorrhynchides.

Conotrachelus nenuphar discussed and figured; Gott, Rep. E. Soc. Ont. 1879, pp. 64–88, fig. 55.

Cœlosternus guadelupensis, Boh., renamed *insulsus*; Chevrolat, Le Nat. ii. p. 286.

New genera and species :—

Thrasyomus, Pascoe, Ann. N. H. (5) v. p. 492. Differs from *Mecistocerus* in the absence of ocular lobes, and by the short broad elytra. Types, *T. tumens*, Chontales, and *angulatus*, Nauta, spp. nn., *l. c.* p. 493.

Epitasis, id. *l. c.* p. 491. Allied to *Tragopus*, &c.; type, *E. niveo-sparsa*, sp. n., *l. c.* p. 491, Brazil.

Neotylodes, Chevrolat, Le Nat. ii. p. 150. Allied to *Acalles*; legs longer, femora spined on the inside, club of antennæ long, 3-jointed. Type, *N. dentipes*, sp. n., *l. c.*, Guadeloupe.

Dysopeomus, Roelofs, CR. Ent. Belg. xxiii. p. xlii. Allied to *Rhynchodes*; elytra not produced into a spine. Type, *D. borrii*, sp. n., *l. c.* Amboina ?.

Dysopir[*r*]*hinus*, id. *l. c.* p. xliv. Mesosternum as in *Syroteles*; elytra rounded at the extremity, legs longer and less robust than in the allied genera. Type, *D. gestroi*, sp. n., *l. c.*, New Guinea.

Discophorus ‖, Chevrolat, Bull. Soc. Ent. Fr. (5) x. p. xcv. Allied to *Cryptorrhynchus*; to contain *C. circulus* and *clitellarius*, Schönh., *C. bicirculus*, Kirsch, and *duplicatus*, sp. n., *l. c.* p. xcvi., Monte Video.

Graphonotus, id. *l. c.* p. xcvi. Allied to *Cryptorrhynchus*; to contain *C. albo-caudatus* and *guadulpensis*, Schönh., *balteatus*, Sahlb., and probably *Macromerus insignis*, Chevr.

Indecentia, Broun, Man. N. Z. Col. p. 484. Placed next to *Aldonus*; types, *I. nubila* and *stramineum* [*-nea*], spp. nn., *l. c.* pp. 485 & 486, New Zealand.

Dolichoscelis, id. *l. c.* p. 495. Placed next to *Acalopsis*; type, *D. celsus* and *lineithoraæ*, spp. nn., *l. c.* p. 496, New Zealand.

Paromalia, id. *l. c.* p. 496. Placed next to last; types, *P. setiger*[*a*] and *vestita*, spp. nn., *l. c.* p. 497, New Zealand.

Aldonida, id. *l. c.* p. 506. Affinities uncertain; differs from *Aldonus* by the total absence of the pectoral canal. Types, *A. scabiosa* and *rufula*, spp. nn., *l. c.* p. 507, New Zealand.

Hemilius, Chevrolat, *l. c.* p. cxi. Allied to *Sympiezoscelus*; types, *H. glabrirostris*, Colombia, and *nudicollis*, Mexico, spp. nn., *l. c.* p. cxii.

Ectatorrhinus hasselti, Roelofs, Deutsche E. Z. xxiv. p. 141; Notes Leyd. Mus. ii. p. 232, Malacca, Sumatra. *E. rugaticollis*, Chevrolat, Bull. Soc. Ent. Fr. (5) x. p. lxxiii., E. Indies.

Conotrachelus puniceo-maculatus, id. *ibid.*, Cayenne. *C. recte-costatus, scapularis, ruber*, p. 229, *marginiceps, frontalis, amœnus*, and *ocularis*, p. 230, *niveiceps*, p. 251, and *serripennis*, p. 285, *id.* Le Nat. ii., Guadeloupe.

Desmidophorus luteo-vestis, Fairmaire, Le Nat. ii. p. 316, Ann. Soc. Ent. Fr. (5) x. p. 336, Nossi-Bé.

Cleogonus margine-sulcatus, Brazil, *distinctus*, Cayenne, *columbianus* [*colomb-*], Colombia, p. lxvi., and *proximus*, Hayti, p. lxvii., Chevrolat, Bull. Soc. Ent. Fr. (5) x.

Rhyssomatus sexcostatus, fasciatus, id. Le Nat. ii. p. 252, Guadeloupe.

Chalcodemus insularis, id. *l. c.* p. 198, Martinique.

Psepholax granulatus, cornutus, p. 479, *punctulatus, rostralis*, p. 480, *femoratus*, p. 481, and *tibialis*, p. 482, Broun, Man. N. Z. Col., New Zealand.

Nettarrhinus granulatus, Venezuela, and *rudis*, Brazil, Pascoe, Ann. N. H. (5) v. p. 492.

Pachyonyx mucoreus, (Murr., MS.), Old Calabar, and *quadridens*, East Indies, Chevrolat, Bull. Soc. Ent. Fr. (5) x. p. cxvii.

Acalles hubbardi, Leconte, Tr Am. Ent. Soc. viii. p. 216, Florida. *A. scapularis* and *albivertex*, Chevrolat, Le Nat. ii. pp. 150 & 151, Guadeloupe. *A. trinotatus*, p. 490, *pascoei, signatus*, p. 491, *tortipes, crisioides*, p. 492, *vividus, certus*, p. 493, and *scitus*, p. 494, Broun, *l. c.*, New Zealand.

Acallopsis sculpturatus, id. *l. c.* p. 495, New Zealand.

Tychanus densus, id. *l. c.* p. 499, New Zealand.

Crisius variegatus and *scutellaris*, id. *l. c.* p. 501, New Zealand.

Lembodes arachnipes, Martinique, and *nocturnus*, Guadeloupe, Chevrolat, *l. c.* pp. 198 & 236.

Ulosomus pallidicornis, id. *l. c.* p. 236, Cuba.

Euscepes erinaceus, Cuba, *fur*, p. 151, *hirsutus* and *tonsus*, Guadeloupe, p. 252, *id. l. c.*

Pseudomus singularis, Guadeloupe, p. 278, *albo-sparsus*, Cuba, *proximus, nitidicutis, punctatissimus*, Hayti, and *mexicanus*, Mexico, p. 279, *id. l. c.*

Oreda murina and *setigera*, Broun, *l. c.* pp. 487 & 488, New Zealand.

Bothrobathys arcticus, Pascoe, *l. c.* p. 490, Parana.

Cryptorrhynchus quadripunctatus, quadrifoveatus, p. 252, *capucinus, clericus, orthodoxus, interstitialis, dentatus*, p. 253, *pallidicornis*, Guadeloupe, and *C.* (*Discophorus*) 10-*guttatus*, Martinique, p. 294, Chevrolat, *l. c.*

Neotylodes solidus, setulosus, neglectus, nodulosus, and *ursus*, id. *l. c.* p. 235, Guadeloupe (*nodulosus* is a *Cryptorrhynchus*, id. p. 261).

Cœlosternus claviger, crucifer, infernalis, p. 285, *aurulentus, grisescens, polycelis, basalis, nigro-striatus*, p. 286, *id. l. c.*, Guadeloupe.

Cylindrocorynus thoracicus, id. *l. c.* p. 286, Guadeloupe.

Macromerus cultricollis, Guadeloupe, and *funebris*, Brazil, *id.* Bull. Soc. Ent. Fr. (5) x. pp. xxvii. & cxiii.

Aldonus rostratus and *peacii*, Broun, *l. c.* pp. 483 & 484, New Zealand.

Rhinpchonus scutellaris and *triangulifer*, Chevrolat, *l. c.* pp. cxiii. & cxiv., Brazil.

Paranomocerus maurus, Broun, *l. c.* p. 505, New Zealand.

Zygopides.

Atenismus, g. n., Chevrolat, Bull. Soc. Ent. Fr. (5) x. p. l. Allied to *Cratosomus*; type, *A. spinipennis*, sp. n., *l. c.*, Brazil.

Mnemyne, g. n., Pascoe, Ann. N. H. (5) vi. p. 179. Unique among the *Zygopinæ* in having the pectoral canal prolonged on the metasternum, and terminating close to the first abdominal segment; type, *M. viduata*, sp. n., *l. c.*, Para.

Copturus conjunctus, Cayenne, *expletus*, Para, p. 494, *bisellatus*, St. Paulo, *lyra*, Brazil, p. 495, *paroticus*, *musculus*, p. 496, *crux*, Parana, *collaris*, Ega, p. 497, and *eximius*, Colombia, p. 498, Pascoe, Ann. N. H. (5) v.; *C. lineolatus*, Fairmaire, Le Nat. ii. p. 295, Guadeloupe: spp. nn.

Sphadasmus depressus, sp. n., Harold, MB. Ak. Berl. 1880, p. 265, East Africa.

Trypetides.

Nanus erythrurus, Chevr., and *uniformis*, Boh., noticed; Chevrolat, Le Nat. ii. p. 295.

Trypetes politus, sp. n., Pascoe, Ann. N. H. (5) vi. p. 180, Chyavitos, E. Peru.

Ceuthorrhynchides.

Ceuthorrhynchus fairmairii, sp. n., Brisout, Bull. Soc. Ent. Fr. (5) x. p. cxxxiii., Briançon, &c.

Peridinetides.

Peridinetus distinctus, Mexico, p. 180, *cretaceus*, Chontales, and *cinctus*, Ega, p. 181, Pascoe, Ann. N. H. (5) vi.; *P. insignis*, Chevrolat, Bull. Soc. Ent. Fr. (5) x. p. xxvii., Guadeloupe: spp. nn.

Baridiides.

Pocoesthes frigidus, Chevr., = *Pithocomus hirsutus*, Pasc.; Chevrolat, Bull. Soc. Ent. Fr. (5) x. p. xci.

New genera and species:—

Eisonyx, Leconte, Tr. Am. Ent. Soc. viii. p. 216. Allied to *Microcholus*; type, *E. crassipes*, sp. n., *l. c.* p. 217, Texas.

Glycaria, Pascoe, Ann. N. H. (5) vi. p. 181. Allied to *Scambus*; type, *G. tetrasticta*, sp. n., *l. c.* p. 182, Brazil.

Anexantha, id. *l. c.* p. 182. Affinities not stated; type, *A. castanea*, sp. n., *l. c.* p. 183, Parana.

Azygides, id. *l. c.* p. 183. Allied to *Parallelosomus*; type, *A. stygius*, sp. n., *l. c.*, Parana.

Baris scissa, *picea*, *multistriata*, and *callaidis*, Chevrolat, Le Nat. ii. p. 300, Guadeloupe.

Centrinus arcu-fascia, *politus*, *pulchellus*, *sociatus*, and *lanæfaucis*[*lanif-*], id. *l. c.* p. 307, Guadeloupe.

Microcholus erasus, Leconte, *l. c.* p. 217, Kansas.

Barilepton lutescens and *albescens*, id. *l. c.* p. 218, Texas.

Madarides.

Madarus crassirostris, sp. n., Pascoe, Ann. N. H. (5) vi. p. 184, Chontales.

Calandrides.

Litorrhynchus westermanni, Boh. Variation noticed; Dohrn, S. E. Z. xli. p. 297.

Calandra oryzæ injurious to maize, maccaroni, vermicelli, &c., as well as to rice; Lucas, Bull. Soc. Ent. Fr. (5) x. pp. xxxii. & xxxiii.

Odonto[*r*]*rhynchus*, g. n., Chevrolat, Le Nat. ii. p. 316. Allied to *Sphenophorus* (?); types, *O. cornu-rostris* and *puncticollis*, spp. nn., *l. c.*, Guadeloupe.

Rhynchophorus lanuginosus and *depressus*, spp. nn., *id. l. c.* p. 315, Guadeloupe.

Sphenophorus atricolor and *pygidialis*, id. *l. c.* p. 198, Martinique; *S. tetraspilotus* and *S.* (?) *erythrurus*, id. Bull. Soc. Ent. Fr. (5) x. p. xxxii., Guadeloupe: spp. nn.

Stromboscelides.

Xerodermus, Motsch., noticed; Roelofs, Ann. Ent. Belg. xxiv. p. 146.

Oxyrrhynchides.

Oxyrrhynchus hydropicus, Chevrolat, Bull. Soc. Ent. Fr. (5) x. p. cxxiv., Andamans; *O. suturalis*, Roelofs, Notes Leyd. Mus. ii. p. 235, Sumatra: spp. nn.

Sipalides.

Mesocordylus subparallelus, Mexico, and *cœlomerus*, Brazil, spp. nn., Chevrolat, Bull. Soc. Ent. Fr. (5) x. pp. cxxiv. & cxxv.

Cossonides.

New genera and species:—

Agrilochilus, Broun, Man. N. Z. Col. p. 520. Placed next to *Entium*; type, *A. prolixus*, sp. n., *l. c.* p. 521, New Zealand.

Cantho[*r*]*rhynchus*, id. *l. c.* p. 525. Allied to *Tychioides*; type, *C. bellus*, sp. n., *l. c.* p. 526, New Zealand.

Novitas, id. *l. c.* p. 527. Placed next to *Microtribus*; types, *N. rufus* and *nigrans*, spp. nn., *l. c.* p. 528, New Zealand.

Lasio[*r*]*rhinus*, id. *l. c.* p. 532. Placed next to *Phlœophagosoma*; type, *L. opacus*, sp. n., *l. c.* p. 533, New Zealand.

Arecophaga, id. *l. c.* p. 533. Allied to last; type, *A. varia*, sp. n., *l. c.* p. 534, New Zealand.

Pentarthrum apicale, p. 509, *brunneum*, *rufum*, p. 510, *assimilata*[*-tum*],

planiuscula[*-lum*], p. 511, *fulvicornis*[*-ne*], p. 512, *æneopicea*[*-eum*], p. 513, *vestita*[*-tum*], p. 514, *piceum*, p. 515, *badium*, *asperirostre*, p. 516, *gratum*, *contiguum*, p. 517, *lateritia*[*-ium*] and *punctatum*, p. 518, *id. l. c.*, New Zealand.

Sericotrogus longipes, *ovicollis*, p. 522, and *stramineus*, p. 523, *id. l. c.*, New Zealand.

Phlœophagosoma constricticolle, id. *l. c.* p. 530, New Zealand.

Eutornus vicinus, *breviceps*, *amplus*, p. 535, and *littoralis*, p. 536, *id. l. c.*, New Zealand.

Cossonus maculosus and *coquereli*, Fairmaire, Le Nat. ii. p. 293, Bourbon.

Phlœophagus filum, Chevrolat, Le Nat. ii. p. 198, Martinique.

Scolytidæ.

Eichhoff, W. Die europäischen Borkenkäfer. Berlin: 1881, 8vo [Oct., 1880], pp. viii. & 315, 109 woodcuts.

A monograph of the European *Scolytidæ* and *Platypidæ*, written from a practical as well as scientific point of view, and dealing very fully with the habits of the insects. Very full tables of genera and species are prefixed, including a table arranged according to the various plants which they attack. The woodcuts represent perfect insects, antennæ, galleries, &c. A few new species are described.

Blastophagus (*Hylesinus*) *piniperda*. Its ravages noticed; Selys-Longchamps, CR. Ent. Belg. xxiii. pp. cli. & clii.

Hylesinus trifolii noticed and figured; Am. Ent. iii. p. 180, fig. 81.

Xyleborus, Eich. Short notes on the various species; H. du Buysson, Feuill. Nat. x. pp. 72–75.

Scolytus pruni and *rugulosus*, Ratz., noticed; Letzner, JB. schles. Ges. lvii. pp. 355 & 356.

Eccoptogaster rugulosus attacking peach-trees at Vesoul; Fairmaire, Bull. Soc. Ent. Fr. (5) x. pp. xxxiii. & xxxix.

Platypus cylindrus injurious to oak; Lucas, *op. cit.* p. xxvi.

New species:—

Carphoborus pini (Kiesenwetter, MS.), Eichhoff, Borkenkäfer, p. 131, S. France.

Cryphalus schreineri, id. *l. c.* p. 185, Pomerania.

Stephanoderes arundinis, id. *l. c.* p. 191, Piedmont.

Xyleborus (?) *punctatissimus*, id. Notes Leyd. Mus. ii. p. 189, Sumatra.

Pityophthorus macrographus (Schreiner, MS.), *id.* Borkenkäfer, p. 200, figs. 55–57, Silesia.

Thamnurgus characiæ (Rosenh., MS.), *id. l. c.* p. 208, Barcelona.

Scolytus kirschi, Skalitzky, Ent. Monatsbl. 1876, p. 110, Eichhoff, Borkenkäfer, p. 159, Prague; *S. ensifer*, Eichhoff, *l. c.* p. 163, Paris.

Platypus caviceps and *castaneus*, Broun, Man. N. Z. Col. pp. 541 & 542, New Zealand.

Tesseracerus belti, Sharp, Ent. M. M. xvii. p. 112, Chontales.

Brenthidæ.

Trachelizus cylindricornis, sp. n., Power, Notes Leyd. Mus. ii. p. 187, Sumatra.

Anth[ot]ribidæ.

New genera and species :—

Rawasia, Roelofs, Notes Leyd. Mus. ii. p. 203. Allied to *Eucorynus*, but with the 3rd joint of the tarsi unusually well developed for the family. Type, *R. ritsemæ*, sp. n., *l. c.* p. 204, Sumatra.

Litotropis, Fairmaire, Le Nat. ii. p. 316, Ann. Ent. Soc. Fr. (5) x. p. 337. Allied to *Basitropis* ; type, *L. lateritius*, sp. n., *ll. c.*, Nossi-Bé.

Tropideres coquereli (= *tessellatus*, Coq., *nec* Boh.), Fairmaire, Le Nat. ii. p. 300, Bourbon.

Xylinades marmoratus, Roelofs, Notes Leyd. Mus. ii. p. 237, Sumatra, Java.

Anthribus sharpi and *lanuginosus*, Broun, Man. N. Z. Col. pp. 546 & 549, New Zealand.

Etnalis conulus and *proximus*, id. *l. c.* p. 555, New Zealand.

Exilis spectabilis, id. *l. c.* p. 558, New Zealand.

Arœocerus purpureus, p. 559, *dignus*, *meinertzhageni*, p. 563, and *fuscopictus*, p. 564, *id. l. c.*, New Zealand.

Brachytarsus lineicollis, Chevrolat, Le Nat. ii. p. 198, Martinique.

Bruchidæ.

Bruchus irresectus destructive to dried beans at Hyères; De Fargères, Feuill. Nat. x. p. 39. *B. pisi* discussed and figured; W. Saunders, Rep. E. Soc. Ont. 1879, pp. 63–65, fig. 31.

Bruchus barcenæ, sp. n., E. Dugès, Ann. Ent. Belg. xxiv. pp. 37–40, pl. [Mexico ?], described and figured in all stages.

Aglycyderes badius, sp. n., Broun, Man. N. Z. Col. p. 427, New Zealand.

Cerambycidæ.

Bates, H. W. Biologia Centrali-Americana [*cf.* General Subject, *sub* Godman & Salvin], *Coleoptera*, v. pp. 17–152, pls. iii.–x.

Includes the Central American Longicorns, from *Xestia* to *Leptostylus*. The following known species are figured (Bates's, when not otherwise stated) or synonymy noticed :—*Sphallenum robustum*, fig. 8, *Xestia pilosovittata*, fig. 10, *nitida*, fig. 11, *sagittaria*, fig. 9, *Pantomallus fuligineus*, fig. 4; *Cerambyx sulcatus*, Ol., = *Chlorida festiva*, Linn., *Styliceps sericata*, Lac., fig. 1, *Eburia pedestris*, White, fig. 3, *Eburodacrys callixantha* and *sticticollis*, figs. 5 & 6 ; *Romalium atomarium* (= *pulverulentus*, De Geer, *marylandicus*, Fabr., and *Enaphalodes simplicicollis*. Hald.) ; *Elaphidion coronatum*, White, fig. 12, *Hypermallus scabricollis* and *dædaleus*, figs. 13 & 14, pl. iii., *Trichophorus albisparsus*, pl. iv. fig. 16, *Peribœum villosulum*, fig. 16, *Nephalius xestioides*, fig. 15, pl. iii., *N. nigriventris*,

fig. 2, *rutilus*, fig. 14, *Mallocera spinicollis*, fig. 4, *Ironeus duplex*, fig. 3, *Miltesthus marginatus*, fig. 1, *Hexoplon albipenne*, fig. 5, *Octoplon glabriolum*, fig. 6, *Ibidion griseicolle*, fig. 17, *carinicolle*, fig. 7, *nigro-cinctum*, fig. 9, *ditelum*, fig. 10, *mexicanum*, fig. 11, *obtusum*, fig. 8, *Alcyopis chalcea*, fig. 18, pl. iv., *Distenia geniculata*, fig. 17, *Cometes pulcherrimus*, fig. 18, pl. vi., *Ophistomis picticornis* and *belti*, figs. 21 & 22, *rufiventris*, fig. 19, *nigella*, fig. 20, pl. iv., and *pallida*, fig. 2, *Chontalia cyanicollis*, fig. 3, *Ommata beltiana*, fig. 7, *cyanipennis*, fig. 5, *Odontocera monostigma*, fig. 6, *clara*, fig. 4, *Tethlimmena aliena*, fig. 1, *Callichroma holochlora*, fig. 9, *cyanomelas*, White, fig. 10, *cosmica*, White, fig. 8, *rugicollis*, Guér. (= *assimilatum*, White, = *scitulum*, Pasc.), *Cyllene erythropus*, Chevr. (= *variegatus*, Lap. & Gory), *Trichoxys melanotelus*, White (= *flexus*, Chevr.), *Clytus hartwegi*, White, must be generically separated from *Trichoxys*, *Ochresthes sommeri*, Chevr. (= *Clytus tibialis*, Lap. & Gory), *Mecometopus jansoni*, fig. 14, pl. v., *Neoclytus augusti*, Chevr. (= *Clytus dubius*, Chevr.), *Apilocera spinicornis*, Chevr. (= *Clytus spinicornis*, Chevr., = *C. elegans*, Lap. & Gory), *Cleozona pulchra*, pl. vi. fig. 10, *Diphyrama singularis*, fig. 12, *Dihammophora chontalensis*, fig. 13, *Rhopalophora versicolor*, Chevr., fig. 15, *Cosmisoma martyra*, Thoms., fig. 16, *titania*, fig. 17, pl. v. *Ozodes xanthophasma*, fig. 14, *Ornithia chevrolati*, Guér. (= *Ozodes mexicanus*, Sturm), *Chrysoprasis belti*, fig. 2, *C. sthenias*, var. described, *Stenosphenus ebeninus*, fig. 5, *ochraceus*, fig. 6, *Agallissus melaniodes*, Dalm., varr. *concolor* and *trifasciatus*, from Honduras, described, p. 67, *Platyarthron quadrinotatum* (? = *Cœlomarthron chilense*, Thoms.), fig. 1, *Evander nobilis*, fig. 11 ; *Crioprosopus iridescens*, White, *rutilans*, fig. 3, *Stenaspis solitaria*, Say (= *unicolor*, Dupont), *Metaleptus angulatus*, Chevr. (= *marginellus*, Bates), fig. 8, *binoculus*, fig. 7, *Sphenothecus bivittatus*, Dup. (= *Leptocera bilineata*, Gory), *Pleuromenus baccifer*, fig. 4, *Eriphus prolixus*, fig. 15, *Dendrobius maudibularis*, Serv. (= *quadrimaculatus* and *testaceus*, Dup.), *Trachyderes succinctus*, Linn. (= *cayennensis*, Dup, *Lissonotus multifasciatus*, Dup., (= *flavo-cinctus*, Bates), *Megaderus bifasciatus*, Dup. (= *corallifer*, Newm.), *M. latifasciatus*, fig. 9, pl. vi., *Monilema albipictum*, White (= *albo-tessellatum*, Thoms.), *Ptychodes trilineatus*, Linn. (= *Saperda vittata*, Fabr.), *cretatus*, fig. 2, *niveisparsus*, fig. 1, *lecontii*, Thoms., fig. 3, *politus*, Serv. (= *Tæniotes lineatus*, Newm.), *Tæniotes scalaris*, Fabr. (= *suturalis*, Thoms.), *præclarus*, fig. 11, *Deliathis incana*, Forst. (= *Lamia vittator*, Fabr.), *nivea*, fig. 9, *Hammoderus spinipennis*, Thoms., fig. 7, *nitidus*, fig. 8, *rubefastus*, fig. 4, *inermis*, Thoms., (= *Tæniotes albiplagiatus*, White), *elatus*, figs. 5 & 6, pl. vii., *Parmenonta valida*, Thoms., fig. 3, *Adetus muticus*, Thoms. (= *Agemopsis pygœa*, Bates and *Ag. mexicanus*, Thoms.), fig. 4, *costicollis*, fig. 5, *scissicauda*, fig. 1, *binotatus*, Thoms., fig. 2, *Esthlogena porosa*, fig. 7, *Epectasis attenuata*, fig. 16, pl. viii., *Amphicnœia brevivittis*, fig. 17, *crustulata*, fig. 16, pl. ix., *Desmiphora fasciculata*, Oliv. (= *gigantea*, Thoms.), fig. 8, *cirrosa*, Er., fig. 9, *canescens*, fig. 10, *Eupogonius subœneus*, fig. 14, *flavocinctus*, fig. 15, *ursulus*, fig. 13, *Estola ignobilis*, fig. 11, *vittulata*, fig. 12, *Ærenea impetiginosa*, Thoms., fig. 22, *Jamesia papulenta*, Thoms., fig. 17, and *multivittata*, fig. 18, *Tybalmia cœca*, fig. 19, *heraldica*, fig. 21, pl. viii., *Hypsioma picticornis* (= *signaticornis*, Thoms.), figs. 7 & 8, *Oncideres albo-marginata*,

Thoms., fig. 12, *fulvo-stellata*, fig. 11, *Taricanus truquii*, fig. 6, *Eudesmus posticalis*, Guér., fig. 13, *Cylicasta terminata*, Buq. (= *Trestonia coarctata*, Bates), *Ecthœa quadricornis*, Oliv. (= *Trachysomus faunus*, Erichs.), fig. 14, *Trestonia assulina*, fig. 15, *Hippopsis lineolata*, Serv., fig. 18, pl. ix., *Thryallis maculosus*, Thoms., fig. 1, *Chalastinus rubro-cinctus*, fig. 3, *Gymnocerus belti*, fig. 4, *Anisocerus palliatus*, White (= *personatus*, Bates), fig. 2, *Hoplistocerus gemmatus*, fig. 5, pl. ix., *Polyrrhaphis fabricii*, Thoms., fig. 1, *paraensis*, fig. 2, *angustata*, Buq. (= *elongata*, fig. 3), *Oreodera glauca*, Linn. (= *Lamia spengleri*, Fabr.), fig. 6, *verrucosa*, fig. 4, *cœnotogata*, fig. 7, *granulifera*, fig. 8, *semialba*, fig. 5, *c-album*, fig. 9, *costaricensis*, Thoms., fig. 10, *inscripta* (= *inscriptipennis*, fig. 11), *obsoleta*, fig. 12, pl. x., *Alphus cavifrons*, pl. x. fig. 15, & pl. xi. fig. 1, *Myoxinus pictus*, pl. x. fig. 16, *Æthomerus antennator*, Fabr., pl. xi. fig. 2, *Stirastoma histrionica*, White (= *larva*, Thoms.), fig. 18, *melanogenys*, White, fig. 17, *senex*, White, fig. 19, *albiceps*, fig. 20, pl. x., *Acanthoderes lævicollis*, fig. 5, *lacrymans*, Thoms. (= *lachrymosus*, fig. 6), *funerarius* (var. = *erichsoni*, Thoms.), figs. 3 & 4, *inquinatus*, fig. 8, *bivitta*, White, fig. 9, *Lagochirus binumeratus*, Thoms. (= *v-album*, Bates), fig. 11, *L. cristulatus*, fig. 10, *rosaceus*, fig. 12, *præcellens*, fig. 13, *simpliciformis*, fig. 14, *Leptostylus viriditinctus*, fig. 16, *hilaris*, fig. 17, *cineraceus*, fig. 19, *triangulifer*, fig. 20, pl. xi.

Food-habits of N. American Longicorns; Riley, Am. Ent. iii. pp. 237–239, 270, & 271.

Prionides.

Parandra brunnea, Fabr., destructive to ash; Am. Ent. iii. pp. 202 & 203.

Agrionoma (*Mallodon*) *fairmairii*, Montr., pupa noticed; the insect is eaten in all stages by the inhabitants of New Caledonia. Lucas, Bull. Soc. Ent. Fr. (5) x. p. lxxviii.

Prionoplus reticularis, White. Habits and transformations described; Broun, Tr. N. Z. Inst. xii. pp. 284–288.

New genera and species:—

Protorma, C. O. Waterhouse, Ann. N. H. (5) v. p. 288. Allied to *Navosoma* and *Strongylaspis*; type, *P. scabrosa*, sp. n., *l. c.* p. 289, Sarayacu.

Episacus, id. *l. c.* p. 291. Allied to *Calloctenus*, but sterna differently formed, and scutellum transverse. Type, *E. pilosicollis*, sp. n., *l. c.*, Chiguinda.

Psalidognathus gloriosus, Thomson, Bull. Soc. Ent. Fr. (5) x. p. lx., Ecuador.

Macrotoma obscura, *læta*, p. 410, *asperata*, p. 411, *vicina*, *pfeifferæ*, p. 412, *sodalis*, p. 413, *mutica*, Madagascar, and *wrighti*, Seychelle Islands, p. 414; C. O. Waterhouse, Ann. N. H. (5) v.

Megopis coquereli, Fairmaire, Le Nat. ii. p. 300, Bourbon.

Udeterus (?) *elegans*, C. O. Waterhouse, *l. c.* p. 290, Chiguinda.

Mallaspis buckleyi, id. *ibid.*, Sarayacu.

Cerambycides.

Asemum, Chevrolat, pre-occupied, renamed by him *Esamus* ; Bull. Soc. Ent. Fr. (5) x. p. xli. He adds a list of known species, and describes several new ones ; Ann. Soc. Ent. Fr. (5) x. pp. 255–259.

Criocephalus polonicus and *coriaceus*, Motsch., = *epibata*, Schiödte, = *ferox*, Kraatz, = *agrestis*, Kirby ; Heyden, Deutsche E. Z. xxiv. p. 304.

Sagridola quinquemaculata, C. O. Waterhouse, ♂ described by him ; Ann. N. H. (5) v. p. 215.

Leptura rufa, Brullé. The South European species, hitherto regarded as this species, is distinct, and is renamed *semirufula* ; *L. oblongo-maculata*, Buq., and *trisignata*, Fairm., are probably varieties of the new species. Kraatz, Deutsche E. Z. xxiv. pp. 375 & 376.

Pachylocerus unicolor, Dohrn, noticed by him ; S. E. Z. xli. pp. 149 & 150.

Aromia moschata, variation ; Sclater & Anderson, Ent. xiii. pp. 21 & 72.

Rosalia alpina, aberration ; L. Failla Tedaldi, Bull. Ent. Ital. Resoconti, 1880, pp. 11 & 12.

Chenoderus tricolor, Fairm., figured by C. O. Waterhouse, Aid, pl. iv.

Clytus speciosus, *pictus*, and *robiniæ* redescribed, and the first figured ; R. V. Rogers, Canad. Ent. xii. pp. 148–152, fig. 21, *cf.* also Rep. Ent. Soc. Ont. 1878, pp. 32 & 33, fig. 13.

New genera and species :—

Cercophorus, Chevrolat, Ann. Soc. Ent. Fr. (5) x. p. 259. Allied to *Esamus* ; elytra of male prolonged into two long downy tails ; rostrum longer and narrower, legs shorter and more curved. To contain *C. floccosus* (fig.), Timor, *fistulosus*, Cambodia (p. 259), *crassipes*, Siam, and *xanthurus*, East Indies (p. 260), spp. nn., *l. c.*

Dicentrus, Leconte, Tr. Am. Ent. Soc. viii. p. 195. Allied to *Opsimus* ; type, *D. bluthneri*, sp. n., *l. c.*, California, Nevada.

Perilasius, Bates, Biol. Centr. Am. Col. v. p. 17. Allied to *Pantomallus*, but differs from all genera of the *Hesperophanina* group by its sulcate antennæ. Type, *P. championi*, sp. n., *l. c.* p. 18, Guatemala.

Votum, Broun, Man. N. Z. Col. p. 572. Allied to *Leptochrous* ; type, *V. munda* [*-dum*], sp. n., *l. c.* p. 573, New Zealand.

Pseudocalliprason, id. *l. c.* p. 573. Allied to *Leptochrous*, &c. ; type, *Calliprason marginatum*, White.

Ambeodontus (Lac., Cat.), *id. l. c.* p. 574. Placed next to *Pseudocalliprason* ; type, *Saperda tristis*, Fabr.

Astetholida, id. *l. c.* p. 578. Allied to *Astetholea* ; type, *A. lucida*, sp. n., *l. c.*, New Zealand.

Œdœus, C. O. Waterhouse, Ann. N. H. (5) v. p. 416. Resembles *Acmæops* ; head and thorax nearly as in *Logisticus*, but the narrow epipleural fold of that genus is replaced by the finely incrassated margin to the elytra. Type, *Œ. geniculatus*, sp. n., *l. c.*, Antananarivo.

Appedesis, id. *l. c.* p. 418. Differs from *Leptura* by the slender antennæ, eyes unsupported by any cheek, and the shorter tarsi. Type, *A. vidua*, sp. n., Antananarivo.

Catorthontus, id. *l. c.* p. 487. Belongs to the *Rhinotraginæ*, but thorax shaped as in *Clytellus*, and metathoracic epimera narrowed from the outer margin. Type, *C. collaris*, sp. n., *l. c.*, Sarayacu.

Championa, Bates, *l. c.* p. 69. Allied to *Ancylocera*; type, *C. aurata*, sp. n., *l. c.* p. 69, Guatemala.

Panchylissus, C. O. Waterhouse, *l. c.* p. 294. Allied to *Lissonotus*, but with more linear antennæ, longer muzzle, elongate scutellum, and longer and more parallel elytra. Type, *P. cyaneipennis*, sp. n., *l. c.* p. 295, Sarayacu.

Esamus productus, p. 256, *luteo-cinctus*, Egypt, *falsus*, Almorah, *lineola*, Cambodia, p. 257, *albicinctus*, *polygrammus*, Assam, *leucocephalus*, Siam, p. 258, and *viridiventris*, E. Indies, p. 259, Chevrolat, Ann. Soc. Ent. Fr. (5) x.

Œme striangulata, Horn, Tr. Am. Ent. Soc. viii. p. 133, pl. ii. fig. 7, Utah.

Opsamates purpureipennis, C. O. Waterhouse, Tr. E. Soc. 1880, p. 60, Madagascar.

Coccoderus sexguttatus, id. Ann. N. H. (5) v. p. 293, Chiguinda.

Criodion pictum and *plagiatum*, id. *l. c.* pp. 292 & 293, Gualaquisa.

Xestia polita, id. *l. c.* p. 486, Sarayacu.

Eburia blancaneaui, Honduras, *macrotænia* and *championi*, Guatemala, p. 20, *brevispinis*, *ægrota*, p. 21, and *laticollis*, Mexico, p. 22, Bates, *l. c.*

Eburodacrys asperula, id. *l. c.* p. 23, Mexico.

Hypermallus gibbulus and *undulatus*, id. *l. c.* p. 25, Mexico.

Ironeus pulcher, id. *l. c.* p. 29, pl. iv. fig. 11, Chontales.

Trichophorus decipiens, id. *l. c.* p. 26, Honduras.

Mallocera costifera, C. O. Waterhouse, *l. c.* p. 486, Sarayacu.

Psyrassa castanea, Bates, *l. c.* p. 28, Mexico.

Haruspex chontalensis, id. *l. c.* p. 30, pl. iv. fig. 12, Chontales; *H. lævifemoratus*, C. O. Waterhouse, *l. c.* p. 294, Sarayacu.

Ibidion virgulatum, Guatemala, and *cribripenne*, Costa Rica, Bates, *l. c.* pp. 31 & 32.

Didymocantha brevicorne [*-nis*], Broun, Man. N. Z. Col. p. 570, New Zealand.

Æmona simplicicollis (Bates, MS.), *id. l. c.* p. 571, New Zealand.

Anisogaster signifer and *luteo-sparsus*. Fairmaire, Le Nat. ii. p. 300, Bourbon.

Astetholea aubreyi, Broun, *l. c.* p. 577, New Zealand.

Artelida asperata, C. O. Waterhouse, *l. c.* p. 415, Antananarivo.

Logisticus suturalis, p. 416, *angustatus* and *simplex*, p. 417, and *obscurus*, p. 418, *id. l. c.*, Madagascar.

Blosyropus simpliceps, Broun, *l. c.* p. 579, New Zealand.

Xuthodes divergens, id. *l. c.* p. 581, New Zealand.

Gaurotes donacioides, pl. iv. fig. 23, and *ochropus*, Bates, *l. c.* p. 37, Mexico.

Leptura simplonica, Stierlin, MT. schw. ent. Ges. v. p. 550, Simplon; *L. aliena*, Bates, *l. c.* p. 38, Mexico.

Ophistomis emaciata, Costa Rica, *lævicollis*, p. 39, and *flavirostris*, Guatemala, p. 40, *id. l. c.*

Ommata championella, id. *l. c.* p. 42, Guatemala.
Odontocera rugicollis, id. *l. c.* p. 43, Guatemala.
Acyphoderes vespiventris, id. *l. c.*, Guatemala.
Stenopseustes sericinus, id. *l. c.* p. 44, Mexico.
Cartallum thoracicum, Sharp, Ent. M. M. xvi. p. 247, Geddah.
Polyschisis rufitarsis, C. O. Waterhouse, *l. c.* p. 294, Sarayacu.
Callichroma xanthogastra, Bates, *l. c.* p. 45, pl. v. fig. 11, Chontales.
Hypocrites limbalis, *longicollis*, and *geniculatus*, Harold, MB. Ak. Berl. 1880, p. 266, E. Africa.
Helymæus albilatens, id. *l. c.* p. 265, E. Africa.
Clytus thomsoni, id. *l. c.* p. 266, E. Africa; *C. rugulosus*, Broun, *l. c.* p. 588, New Zealand.
Trichoxys abbreviatus, Bates, *l. c.* p. 50, Guatemala.
Ochresthes picticornis, Guatemala, and *palmeri*, Mexico, *id. l. c.* p. 52.
Mecometopis hægii, id. *l. c.* p. 56, Mexico.
Mannophorus ferreus, id. *l. c.* p. 82, Mexico.
Euderces reticeps, id. *l. c.* p. 59, Guatemala.
Dihammophora auro-vittata, id. *l. c.* p. 61, Guatemala.
Rhopalophora rubecula, id. *l. c.* p. 62, Guatemala, Nicaragua, Costa Rica.
Iresioides sericeo-vittata, C. O. Waterhouse, *l. c.* p. 215, Fianarantsoa, Madagascar.
Leptocera lineato-punctata, id. *l. c.* p. 419; *L. flavo-vittata*, id. Tr. E. Soc. 1880, p. 61, Madagascar.
Allæsia bicolor, id. Ann. N. H. (5) v. p. 488, Chiguinda.
Chrysoprasis seticornis and *hirtula*, Bates, *l. c.* p. 65, Chontales.
Stenosphenus subtilis and *protensus*, id. *l. c.* p. 66, Guatemala.
Betyle meridionalis, id. *l. c.* p. 87, Tehuantepec.
Agallissus clytoides, id. *l. c.* p. 68, Mexico.
Ancylocera macrotela, id. *l. c.*, Guatemala, Nicaragua.
Platyarthron rectilineum, id. *l. c.* p. 70, Guatemala.
Evander unicolor, id. *l. c.* p. 71, pl. vi. fig. 12, Costa Rica.
Deltosoma guatemalense, id. *l. c.* p. 72, Guatemala.
Pteroplatus quadriscopulatus, Guatemala, and *octo-costatus*, Mexico, *id. l. c.* p. 73.
Crioprosopus basileus, id. *l. c.* p. 75, Oaxaca.
Deltaspis rubriventris and *nigripennis*, id. *l. c.* p. 77, Mexico.
Megaleptus pyrrhulus, id. *l. c.* p. 79, Guatemala.
Oxoplus pœcilus, id. *l. c.* p. 80, Tehuantepec.
Æthecerus latecinctus, Horn, *l. c.* p. 134, Arizona.
Sphenothecus picticornis, Mexico, *argenteus*, p. 84, and *funebris*, Guatemala, p. 85, Bates, *l. c.*
Ischnocnemis minor, id. *l. c.* p. 83, Mexico.
Gambria leucozona, id. *l. c.* p. 86, Mexico.
Crossidius palmeri and *trivittatus*, id. *l. c.* pp. 81 & 82, Mexico.
Trachyderes subpilosus, Honduras, Nicaragua, Costa Rica, and *hilaris*, pl. vi. fig. 13, Costa Rica, Ecuador, *id. l. c.* pp. 89 & 90.
Navomorpha neglectum, Broun, *l. c.* p. 591, New Zealand.
Distenia phœocera (= *rufipes*, pl. vi. fig. 16), Nicaragua, *lineatopora*,

p. 35, *nigrella* and *vittata*, Guatemala, p. 36, Bates, l. c. *D. humeralis*, C. O. Waterhouse, *l. c.* p. 295, Chiguinda.

Cometes apicalis, id. *l. c.* p. 296, Medellin.

Lamiides.

HORN, G. H. Notes on some genera of *Cerambycidæ*, with descriptions of new species. Tr. Am. Ent. Soc. viii. pp. 115-138, pl. ii.

The following known genera are noticed, and the N. American species tabulated:—*Acanthoderes*, Serv., *Lagochirus*, Er., *Leptostylus*, Lec., *Liopus*, Serv. (= *Sternidius*, Lec.), *Mecotetartus* and *Lepturges*, Bates, *Dectes*, Lec., *Hyperplatys*, Hald., *Graphisurus*, Kirb., *Acanthocinus*, Steph., *Œme*, Newm., *Æthecerus*, Chevr., and *Cyllene*, Newm.

Bates (Biol. Centr. Am. Col. v.) divides the *Lamiidæ* into the following groups (either the typical genus, or the equivalent sections of Lacordaire are here added in brackets):—

DORCADIONINI (*Dorcadidides* and *Parmenidides*).
MONOHAMMINI (*Monohammides* and *Batocerides*).
APOMECYNINI (*Apomecyna*).
ATAXIINI (*Pteropliides* and the genera *Epectasis*, *Amphicnæia*, and *Aletretia*).
DESMIPHORINI (*Desmiphorides* and *Apodasyides*).
POGONOCHERINI (*Pogonocherus*).
COMPSOSOMINI (*Compsosomides*, *Æreneides*).
ONCIDERINI (*Onciderides*, *Onocephalides*).
HIPPOPSINI (*Hippopsides*, *Spalacopsides*, *Ischiolonchides*).
ACANTHODERINI (*Acanthoderes*, &c.).
ACANTHOCININI (*Acanthocinides*, *Colobotheides*).

Lachnia subcincta, Serv., figured by C. O. Waterhouse, Aid, pl. v.

Xylorrhiza adusta, Wiedm. (1819), was figured by Latreille in Cuv. Règne Animal, ed. 1 (1817), as *Lamie veinée*, which gives Castelnau's name of *venosa* (1840) no claim to priority; Lucas & Bedel, Bull. Soc. Ent. Fr. (5) x. pp. xcii. & xciii.

Psenocerus supernotatus, Say, figured and habits described; W. Sannders, Rep. E. Soc. Ont. 1879, pp. 75 & 77, fig. 49, Canad. Ent. xii. pp. 5 & 6, fig. 2.

Pogonocherus dentatus attacks the fig; Poussielgue, Feuill. Nat. xi. p. 15.

Parmena caucasica, Leder, belongs to *Pogonocherus*; Leder, Verh. z.-b. Wien, xxx. p. 518.

Oncideres cingulatus, Say. Habits described and transformations figured; Am. Ent. iii. p. 293, figs. 155 & 156.

Discopus, Thoms., discussed; H. W. Bates, Ent. M. M. xvi. pp. 253–255.

Leptostylus parvus, Lec., and *argentatus*, Duval, redescribed by Horn, *l. c.* pp. 121 & 123.

Liopus crassulus, Lec., and *dorsalis*, White, redescribed; *id. l c.* p. 125.

Graphisurus pusillus, Kirb., redescribed; *id. l. c.* p. 129.

New genera and species:—

Sicyobius, Horn, Tr. Am. Ent. Soc. viii. p. 137. Differs from the group *Apomecynides* by the eyes being entirely divided, and the anterior coxæ not angulate externally. Differs from Leconte's group *Hippopsini* by the short antennæ and divided eyes. Type, *S. brousii*, sp. n., *l. c.* pl. ii. fig. 9, W. Kansas.

Idœmea, id. *ibid.* Allied to *Styloxus*, front longer and more vertical, more deeply impressed on the vertex, and rather widely separated on the under side. Type, *I. fulleri*, sp. n., *l. c.* pl. ii. fig. 10, Texas.

Asyngenes, Bates, Biol. Centr. Am. Col. v. p. 114. Allied to *Eupogonius* and *Amphicnœia*; type, *A. chalceolus*, sp. n., *l. c.* p. 115, Guatemala.

Parestola, id. *l. c.* p. 119. Allied to *Estola*; type, *P. zapotensis*, sp. n., *l. c.*, Guatemala.

Atimiola, id. *ibid.* Allied to *Estola*, but with some affinity to *Exocentrus*. Type, *A. guttulata*, sp. n., *l. c.* p. 120, Guatemala.

Poliœmus, id. *l. c.* p. 120. Allied to *Pogonocherus*; type, *P. hirsutus*, sp. n., *l. c.*, Guatemala.

Lochmœodes, id. *l. c.* p. 124. Section of *Oncideres*, less cylindrical and less convex, thorax in both sexes as wide, or wider behind than before, and frontal horns of the male porrect. Type, *O. callidryas*, Bates, fig. 9, add *O. sparsa*, Bates, sp. n., *l. c.* p. 125, fig. 10, Mexico, Nicaragua, pl. ix. and *O. tessellata*, Thoms.

Tetrasarus, id. *l. c.* p. 142. Allied to *Acanthoderes* (*circumflexus*), but joints 3 & 4 of the antennæ tufted. To contain *Discopus quadriscopulatus*, Thoms., *inops*, p. 142, *albescens*, Mexico, *pictulus* (= *D. quadriscopulatus*, pl. xi. fig. 7), Chontales, and *callistus*, Guatemala, p. 143, spp. nn.

Plagiosarus, id. *l. c.* p. 144. Allied to *Tetrasarus*, antennæ much shorter, 3rd joint tufted only beneath, 4th not tufted; elytra not depressed along the suture or carinated. Type, *P. binoculus*, sp. n., *l. c.* p. 144.

Cœnopœus, Horn, *l. c.* p. 117. Allied to *Lagochirus*; lateral spine obtuse, disc not tuberculate, antennæ not longer than the body in either sex. Type, *Leptostylus palmeri*, Lec., redescribed and figured, *l. c.* pl. ii. fig. 1.

Urographis, id. *l. c.* p. 128. Allied to *Graphisarus*; mesosternum broad, antennæ not much longer than the body, and not ciliate beneath, except on the scape. Types, *Acanthoderes triangulifera*, Hald., and *Cerambyx fasciata*, De Geer.

Calliphenges, C. O. Waterhouse, Ann. N. H. (5) v. p. 296. Allied to *Colobothea*; type. *C. cuprascens*, sp. n., *l. c.*, Chiguinda.

Ites, id. *l. c.* p. 297. Allied to the *Amphionychi*, but the 2nd joint of the antennæ is elongate, and a little longer than the 3rd; it may be placed before *Clythraschema*. Type, *I. plagiatus*, sp. n., *l. c.*, p. 298, Gualaquisa.

Xyloteles inornatus and *gratus*, Broun, Man. N. Z. Col. p. 595, New Zealand.

Somatidia assimilata, p. 600, *terrestre* [*-tris*], *angusta*, p. 601, *pictipes*, p. 602, *diversa* and *nitida*, p. 603, *id. l. c.*, New Zealand.

Spilotrogia hilarula, id. *l. c.* p. 607, New Zealand.

Eurychœna acutula, id. *l. c.* p. 608, New Zealand.

Phrynidius singularis and *echinus*, Bates, Biol. Centr. Am. Col. v. pp. 92 & 93, Guatemala.

Nemophas zonatus, Timor, *bicinctus*, Sula-Bessi, Lansberge, CR. Ent. Belg. xxiii. p. cxxxvii.

Monohammus rubigineus, Bates, *l. c.* p. 103, Mexico.

Ptychodes mixtus, Panama, and *albo-guttatus*, Mexico, *id. l. c.* p. 97.

Tæniotes xanthostictus, id. *l. c.* p. 98, Chontales (= *luciani*, pl. vii. fig. 10).

Deliathis pœcilodryas, id. *l. c.* p. 99, Mexico.

Hammoderus albatus, Costa Rica, p. 100, *masculosus*, Chontales, *thiodes*, Chiriqui, p. 101, *pollinosus*, Costa Rica, and *lunaris*, Mexico, p. 102, *id. l. c.*

Parmenonta ovatula, albisetosa, Guatemala, and *minor*, Mexico, *id. l. c.* p. 105.

Calloplophora graafii, Ritsema, Notes Leyd. Mus. ii. p. 246, Sumatra.

Batocera bruyni, Lansberge, *l. c.* p. cxxxviii., Sanghir Islands.

Protemnemus thomsoni, id. *ibid.*, New Guinea.

Rhaphidopsis pulchra, C. O. Waterhouse, Ann. N. H. (5) vi. p. 461, Antananarivo.

Cochliopalpus suturalis, Harold, MB. Ak. Berl. 1880, p. 266, E. Africa.

Xylorrhiza dohrni, Lansberge, *l. c.* p. cxxxix., Sumbawa.

Adetus strigulatus, subellipticus, Guatemala, p. 107, *leucostigma*, Mexico, *denticauda*, Guatemala, p. 108, *pictus*, British Honduras, and *excultus*, Chontales, p. 109, Bates, *l. c.*

Pterichthya longicauda, Mexico, and *furculicauda*, pl. viii. fig. *b*, Guatemala, *id. l. c.* p. 110.

Ptericoptus caudalis, griseolus, Guatemala, and *panamensis*, Panama, *id. l. c.* p. 111.

Parysatis rufitarsis, Chontales, *flavescens*, p. 112, and *canescens*, Mexico, &c., p. 113, *id. l. c.*

Esthlogena albisetosa, id. *l. c.* p. 113, Mexico, British Honduras.

Desmiphora ægrota, id. *l. c.* p. 116, Guatemala.

Eupogonius longipilis, id. *l. c.* p. 117, locality not stated.

Hybolasius promissus, p. 612, *modestus, variegatus*, p. 613, *bellicosus* and *parvus*, p. 614, Broun, *l. c.*, New Zealand.

Ecyrus penicillatus, Bates, *l. c.* p. 137, Mexico.

Tybalmia funeraria, Mexico, and *turbida*, pl. viii. fig. 20, Chontales, *id. l. c.* p. 122.

Pteroaia degenera, id. *l. c.* p. 123, Guatemala.

Oncideres pœcila and *scitula*, id. *l. c.* pp. 125 & 126, Mexico, &c.

Spalacopsis variegata, id. *l. c.* p. 129, Guatemala.

Dorcasta furcula, Guatemala, and *geometrica*, Guatemala, Costa Rica, *id. l. c.* p. 139.

Thryallis sallæi, id. *l. c.* p. 131, Mexico.

Oreodera purpurascens and *hispida*, id. *l. c.* p. 135, Guatemala.

Myoxinus asper, id. *l. c.* p. 136, Mexico, Yucatan, Nicaragua.

Stirastoma anomala, Bates, *l. c.* p. 138, Mexico.

Acanthoderes clericus, *doctus*, *sylvanus*, Mexico, p. 141, and *cornutus*, Guatemala, p. 142, *id.* l. c. *A. vetustus*, S. Brazil, Ecuador, *longitarsis*, Ecuador, *satanas*, p. 58, *thammi*, Chanchamayo, Peru, *zonatus*, New Granada, *subtessellatus*, p. 59, *lætificus*, Ecuador, *luctuosus*, Rio Janeiro, *pupillatus*, Venezuela, New Granada, *abstersus*, New Granada. p. 60, *leucodryas*, Ecuador, *flexistigma*, Pará, *carinicollis*, Brazil, and *croco-stigma*, Ecuador, p. 61, *id.* Ent. M. M. xvii. *A. peninsularis*, Horn, Tr. Am. Ent. Soc. viii. p. 116, Lower California.

Discopus eques, Chanchamayo, p. 253, *patricius*, *buckleyi*, *comes*, Ecuador, p. 254, and *princeps*, Pebas, p. 255, Bates, Ent. M. M. xvi.

Lagochirus longipennis, British Honduras, Guatemala, and *rogersi*, pl. xi. fig. 15, Costa Rica, *id.* Biol. Centr. Am. Col. v. pp. 145 & 146.

Alcidion pulchrum, New Granada, *lætulum*, Bahia, p. 273, *deletum*, Cayenne, *venosum*, Rio Janeiro, *humerosum* and *nebulosum*, Ecuador, p. 274, *id.* Ent. M. M. xvi.

Leptostylus metallicus, Costa Rica, *sulfurcatus*, pl. xi. fig. 8, Chontales, p. 147, *pulcherrimus*, *leucanthes*, Mexico, *spiculatus*, *viridescen*[*s*], Nicaragua, p. 148, *lazulinus*, Mexico, *decipiens*, *xanthopygus*, *notaticollis*, Chontales, p. 149, *lævicauda*, Guatemala, *obliquatus*, Mexico, p. 150, *orbiculus*, Mexico, Nicaragua, p. 151, *pilula*, Costa Rica, *corpulentus*, Chontales, and *trigonus*, Guatemala, p. 152, *id.* Biol. Centr. Am. Col. v. *L. nebulosus*, W. Nevada, and *terræcolor* [*terric-*], Florida, Horn, *l. c.* p. 122.

Liopus wilti, id. *l. c.* p. 124, Texas.

Exocentrus madecassus, Fairmaire, Ann. Soc. Ent. Fr. (5) x. p. 338, Nossi-Bé.

Nupserha globiceps, Harold, *l. c.* p. 267, E. Africa.

Phytœcia gougeleti, Fairmaire, *l. c.* p. 251, Morocco.

Oberea sansibarica and *pagana*, Harold, *l. c.* p. 267, E. Africa.

Lycidola flavo-fasciata, Cuenca, *felix*, p. 298, and *retifera*, Chiguinda, p. 299, C. O. Waterhouse, *l. c.* v.

Lycaneptia antiqua, id. *l. c.* p. 300, Brazil.

Themistonoe reticulata, Chiguinda, *humeralis*, Sarayacu, and *delectabilis*, Bogota, *id. l. c.* pp. 300–302.

Chrysomelidæ.

Chapuis, F. Phytophages Abyssiniens du Musée civique d'Histoire Naturelle de Gênes. Ann. Mus. Genov. xv. pp. 5–31.

Includes notes on the distribution of the known species, and descriptions of several new genera and species.

Jacoby, M. Biologia Centrali-Americana [*vide* General Subject, *sub* Godman & Salvin]. *Coleoptera*, vi. pt. 1. *Chrysomelidæ*, pp. 1–72, pls. i.–iii.

Extends to the genus *Pachybrachys*. The following known species are figured, or synonymy noticed, and many others are redescribed:—*Aulacoscelis melanocephalus*, Jac., fig. 1, *Lema bouchardi*, Baly, var. *problematica* (p. 3), fig. 10, *nicaraguensis*, Jac., fig. 11, *trilineata*, Oliv. (= *immaculicollis*,

Chevr., = *trivirgata*, Lec., = *trivittata*, Say, = *lecontii*, Clark), *suffriani*, Jac., fig. 14, *championi*, Jac., fig. 5, pl. i., *quinque-notata*, Clark, pl. ii. fig. 2, *sexnotata*, fig. 8, *antennalis*, Jac., fig. 6, *dorsalis*, Oliv. (= *nigricornis*, Fabr.), fig. 9, *subapicalis*, Baly, fig. 12, *Crioceris sallæi*, Baly, fig. 15, *scabrosa*, Baly, fig. 17, *Megascelis purpureicollis*, Jac., fig. 2, pl. i., *Mastostethus fraternus*, Baly, pl. ii. fig. 11, *salvini*, Jac., fig. 18, *sex-plagiatus*, Lac., fig. 24, *rubricollis*, Chevr., fig. 20, *phaleratus*, Klug (= *dohrni*, Baly), *novem-maculatus*, Klug, fig. 19, *placidus*, fig. 22, pl. i., *Megalopus sex-vittatus*, Bates, ? = *inscriptus*, Klug, *Titubœa sanguinipennis*, Lac., figs. 16 & 17 (redescribed, p. 27), *Gynandrophthalma agilis*, Lac., fig. 22, *aviculus*, fig. 18, *Megalostomis splendida*, Lac., fig. 15, *dimidiata*, Lac., fig. 14, *Euryscopa pilatii*, Lac., fig. 20, *Dachrys bipartita*, Jac., fig. 19, *Babia pudica*, *stabilis*, and *pulla*, Lac., may be identical, *Saxinis guatemalensis*, fig. 21, pl. ii., *Cryptocephalus porosus*, Suffr., fig. 4, *octodecim-punctatus*, Chevr., fig. 6, *quaternarius*, Suffr., fig. 15, *irroratus*, Suffr., fig. 9, *trizonatus*, Suffr. (= *tricinctus*, Suffr.), fig. 8, *14-pustulatus*, Suffr. (= *tesseratus*, Chevr.), fig. 7, *ocellatus*, Suffr. (= *subtilis*, Har.), *militaris*, Suffr. (= *purpureo-maculatus*, Suffr.), fig. 5, pl. iii., *basalis*, Suffr. (= *cruentatus*, Suffr., = *mucoreus*, Lec.), pl. iv. fig. 4, *auratus*, Fabr. (= *æreus*, Sturm, = *chalconotus*, Mannerh., = *viridis*, Mels.), *Scotochrus purpurascens*, Suffr., fig. 21, *albilabris*, Suffr. (= *suturalis* and *biverrucatus*, Suffr.), *montezuma*, Suffr. (= *speciosus*, Lec.), fig. 19, *cazicus*, Suffr., fig. 24, *errans*, Suffr., fig. 25, *decoratus*, Sturm. (= *larvatus*, Newm., = *spadiceus*, Suffr.), fig. 23, *personatus*, Suffr., figs. 20 & 22, pl. iii., *sulcipennis*, Suffr. (= *ablutaceus*, Jac.), *Pachybrachys hæmatodes*, Suffr., fig. 11, *varicolor*, Suffr. (= *occator*, Suffr.), *irregularis*, Suffr., fig. 12, *umbraculatus*, Suffr., fig. 14, *gregarius*, Suffr., fig. 13, *hepaticus*, Mels. (= *punctatus*, Hald.).

Osborne, J. A. On the Eggs and Larvæ of some *Chrysomelæ* and other (allied) species of *Phytophaga*. Ent. M. M. xvii. pp. 150–154.

The larvæ of *Lina populi* and *Gastrophysa raphani* have been supposed to emit drops of strongly-scented fluid when disturbed, which are subsequently withdrawn; but these are more probably fleshy tubercles, presenting this appearance when extended.

Sagrides.

Rhagiosoma madagascariense, Chap., ♀ described; Preudhomme de Borre, CR. Ent. Belg. xxiii. pp. clii. & cliii. fig.

Crioceris asparagi noticed and figured; Fuller, Am. Ent. iii. pp. 3–5, fig. 1.

Criocerides.

Lema raffrayi, Chapuis, Ann. Mus. Genov. xv. p. 5, Abyssinia. *L. viridana*, *semicyanea*, pl. liv. fig. 1, p. 588, and *flavicornis*, p. 589, Jacoby, P. Z. S. 1880, Ecuador. *L. elegantula*, fig. 4, British Honduras, p. 3, *transverso-fasciata*, fig. 11, Costa Rica, p. 4, *bi-ornata*, Guatemala, p. 5, *nigro-maculata*, fig. 7, pl. i., *godmani*, fig. 4, Chontales, p. 9, *minuta*, fig. 3, *scutaria*, fig. 6, p. 10, *discoidalis*, Guatemala. *hægii*, fig. 5, Mexico, p. 11, *bipustulata*, fig. 10, Costa Rica, p. 13, *mexicana*, fig. 7, Mexico, and *pus-*

tuligera, fig. 9, pl. ii. Guatemala, p. 14, *id.* Biol. Centr. Am. Col. vi. (1) : spp. nn.

Crioceris intermedia, id. *l. c.* p. 16, pl. i. fig. 16, Nicaragua, Costa Rica ; *C. inæqualis*, Fairmaire, Le Nat. ii. p. 316, & Ann. Soc. Ent. Fr. (5) x. p. 338, Madagascar : spp. nn.

Megalopides.

Mastostethus suavis, Bates, var. (p. 590), *Megalopus armatus*, Lac., var., *Colaspis lefevrii*, Baly, belongs to *Metaxyonycha* (p. 591), *Eumolpus prasenus*, Er., black var. (p. 594), *Doryphora fulgora*, var. (p. 596), *javeti* and *thomsoni*, Baly, = *nympha*, Stål, varr., = *pulchella*, Baly (p. 597), *selecta*, Er., var. (p. 599), *Diabrotica dimidiata* and *discoidalis*, Baly, noticed (pp. 602 & 603), *Monocesta splendida*, Clark, variation noticed (p. 608) ; Jacoby, P. Z. S. 1880.

Mastostethus championi, pl. ii. fig. 12, Guatemala, p. 21, *rogersi*, fig. 23, Costa Rica, *chontalensis*, fig. 21, pl. i. Chontales, p. 22, and *nigro-fasciatus*, pl. ii. fig. 25, Guatemala, p. 24; Jacoby, Biol. Centr. Am. Col. vi. (1). *M. chontalensis*, Chontales, *rogersi*, Cache, Costa Rica, p. 166, and *modestus*, Ecuador, p. 589, pl. liv. fig. 2, *id.* P. Z. S. 1880 : spp. nn.

Agathomerus simplicipennis, id. *l. c.* p. 590, Ecuador. *A. atripennis* and *affinis*, id. Biol. Centr. Am. Col. vi. (1), p. 25, Mexico : spp. nn.

Pœcilomorpha sobrina, sp. n., Harold, MB. Ak. Berl. 1880, p. 267, E. Africa.

Clithrides.

Coscinoptera dominicana noticed and figured; Am. Ent. iii. p. 127.

New species :—

Miochira impressa, Harold, MB. Ak. Berl. 1880, p. 268, E. Africa.

Melitonoma hildebrandti and *inconspicua*, id. *l. c.* pp. 267 & 268, E. Africa.

Gynandrophthalma ochropus, id. *l. c.* p. 268, E. Africa ; *G. lefevrii*, Chapuis, Ann. Mus. Genov. xv. p. 7, Abyssinia ; *G. bimaculata*, Jacoby, Biol. Centr. Am. Col. vi. (1) p. 28, Mexico.

Megalostomis tomentosa, Mexico, and *flavipennis*, pl. ii. fig. 13, Chontales, *id. l. c.* pp. 30 & 31.

Saxinis punctatissimus, id. *l. c.* p. 37, Mexico.

Cryptocephalides.

Monachus, *Cryptocephalus*, and *Pachybrachys*. Tables of North American species ; Leconte, Tr. Am. E. Soc. viii. pp. 195–209.

Diachus, g. n., Leconte, Tr. Am. Ent. Soc. viii. p. 196. Allied to *Cryptocephalus* ; to contain *C. chlorianus*, *squaleus*, *catarius*, and *pallidicornis*, Suffr., *auratus*, Fabr., *levis*, Hald., and *erasus*, California, and *æruginosus*, Colorado, spp. nn., *l. c.* p. 197.

Triachus, id. *l. c.* p. 197. Allied to *Cryptocephalus* ; to contain *C. atomus*, Suffr., and *cerinus*, Florida, *vacuus*, Illinois, Kansas, and *postremus*, Texas, spp. nn., *l. c.*

New species:—

Monachus guatemalensis, Mexico, Guatemala, fig. 1, p 38, *bimaculatus*, Guatemala, Nicaragua, fig. 2, pl. iii. p. 39, *semipunctatus*, Guatemala, and *sculptilis*, Mexico, p. 41, Jacoby, Biol. Centr. Am. Col. vi. (1).

Cryptocephalus sansibaricus and *hildebrandti*, Harold, MB. Ak. Berl. 1880, p. 268, E. Africa; *C. jucundus*, Madagascar, and *pragmaticus*, Zanzibar, Dohrn, S. E. Z. xli. p. 367; *C.* (*Bassareus*) *mammifer*, United States, p. 198, *C.* (*B.*) *croceipennis*, Florida, p. 199, *C. cribripennis*, Texas, *castaneus*, California, p. 200, *defectus*, Texas, p. 201, *carinatus*, Kansas, *pumilus*, Southern States, p. 202, *fulguratus*, *tinctus*, Texas, p. 203, and *striatulus*, Illinois, Virginia, p. 204, Leconte, Tr. Am. Ent. Soc. viii.; *C. semimarginatus*, fig. 3, Mexico, p. 43, *nigro-vittatus*, Guatemala, fig. 16, pl. iii., *quadrivittatus*, fig. 1, Mexico, Guatemala, p. 44, *atro-fasciatus*, Mexico, fig. 2, pl. iv. p. 48, *guatemalensis*, Mexico, fig. 10, p. 49, *stigmatipennis*, fig. 14, p. 50, *championi*, Guatemala, fig. 13, pl. iii. p. 51, *irazuensis*, Costa Rica, p. 52, *salvini*, pl. iv. fig. 3, *obscuripennis*, Guatemala, fig. 11, p. 54, *lævipennis*, Mexico, Guatemala, fig. 18, p. 55, *inconspicuus*, British Honduras, Guatemala, fig. 12, pl. iii., *zapotensis*, Mexico, Guatemala, pl. iv. fig. 5, p. 56, *subæneus*, p. 57, and *inornatus*, Guatemala, p. 58, Jacoby, *l. c.*

Scolochrus suffriani, Mexico, and *boucardi*, Panama, *id. l. c.* pp. 60 & 63, pl. iv. figs. 7 & 8.

Pachybrachys fenestratus, Mexico, p. 64, *rubro-notatus*, fig. 18, *rubro-ornatus*, fig. 19, p. 65, *punctatissimus*, Mexico, fig. 20, p. 68, *regularis*, fig. 15, p. 69, *uniformis*, Guatemala, p. 70, *bifasciatus*, fig. 17, p. 71, *laticollis*, fig. 16, Mexico, Guatemala, pl. iv., *championi*, Guatemala, p. 72, *id.* l. c.; *P. striatus*, Texas, Kansas, Colorado, *virgatus*, Kansas, Nebraska, p. 205, *dubiosus*, *cruentus*, Texas, p. 206, *lustrans*, California, *renidens*, Colorado, *subvittatus*, *turbidus*, *brevicollis*, Texas, p. 208, Leconte, *l. c.*

Alema puncticolle and *spatiosa*[*-sum*], Broun, Man. N. Z. Col. pp. 620 & 621, New Zealand.

Chlamydides.

Chlamys. General notes; Dohrn, S. E. Z. xli. pp. 296 & 297.

Lamprosomatides.

Lamprosoma ignicolle, *violaceum*, p. 167, *politum*, Honduras, and *guatemalense*, Zapote, Guatemala, p. 168, spp. nn., Jacoby, P. Z. S. 1880.

Eumolpides.

Paria aterrima and *Colaspis flavida*. Larvæ destructive to strawberry; Am. Ent. iii. pp. 242 & 243, fig. 121.

Metaxyoncha rufo-limbata, Jacoby, = *Colaspis cruentata*, Lef.; Jacoby, P. Z. S. 1880, p. 181.

New species:—

Colaspis buckleyi, fig. 5, p. 591, *fulvilabris*, *nigripennis*, fig. 4, and *fovicollis*, fig. 3, p. 592, Jacoby, P. Z. S. 1880, pl. liv., Ecuador; *C. puncticollis*, *jucundus*[*-da*], p. 623, *subæneus*[*-nea*], *sculptus*[*-ta*], *merus*[*-ra*], p. 624,

brevicollis, *atro-ceruleus*[*-cærulea*], *ochraceus*[*-ea*], p. 625, and *huttoni*, p. 626, Broun, Man. N. Z. Col., New Zealand.

Peniticus robustus, id. *l. c.* p. 628, New Zealand.

Apilon pretiosum, *punctatum*, p. 630, and *minutum*, p. 631, *id. l. c.*, New Zealand.

Chalcophana buckleyi, Ecuador, Peru, and *ignicollis*, Amazons, Ecuador, Jacoby, *l. c.* p. 593.

Nodostoma vulgaris[*-re*], Chapuis, Ann. Mus. Genov. xv. p. 9, Abyssinia.

Scelodonta vittata, id. *l. c.*, Bogos.

Pseudocolaspis viridis and *fusco-ænea*, id. *l. c.* pp. 9 & 10, Abyssinia.

Trichostola fuscitarsus, id. *l. c.* p. 10, Abyssinia.

Colasposoma perlata[*-tum*], Harold, Deutsche E. Z. xxiv. p. 220, S. Africa.

Euryope batesi, East Central Africa, and *minuta*, Cape of Good Hope, Jacoby, *l. c.* p. 169.

Pachnephorus testaceipes, Fairmaire, Le Nat. ii. p. 316, & Ann. Soc. Ent. Fr. (5) x. p. 338, Nossi-Bé.

Eurydemus oculatus, Chapuis, *l. c.* p. 10, Abyssinia.

Colaspoides cupreipennis and *elongatus*, Jacoby, *l. c.* pp. 594 & 595, Ecuador.

Chrysomelides.

Colaspidema (*Colaphus*) *sophiæ*, Fabr. Transformations described and figured; Ritsema, Tijdschr. Ent. xxiii. pp. 139–151 & 251, pl. ix.

Gastrophysa raphani. Habits and transformations; J. A. Osborne, Ent. M. M. xvii. pp. 49–57. Parthenogenesis; *id. l. c.* pp. 127–130, and Nature, xxii. pp. 509 & 510. This phenomenon occurs chiefly in the first-laid batches; it is peculiar to some females, and the tendency is increased by confinement and domestication; the insect is many-brooded, and the eggs are true ova.

Plagiodera scripta. Natural history; Am. Ent. iii. pp. 159–161, figs. 61–64.

Chrysomela menthastri, Suffr.: melanic example; G. Piolti, Bull. Ent. Ital. Resoconti, 1880, p. 11. *C. polita*: eggs described; Osborne, Sci. Goss. xvi. p. 223.

Doryphora 10-*lineata.* History, &c.; Am. Ent. iii. pp. 116–118, 169, 170, 190, 191, 294, 296 & 297, woodcuts, and Nat. Canad. xii. p. 126. Will eat *Solanum dulcamara*; fowls can be trained to eat the insect, though they refuse it at first: J. E. Bates, Rep. E. Soc. Ont. 1878, pp. 77 & 78. Also eaten by the Rose-breasted Grosbeak; Kunze, Am. Nat. xiv. pp. 521 & 522.

Timarcha lævigata. Tenacity of life; Brunetti, Ent. M. M. xvi. p. 235.

New species:—

Plagiodera quadrimaculata, Costa Rica, p. 171, and *sexmaculata*, Ecuador, pl. liv. fig. 12, p. 595, Jacoby, P. Z. S. 1880.

Chrysomela camerani, G. Piolti, Atti Acc. Tor. xv. p. 378, Rivoli (Piedmont); *C. sansibarica*, Harold, MB. Ak. Berl. 1880, p. 269, E. Africa.

Stilodes chapuisi, Chontales, and *steinheili*, pl. xviii. fig. 1, Colombia, Jacoby, *l. c.* pp. 169 & 170.

Prosicela simplicipennis and *bieruciata*, id. *l. c.* pp. 595 & 596, pl. liv. figs. 7 & 6, Ecuador.

Doryphora rudis, and *kraatzi*, Colombia, and *boliviana*, Bolivia, Harold, Deutsche E. Z. xxiv. p. 217; *D. funebris*, fig. 11, p. 597, *sex-guttata*, fig. 9, *marginicollis*, fig. 10, p. 598, *connexa*, fig. 8, p. 599, Jacoby, *l. c.* pl. liv., Ecuador.

Desmogramma marginella, id. *l. c.* p. 600, Ecuador.

Timarcha vermiculata, Portugal, *lævisterna*, Cuenca, *tenuicornis*, Valencia, and *oblongula*, Spain, p. 332, *convexifrons*, ibid., and *janthinipes*, p. 333, Portugal, Fairmaire, Le Nat. ii.

Cyrtonastes seriatoporus, id. Ann. Soc. Ent. Fr. (5) x. p. 243, Crete.

Cyrtonus martorelli, id. Bull. Soc. Ent. Fr. (5) x. p. xxvii., Estramadura.

Australica violacea, Jacoby, *l. c.* p. 171, pl. xviii. fig. 2, New Guinea.

Phytodecta kaufmanni, Miller, Verh. z.-b. Wien, xxx. p. 7, Dalmatia.

Halticides.

Haltica (*Epitrix*) *cucumeris*, Harr., injurious to tobacco; Am. Ent. iii. p. 123, fig. 47.

Graptodera chalybea, Ill.: natural history; Am. Ent. pp. 183 & 184, fig. 86. *G. carinata*, Germ.: habits noticed; *l. c.* p. 200.

Laetica ocreata, Say, and *specularis*, Har., noticed; Horn, Tr. Am. E. Soc. viii. p. 151.

New species:—

Amphimela geminata, Chapuis, Ann. Mus. Genov. xv. p. 13, Abyssinia.

Nisotra testacea, id. *ibid.*, E. Africa.

Balanomorpha æthiopica, id. *ibid.*, Bogos.

Crepidodera eorrusca, id. *l. c.* p. 14, Abyssinia.

Mantura cylindrica, Miller, Verh. z.-b. Wien, xxx. p. 2, Dalmatia.

Chlamophora colorata, p. 218, *opacicollis*, *selloi*, *costulata*, *sculpturata*, *strigulata*, p. 219, and *æneipennis*, p. 220, Harold, Deutsche E. Z. xxiv., Brazil.

Haltica convexicollis, id. *l. c.* p. 218, Brazil.

Disonycha dorsata, id. *l. c.* p. 220, Mexico.

Lactica africana, Chapuis, *l. c.* p. 16, Abyssinia.

Longitarsus fulviceps, id. *l. c.* p. 15, Abyssinia.

Phyllotreta tricolor and *collaris*, id. *l. c.* p. 15, Abyssinia; *P. rugulosa*, *nitida*, p. 636, *testacea*, *fuliginosa*, p. 637, and *cyaneum*[*-nea*], p. 638, Broun, Man. N. Z. Col., New Zealand.

Chætocnema pulla, Chapuis, *l. c.* p. 14, Abyssinia.

Blepharida antinorii, id. *l. c.* p. 12, Bogos.

Asphæra tomentosa, *basalis*, p. 601, *decem-maculata*, p. 602; Jacoby, P. Z. S. 1880, pl. lv. figs. 2–4, Ecuador.

Homophæta militaris, p. 172, *affinis*, Guatemala, and *bitæniatus*, pl. xviii. fig. 3, Cayenne, Bolivia, p. 173, *id. l. c.*

Œdionychis quinque-vittata, Honduras, *ornata*, Capetillo, Guatemala, p. 174, *crucigera*, fig. 4, *variegata*, fig. 5, Brazil, p. 175, *duodecim-maculata*, Capetillo, *obscuripennis*, fig. 6, p. 176, *quinque-maculata*, fig. 7, Chanchamayo, *binotata*, fig. 8, Amazons, *tredecim-maculata*, Mexico,

p. 177, *nigricollis*, fig. 10, locality unknown, *godmani*, Costa Rica, Chontales, p. 178, *salvini*, Zapote, Guatemala, Costa Rica, *steinheili*, fig. 9, Colombia, p. 179, *abbreviata*, Amazons, *marginicollis*, fig. 11, Rio Janeiro, *sex-plagiata*, fig. 12, Amazons, p. 180, and *laticollis*, Guatemala, Colombia, p. 181, *id. l. c.* pl. xviii.; *Œ. terminata*, Peru, *extrema*, Mexico, *kraatzi*, Brazil, p. 221, *virgata*, Mexico, *wagneri*, Costa Rica, and *nobilis*, Ecuador, p. 222, Harold, *l. c.*

Rhoicus maculicollis, Jacoby, *l. c.* p. 600, pl. lv. fig. 1, Ecuador.

Himatium conicum, Leconte, Tr. Am. Ent. Soc. viii. p. 218, Virginia.

Mniophila wroblewskii, Wankowicz, Bull. Soc. Ent. Fr. (5) x. p. cxviii., Lithuania.

Sphæroderma dorcatomoides, Fairmaire, Le Nat. ii. p. 316, and Ann. Soc. Ent. Fr. (5) x. p. 339, Nossi-Bé.

Psylliodes æthiopica, Chapuis, *l. c.* p. 16, Abyssinia.

Galerucides.

Aulacophora æneipennis, Baly, and *Malacosoma viridipenne*, Charp., = *Asbecesta cyanipennis*, Har.; Harold, MB. Ak. Berl. 1880, p. 269.

Diabrotica longicornis, Say, noticed; Am. Ent. iii. p. 247. *D. vittata* noticed and figured; Rep. E. Soc. Ont. 1878, p. 30.

Agelastica halensis, ♂ noticed *in coitu* with *Chrysomela brunsvicensis*, ♀; De Rossi, Ent. Nachr. vi. p. 57.

Lyperus brunneus, Crotch, noticed; Am. Ent. iii. p. 232.

Galeruca xanthomelæna and parasites noticed; Riley, Am. Ent. iii. pp. 291 & 292.

Monolepta flaveola, Gerst., belongs to *Candezea*; Harold, MB. Ak. Berl. 1880, p. 269.

Ochralea nigripes, Oliv. (= *nigripennis*, Clark), redescribed; Harold, S. E. Z, xli. pp. 147 & 148.

New genera and species:—

Hyperacantha, Chapuis, Ann. Mus. Genov. xv. p. 18. Allied to *Diacantha*, but hooks of the tarsi appendiculate, and only the 4 hind tarsi mucronate. To contain *H. fenestrata*, *inæqualis*, p. 19, and *colorata*, p. 20, spp. nn., *l. c.*, Abyssinia.

Gastrida, id. *l. c.* p. 20. Allied to *Diabrotica*; antennæ moniliform, slender at the base, and slightly thickened towards the tip. Type, *G. abdominalis*, sp. n., *l. c.* p. 21, Abyssinia and Cape.

Candezea, id. *l. c.* p. 24 (nec *Candezia*, Deyr., *Elateridæ*). Allied to *Mesolepta*, shape less obtuse behind, and epipleura prolonged to the hinder lateral angle. Type, *M. occipitalis*, Reiche (= *Lyperodes cisteloides*, Har.).

Paralepta, id. *l. c.* p. 25. Allied to *Mesolepta*; oblong-oval, less robust, and only the intermediate tibiæ spined. Types, *P. fossulata*, sp. n., *l. c.* p. 26, Abyssinia, and *Diacantha ornata*, Reiche.

Ergana, id. *l. c.* p. 27. An aberrant form, apparently belonging to the *Cerotomides*, but would agree better with the *Galerucites*, except for the presence of a spine at the extremities of all the tibiæ. Type, *E. proteus*, sp. n., *l. c.* p. 28, Bogos.

Adoxia, Broun, Man. N. Z. Col. p. 631. Allied to *Lyperus* and *Lype-*

rodes [script. *Sup-* in both cases]; to contain *A. vulgaris*, p. 632, *attenuata*, *thoracica*, p. 633, *nigripes*, *nigricans*, *nitidicollis*, p. 634, *æneum*[*-nca*], and *viridis*, p. 635, spp. nn., *l. c.*, New Zealand.

Aulacophora formosa, Bogos, and *albicans*, Abyssinia, Chapuis, Ann. Mus. Genov. xv. pp. 16 & 17. *A. cavicollis*, Fairmaire, Le Nat. ii. p. 316, Ann. Soc. Ent. Fr. (5) x. p. 339, pl. xi. fig. 9, Madagascar.

Diacantha lacordairii, Chapuis, *l. c.* p. 17, Abyssinia.

Thoramus rugipennis, p. 281, *perblandus*, p. 282, and *foveolatus*, p. 283, Broun, Man. N. Z. Col., New Zealand.

Diabrotica translucida, *verrucosa*, fig. 6, p. 603, *flavo-notata*, fig. 7, *nigro-plagiata*, fig. 9, p. 604, *quadrimaculata*, fig. 5, *basalis*, fig. 8, p. 605, and *atriventris*, p. 606, Jacoby, P. Z. S. 1880, pl. lv., Ecuador.

Malacosoma unipunctata, Harold, MB. Ak. Berl. 1880, p. 269, E. Africa. *M. viridipennis* and *nigritula*, Chapuis, *l. c.* pp. 21 & 22, Abyssinia.

Ootheca cyaneo-vittata, Fairmaire, Le Nat. ii. p. 316, & Ann. Soc. Ent. Fr. (5) x. p. 340, Nossi-Bé.

Chthoneis apicalis, Jacoby, *l. c.* p. 608, Ecuador.

Lyperus quaternus, Fairmaire, Le Nat. ii. p. 317, & Ann. Soc. Ent. Fr. (5) x. p. 340, Nossi-Bé.

Galeruccila geniculata, Harold, *l. c.* p. 271, E. Africa.

Dircema rufipennis, Jacoby, P. Z. S. 1880, p. 607, pl. lv. fig. 12, Ecuador.

Cœlomera buckleyi, id. *l. c.* p. 606, pl. lv. fig. 11, Ecuador.

Merista variabilis, p. 142, *fallax*, *flaviventris*, p. 143, and *rufipennis*, p. 144, Harold, S. E. Z. xli., Darjiling.

Leptarthra ventralis, id. *l. c.* p. 145, East Indies.

Galerucida magica, N. India, p. 145, *singularis*, *indica*, Darjiling, p. 146, and *bombayana*, Bombay, p. 147, *id. l. c.*

Ccrotoma trifasciata, Jacoby, *l. c.* p. 606, pl. lv. fig. 10, Ecuador.

Monolepta postrema, *haroldi*, p. 22, *sordida*, *longiuscula*, *alternata*, and *puncticeps*, p. 23, Chapuis, *l. c.*, Abyssinia.

Ochralea straminea, *ceylonica*, Ceylon, and *pectoralis*, Sumatra, Harold, *l. c.* p. 149.

Xenartha orphana, Chapuis, *l. c.* p. 28, Bogos.

Hispides.

Leptispa abdominalis, Baly, noticed; Dohrn, S. E. Z. xli. p. 297.

Arescus histrio. Great variability; Pascoe, Tr. E. Soc. 1880, p. xxxv.

Odontota scutellaris, Oliv., noticed; Am. Ent. iii. p. 151.

Cœlœnomenodera lcroyi, sp. n., Fairmaire, Le Nat. ii. p. 316, Madagascar.

Hispa gestroi, sp. n., Chapuis, Ann. Mus. Genov. xv. p. 29, Abyssinia.

Cassidides.

Chelymorpha variabilis, Boh., var. from Entre Rios, described; Dohrn, S. E. Z. xli. p. 156.

Aspidomorpha madagascarica, Boh., var. from Ashanti described; Wagener, Deutsche E. Z. xxiv. p. 161.

Ischyrosonyx oblonga, Boh., var. described; Dohrn, S. E. Z. xli. p. 156.

Cassida hepatica, Boh., var. noticed; *id. l. c.* pp. 150 & 151. *C. chloris*

and *denticollis*, Suffr., distinctive characters; Letzner, JB. schles. Ges. lvii. pp. 354 & 355.

New species :—

Platyauchenia titubans, Dohrn, S. E. Z. xli. p. 153, Brazil (?).

Canistra formosa, Broun, Man. N. Z. Col. p. 639, New Zealand.

Chirida puberula and *setosa*, Chapuis, Ann. Mus. Genov. xv. p. 30, Abyssinia.

Chelymorpha omissa, Dohrn, *l. c.* p. 155, Guatemala.

Aspidomorpha simonis and *semiramosa*, Wagener, Deutsche E. Z. xxiv. p. 162, Ashanti.

Cassida artemisiæ, Brisout, Bull. & Ann. Soc. Ent. Fr. (5) x. pp. xxiv. & 234, Aranjuez. *C. involuta*, Fairmaire, Ann. Mus. Genov. xv. p. 419, Sicily and Tunis. *C. weinmanni*, Chapuis, *l. c.* p. 30, Abyssinia.

Laccoptera submetallica, id. *l. c.* p. 31, Bogos.

Coptocycla kraatzi, Wagener, *l. c.* p. 161, Ashanti. *C. andamanica*, Dohrn, *l. c.* p. 370, Andaman Islands.

Erotylidæ.

Erotylus incomparabilis, Perty, and *cassidoides*, Crotch, noticed ; Dohrn, S. E. Z. xli. pp. 291–293.

Daulis sanguinea, L. Transformations described ; Arribálzaga, Nat. Arg. i. pp. 289–292.

Tritomidea rubripes, sp. n., Reitter, Verh. Ver. Brünn, xviii. p. 183, New Zealand.

Cryptodacne ferrugata, id. ibid., *C. lenis*, Broun, Man. N. Z. Col. p. 641, New Zealand, spp. nn.

Ægithus sanguineus, sp. n., Dohrn, *l. c.* pp. 152 & 293, Ega.

Endomychidæ.

Trycherus erotyloides, Gerst., ♂ described; Reitter, Deutsche E. Z. xxiv. p. 164.

Xenomycetes, g. n., Horn, Tr. Am. Ent. Soc. viii. p. 141. Allied to *Heliobletus*, but with no grooves on the thorax except the transverse basal. Type, *X. morrisoni*, sp. n., *l. c.* pl. iii. fig. 4, W. Nevada.

Phymatophora californica, sp. n., *id. l. c.* p. 142, pl. iii. fig. 5, San Francisco and W. Nevada.

Coccinellidæ.

Gradl, H. Coccinelliden. Ent. Nachr. vi. pp. 253–256, 275–278.

The writer protests against the practice of naming varieties, and gives an abstract of the numerous named slight varieties of *Coccinella* 10-*punctata* and *Halyzia ocellata*, Linn.

Chilocorus bivulnerus, Muls., noticed and figured ; Am. Ent. iii. p. 204, fig. 109.

Hyperaspis, Chevr., North American species tabulated ; Leconte, Tr. Am. Ent. Soc. viii. pp. 186–189.

Scymnus minimus, Payk. Transformations described; Clément, Ann. Soc. Ent. Fr. (5) x. pp. 341–346, pl. xii.

Epilachna pavonia, Oliv., noticed; Dohrn, S. E. Z. xli. p. 150.

New species:—

Hippodamia impictipennis, Fairmaire, Ann. Soc. Ent. Fr. (5) x. p. 31, Oran.

Hyperaspis bolteri, Illinois, p. 186, *cruenta*, Texas, *discreta*, Massachusetts, *tædata*, Florida, *osculans*, California, p. 187, *gemina*, United States, *postica*, California, *punctata*, Texas, and *tristis*, Colorado, p. 188, Leconte, Tr. Am. Ent. Soc. viii.

Hyperaspidius coccidivora[*-rus*], Ashmead, Orange Insects, p. 10, Florida.

Scymnus eximius, *flavihirtus*, p. 646, *acceptus*, *consors*, *tristis*, p. 647, *pallidiceps*, *fugax*, *terrenus*, p. 648, *rarus*, *suffusus*, *minutulus*, and *picinus*, p. 649, Broun, Man. N. Z. Col., New Zealand.

Epilachna nevilli, Dohrn, S. E. Z. xli. p. 369, Andaman Islands.

HYMENOPTERA.

BY

W. F. Kirby, M.E.S., &c.

The General Subject.

Adolph, G. [See Formicidæ and Insecta (General Subject).]

André, E. Species des Hymenoptères d'Europe et d'Algerie. Tom. 1ière fasc. iv.–vii. pp. cxlix.–cxcvi., 49–300, 9*–36*, pls. x.–xiv., xvi.–xx.

Includes Latin, French, German, and English glossaries of technical terms; list of subscribers, descriptive text of *Tenthredinidæ* from *Schizocera* to *Blennocampa*, and list of species from *Lophyrus* to *Selandria*. A few new species are described.

Arribálzaga, F. L. Pompilites y Esfégites del Norte de Buenos Aires. Nat. Arg. i. [1878] pp. 321–329.

Blackburn, T., & Kirby, W. F. Notes on species of Aculeate *Hymenoptera* occurring in the Hawaiian Islands. Ent. M. M. xvii. pp. 85–89.

35 species noticed, 4 new.

Cameron, P. Notes on *Tenthredinidæ* and *Cynipidæ*. Ent. M. M. xvi. pp. 220–224, 247–250, 265–267, xvii. pp. 66 & 67.

Relates chiefly to the former group. The most important observations will be noticed in their places.

Canestrini, G. Über ein sonderbares Organ der *Hymenopteren*. Zool. Anz. iii. pp. 421 & 422.

This organ was first observed in the hive-bee, in which it consists of a forked spur rising from the inside of the front end of the anterior tibiæ. Corresponding to this is a deep cavity on the inside of the first joint of the tarsi, which is set with short upright thorn-like bristles. The use of this arrangement may be to clean the tongue of the bee; but a similar organ is found in all *Hymenoptera*, and as its form appears to be constant in the main groups, it may prove useful in classification. Sometimes there is one spur, sometimes two, which may be simple, forked, smooth, or set with bristles (*cf.* next paragraph).

—— & Berlese, A. La Stregghia degli Imenotteri. Atti Soc. Pad. vii. pp. 53–73, pl. vii.

The structure of the comb of various *Hymenoptera* is discussed under the following heads :— (1) *Hymenoptera* without groove (*Tenthredinidæ* and *Siricidæ*) ; (2) *Hymenoptera* with groove, provided with a spine without membrane (*Cynipidæ*, *Bracon*, *Chrysididæ*, *Formicidæ*, and *Scolia*) ; (3) *Hymenoptera* with groove, and a membrane in addition to the spine ; this group is subdivided as follows—(1) with a simple spine and simple membrane (*Ichneumon*, *Ophion*, *Microgaster*, *Chalcis*, *Mutilla*, *Osmia*, *Crabro*, *Andrena*, &c.) ; (2) spine bifid, with an inner branch, and simple membrane (*Crocisa*, *Anthidium*, *Xylocopa*, &c.) ; (3) spine simple or bifid, and membrane ciliated (*Sphex*, *Pompilus*, *Eumenes*, *Odynerus*, *Vespa*, &c.) ; (4) spine bifid, with an outer branch, and simple membrane (*Bombus*, *Apis*).

Cresson, E. T. Descriptions of new North American *Hymenoptera* in the Collection of the American Entomological Society. Tr. Am. Ent. Soc. viii. pp. 1–52.

Contains *Tenthredinidæ* and *Uroceridæ*. Descriptions of all the species added since Norton's monograph in Tr. Am. Ent. Soc. i. & ii. are appended to the paper.

——. Catalogue of the *Tenthredinidæ* and *Uroceridæ* of North America. *L. c.* pp. 53–68.

Parfitt, E. The Fauna of Devon. *Hymenoptera*. Section *Aculeata*. Tr. Devon. Ass. xii. pp. 500–559.

Includes remarks both of general and local interest, and a description of a new *Sphecodes*. A list of a few species taken on Lundy Island is added.

Provancher,—. Faune Canadienne : Les Insectes Hyménoptères. Nat. Canad. xii. pp. 4–22, 33–48, 65–81, 97–102, 130–147, 161–180, woodcuts.

Includes *Ichneumonidæ* (*Exochus* to *Odontomerus*) and *Braconidæ*

(*Bracon* to *Microdus*). The figures represent the neuration of the genera of *Braconidæ*.

SAUNDERS, E. Synopsis of the British *Heterogyna* and Fossorial *Hymenoptera*. Tr. E. Soc. 1880, pp. 201–304, pls. vii. & viii.

30 species of the first group and 121 of the second are described. *Mutilla*, *Myrmosa*, and *Methoca* are omitted, being regarded as *Fossores*. Many species introduced by Smith are omitted as doubtfully British. The plates represent the neuration of the various genera.

SIEBKE, H., & SCHNEIDER, G. S. Enumeratio insectorum Norvegicorum. Fasc. v. pars i. (*Hymenoptera Phytophaga* et *Aculeata*). Christiania: 1880, 8vo, pp. 95.

204 *Phytophaga* and 266 *Aculeata* enumerated.

VOLLENHOVEN, S. C. SNELLEN VAN. Pinacographia. [Zool. Rec. xi. p. 444, xii. p. 384, xiv. *Ins.* p. 86, xv. *Ins.* p. 124, xvi. *Ins.* p. 95.] Pt. 9, pp. 65–68, pls. xli.–xlv.

The concluding part of this work, edited by G. A. Six, includes the title-page and index. The five last plates represent *Ichneumonidæ*, *Braconidæ*, and *Proctotrypidæ*, but the text consists only of general remarks on the genera. The death of the author having left the work unfinished, the number of species figured in the whole work is as follows:—*Ichneumonidea* 242, *Braconidea* 51, *Chalcidea* 9, *Pteromalidea* 15, and *Proctotrypidea* 53, in all 370.

The wings of *Hymenoptera* are folded in the pupa, and when the perfect insect is developed, the folds disappear, but their position can be determined by the thinness of the chitinous covering, and the scantiness of the hairy covering along the lines. Breitenbach, Zool. Anz. iii. pp. 522 & 523.

Notice of several *Hymenoptera* new to Britain; P. Cameron, P. Glasg. Soc. iv. p. 108.

Captures in Yorkshire; Roebuck & Bairstow, Tr. Yorksh. Union, iii. Ser. D, pp. 65–70. At Norwich and Guildford (including notices of species new to Britain); Bridgman & Capron, Ent. xiii. pp. 51–55, 87–89.

Captures of *Hymenoptera* in Thuringia; Schmiedeknecht, Ent. Nachr. vi. pp. 173 & 174.

Gribodo enumerates a few *Hymenoptera* from Tunis; Ann. Mus. Genov. xv. pp. 399–404.

List of parasitic *Hymenoptera* and their Lepidopterous hosts; Fitch, Ent. xiii. pp. 67–69.

On the preservation of parasitic *Hymenoptera*; Capron, S. E. Z. xli. pp. 33–35.

APIDÆ.

MORAWITZ, F. Ein Beitrag zur Bienen-Fauna Mittel-Asiens. Bull. Pétersb. xxvi. pp. 333–389.

172 species mentioned, many new.

Ritsema, C. Eerste Supplement af de Naamlijst der Nederlandsche *Hymenoptera Anthophila*. Tijdschr. Ent. xxiii. pp. xxiv.–xxix.

Ritsema (Tijdschr. Ent. xxiii. pp. xcvi.–xcviii.) notices Smith's "Descriptions of New Species of *Hymenoptera*," and renames several species whose names are preoccupied in their respective genera, as follows:—*Sphecodes rufiventris*, Smith (*nec* Wesm.), renamed *hagensi*; *Halictus vagans*, Sm. (from Mexico, nec *vagans*, Sm., from Borneo), renamed *H. errans*; *H. politus*, Sm. (*nec* Schenck), renamed *H. schencki*; *Megachile tuberculata*, Sm. (from Sierra Leone, nec *tuberculata*, Sm., from Borneo), renamed *M. bituberculata* (p. xcvii.); *M. ventralis*, Sm. (from Ega, nec *ventralis*, Sm., from Amboina), renamed *M. dupla*; *Anthophora insularis*, Sm. (from Vancouver's Island, nec *insularis*, Sm., from Borneo), renamed *A. solitaria*. *Megachile anthidioides* of Smith and Radoszkovsky are identical; *Cacosoma*, Sm., is preoccupied in *Lepidoptera*, but = *Rhopalictus*, Sich. (p. xcviii.).

Apis and *Bombus* pierce the corolla of flowers to get at the honey, but the *Andrenidæ* do not, and although the tongue of bees is really a sucking-tube in the *Apidæ*, it is not so in the *Andrenidæ*: Chambers, J. Cincinn. Soc. i. pp. 40–52, 161 & 162, fig. [*cf.* Zool. Rec. xv. *Ins.* p. 122].

Remarks on the nests of bees; Dalla Torre, Ent. Nachr. vi. p. 143.

Andrenides.

Schmiedeknecht, O. Ueber einige seltene, zum Theil neue, Arten der Bienengattung *Andrena* aus Thüringen. Ent. Nachr. vi. pp. 1–5, 9–15, 21–27, 51–55.

Includes a sketch of the German species belonging to the group with red marks on the abdomen. *A. nasuta*, Gir., is redescribed (p. 21). *A. squamigera*, Schenck, and allies discussed (pp. 52–54).

Prosopis rubicola from Epirus infested with *Hylechthrus*; S. S. Saunders, P. E. Soc. 1880, pp. xxv.–xxvii.

Sphecodes scabricollis and *perversus* noticed; Ritsema, Tijdschr. Ent. xxiii. p. xvi.

Halictus fertilizing tulip; Patton, Am. Ent. iii. p. 145. *H. cylindricus* and *sexcinctus*, habits and parthenogenesis; *Myiodites subdipterus* is parasitic on *H. sexcinctus*; Fabre, Ann. Sci. Nat. (6) ix. No. 4, pp. 27.

Andrena lucens, Imh., recorded as new to Britain, and redescribed; E. Saunders, Ent. M. M. xvii. p. 99. *A. mordax*, Morawitz, redescribed by him; Bull. Pétersb. xxvi. p. 362. *Andrena* sp. from Tunis noticed; Gribodo, Ann. Mus. Genov. xv. p. 400.

Dufourea minuta, St. Farg., recorded as a genus and species new to Britain; S. S. Saunders, Ent. M. M. xvi. p. 181.

Macropis labiata, Fabr. & Schenck, discussed; Patton, Ent. M. M. xvii. pp. 34 & 35.

New species:—

Prosopis flavifrons, Kirby, Ent. M. M. xvii. p. 85, Kauai.

Sphecodes connexa, Parfitt, Tr. Devon Ass. xii. p. 533, Ide, Devonshire;

S. arvensis, Atlantic States, and *falcifer*, New England, Patton, Am. Ent. iii. p. 230.

Halictus mongolicus, N.W. Mongolia, and *nigriceps*, Ordoss, Morawitz, Bull. Pétersb. xxvi. pp. 365 & 366.

Nomia latipes, id. *l. c.* p. 368, Krasnowodsk.

Andrena pretiosa, pp. 1 & 52, and *fumipennis*, p. 13, Schmiedeknecht, Ent. Nachr. vi., Thuringia; *A. anthracina*, Kansu, China, p. 359, *mongolica*, p. 360, *genalis*, p. 363, and *scutellaris*, N.W. Mongolia, p. 364, Morawitz, *l. c.*

Dasypoda tibialis, id. *l. c.* p. 358, Mongolia.

Macropis ciliata, Patton, Ent. M. M. xvii. pp. 31 & 33, Connecticut.

Apides.

Cook, A. J. The Tongue of the Honey-Bee. American Bee Journal, and Am. Nat. xiv. pp. 271–280, woodcuts.

A detailed account of its structure and functions.

Dalla-Torre, K. W. v. Unsere Hummel-Arten. Naturhistoriker, ii. [Not seen by the Recorder.]

Frey-Gessner, E. Berichtigungen zu Osmien-Jagd. MT. schw. ent. Ges. v. pp. 587–589.

Corrections of synonymy, &c., in a former paper.

Layons, G. T. Remarques sur la Ventilation des Abeilles, à l'entrée des Ruches. Bull. Soc. d'Acclim. (3) vii. pp. 290–298.

——. Remarques sur l'eau recueillie par les Abeilles. *Ibid.* pp. 298–304.

The author's results are illustrated by several tables, but the papers do not admit of abridgment.

MacLeod, J. Contribution à l'étude du rôle des insectes dans la pollinisation des fleurs hétérostyles (*Primula elatior*). Bull. Ac. Belg. (2) l. pp. 27–35.

Two species of *Bombus* fertilize this plant—one by thrusting its head into the flower; and the other (*B. muscorum*) by creeping on the flower, and piercing the nectary laterally with its mandibles.

Tomaschek, A. Ein Schwarm der amerikanischen Bienenart, *Trigona lineata*, Lep., lebend in Europa. Zool. Anz. iii. pp. 60–65.

The habits of swarms of this and other species of *Trigona* and *Melipona* are detailed; but these experiments have not yet proved satisfactory, owing to the difficulty of preserving them through the winter [*cf.* Zool. Rec. xvi. *Ins.* p. 100].

Morawitz redescribes his *Melecta corpulenta*, *Megachile desertorum*, and *Osmia indigotea*; Bull. Pétersb. xxvi. pp. 371, 377 & 381.

Megachile willughbiella. Habits described; King, Sci. Goss. xvi. pp. 272–274, woodcuts.

Eucera bicincta, Lep., noticed; Gribodo, Ann. Mus. Genov. xv. p. 399.

Melissodes nigripes, ♂, Smith, = his *desponsa*, ♂; and his *nigripes*, ♀, = his *M.* (*Synhalmia*) *atriventris*, ♀; *M. desponsa* var., Sm., probably = *bimaculata*, Lep.: Patton, Am. Nat. iii. p. 156.

Notes on Humble Bees of Quebec (*Bombus* 10 spp., *Apathus* 2 spp.); Bowles, Rep. E. Soc. Ont. 1879, pp. 31–33.

Wren's nest appropriated by Bombi (?); Candler, Sci. Goss. xvi. p. 142.

Apis mellifica will kill and eat moths captured by flowers; it also attacks drones with its mandibles; this or some other honey-bee also sucks the juices from raw meat in Brazil: Packard & others, Am. Nat. xiv. pp. 48–50 & 363. Torpor produced by sudden change of temperature; Swinton, Ent. M. M. xvi. p. 278. Destructive to fruit; Am. Ent. iii. pp. 55, 176 & 177. On American and Italian Bees, p. 195. Bees attracted by artificial flowers, *l. c.* p. 74, and Sci. Goss. xvi. p. 17. Sting described; Briant, Sci. Goss. xvi. pp. 31–34, woodcuts. On the formation of the combs; Wighton, *op. cit.* p. 127. Queen attacked by parasites (*Braula cœca*); Horsnaill, *op. cit.* p. 277. Carnivorous Bees, *l. c.* p. 65. Experiments on Bees by Erlenmayer and Planta-Reichenau appear to indicate that their food should not be highly nitrogenous, and that bees'-wax is formed of non-nitrogenous substances, especially sugar; Bien. Centr. 1880, pp. 191–193; J. Chem. Soc. (Abstr.) xxxviii. pp. 725 & 726; J. R. Micr. Soc. iii. pp. 937 & 938.

New species :—

Panurgus cavannæ, Gribodo, Bull. Ent. Ital., Resoconti, 1880, p. 8, Calabria.

Panurginus nigripes, Morawitz, Bull. Pétersb. xxvi. p. 357, Kansu, China.

Epimethea nana, id. *l. c.*, Ordoss, China.

Systropha rufiventris, id. *l. c.* p. 356, Krasnowodsk.

Osmia mongolica, S.E. Mongolia, p. 382, *maculata*, Kulja, p. 383, *excisa*, Ordoss, *denudata*, N.W. Mongolia, p. 385, and *brevicornis*, Krasnowodsk, p. 386, *id. l. c.*

Megachile nasica and *dohrandti*, Amu Daria, p. 378, and *genalis*, Thian-Shan, p. 380, *id. l. c.*

Anthidium caspicum, id. *l. c.* p. 375, Krasnowodsk.

Nomada thoracica, id. *l. c.* p. 369, S.E. Mongolia.

Cœlioxys mielbergi, id. *l. c.* p. 373, Amu Daria.

Stelis aculeata, id. *l. c.* p. 374, N.W. Mongolia.

Tetralonia turcomannica, id. *l. c.* p. 354, Krasnowodsk.

Camptopœum rufiventre, id. *l. c.* p. 355, Turkistan.

Anthophora simplicipes, p. 344, *acutilabris*, Thian-Shan, p. 346, *asiatica*, Krasnowodsk, p. 347, *prshewalskii*, Thian-Shan, p. 348, *christofi*, Krasnowodsk, p. 349, *pilosa*, Thian-Shan, p. 351, and *erubescens*, Krasnowodsk, p. 353, *id. l. c.*

Xylocopa tuberculiceps, Cape of Good Hope, *assimilis*, Sumbawa, and *incompleta*, Java, Sumatra, Ritsema, Notes Leyd. Mus. ii. pp. 220–222.

Bombus regeli, Kulja, p. 337, *lugubris*, p. 339, *prshewalskii*, p. 342, and *rufo-cinctus*, China (Kansu, &c.), p. 343, Morawitz, *l. c.*

Vespidæ.

Eumenes fraternus, Say, noticed and figured; Am. Ent. iii. p. 180, fig. 82.

Polistes (?) attacking and destroying spiders; Green, Am. Ent. iii. p. 176. Ditto in S. Africa; Sci. Goss. xvi. pp. 224 & 280. *P. fuscus* mimicked by *Trochilium polistiforme*; Packard, Am. Nat. xiv. p. 600.

Odynerus. Habits and parasites noticed; Riley, Am. Ent. iii. p. 154, figs. 59 & 60. *O. parietinum* and *parietum* are perfectly distinct; Fitch, Ent. xiii. pp. 19 & 20, woodcuts.

Vespa. Extraordinary abundance of wasps in Kirkcudbright in 1880; Service, Ent. xiii. pp. 223 & 224. On their intelligence; Newall, Nature, xxi. p. 494.

Odynerus extraneus and *blackburni* (= *rubritinctus*, ♂, Smith), spp. nn., Kirby, Ent. M. M. xvii. pp. 86 & 87, Kauai.

Crabronidæ.

Kohl, F. F. Die Raubwespen Tirol's nach ihrer horizontalen und verticalen Verbreitung, mit einem Anhange biologischer und kritischer Notizen. Z. Ferd. (3) xxiv. pp. 97–242.

Includes lengthy notices of the varieties of most of the known species, and descriptions of several new ones.

Larrada semirufa, *Sphex ichneumonea*, *Chlorion cæruleum*, *Larra tarsata*, and also ants, said to be destructive to locusts in America; 1st Rep. Ent. Comm. on Rocky Mountain Locust, pp. 317–319 & 334, figs. 55–58; 2nd Rep. pp. 270 & 271.

Pompilides.

Pompilus minutulus, Dahlb. (= *neglectus*, Dahlb. (?) = *cellularis*, Thoms.), *P. wesmaeli*, Thoms. (woodcuts), *Prionocnemis parvulus*, Dahlb. (woodcut), and *P. pusillus*, Schiödte, recorded as new to Britain, and redescribed; E. Saunders, Ent. M. M. xvii. pp. 97–99. *P. pectinipes*, auct., discussed, and ♀ described; Kohl, Z. Ferd. (3) xxiv. pp. 239–241. *P. elegans*, Smith, *nec* Cress., renamed *P. smithi*; Ritsema, Tijdschr. Ent. xxiii. p. xcviii.

Prionocnemis brasiliensis, Tasch., ? = *Pompilus tuberculatus*, Guér.; *P. hirticeps*, Spin., is also noticed; Taschenberg, Z. ges. Nat. (3) v. pp. 769 & 770.

Ceropales tricolor, sp. n., Arribálzaga, Nat. Arg. i. [1878], p. 322, Buenos Aires.

Pompilus lateritius, p. 772, *tomentosus*, p. 773, *seminiger*, Abyssinia, and *anthracinus*, Peru, p. 774, Taschenberg, *l. c.*, spp. nn.

Agenia militaris, sp. n., Arribálzaga, *l. c.* p. 324, Buenos Aires.

Prionocnemis tricolor, Peru, *violascens*, W. Africa, and *bicolor*, Peru, Taschenberg, *l. c.* pp. 770–772; *P. pampeanus*, Arribálzaga, *l. c.* p. 324, Buenos Aires: spp. nn.

Ferreola chalybea, sp. n., Taschenberg, *l. c.* p. 775, W. Africa.

Sphegides.

Ammophila mocsarii, Friv. (= *rhætica*, Kohl), ♂ described; Kohl, Z. Ferd. (3) xxiv. p. 237.

Crabro spinosus, Fabr., = *Sphex spinosa*, Forst.; Dalla Torre, Ent. Nachr. vi. p. 143.

Enodia fervens, L. (destructive to *Acrydium paranense*, Burm.), redescribed; Conil, Period. Zool. Argent. ii. pp. 241–246, pl. iv. figs. 35 & 36, pl. v.

Chlorion fulvipes, sp. n., Taschenberg, Z. ges. Nat. (3) v. p. 776, W. Africa.

Ammophila koppenfelsi, sp. n., *id. l. c.* p. 777, W. Africa.

Priononyx isseli, sp. n., Gribodo, Ann. Mus. Genov. xv. p. 401, Galita.

Chalybion curvatum, sp. n., Ritsema, Notes Leyd. Mus. ii. p. 226, Japan.

Larrides.

Larrada aterrima, Smith ?, noticed from Tunis; Gribodo, Ann. Mus. Genov. xv. p. 402.

Astata stigma, Panz. (?), *Tachytes spoliata*, Gir. (= *rufipes*, Aich.), and *acrobatus*, Kohl, ♂ described; Kohl, Z. Ferd. (3) xxiv. pp. 231–235.

Tachytes psammobia, sp. n., Kohl, *l. c.* p. 235, Tyrol; *T. flavo-geniculatus*, Taschenberg, Z. ges. Nat. (3) v. p. 778, Abyssinia: spp. nn.

Astata dimidiata, sp. n., *id. l. c.* p. 779, Peru.

Nyssonides.

Stizus speciosus. Habits described; Fuller, Am. Ent. iii. pp. 167–169, fig. 71.

Hoplisus pleuro-punctatus, Costa, var. *tirolensis* and *eburneus*, Chevr., described; Kohl, Z. Ferd. (3) xxiv. pp. 226–229.

Larra erythrocephala, sp. n., Tachenberg, Z. ges. Nat. (3) v. p. 780, Abyssinia.

Gorytes smithi, sp. n., Cresson, Tr. Am. Ent. Soc. viii. p. xviii., Illinois.

Hoplisus lævigatus, sp. n., Kohl, *l. c.* p. 229, Tyrol.

Crabronides.

Fabre, H. On an undefined faculty in Insects. Ent. M. M. xvii. pp. 100–102. (Translated.)

Relates to the power of *Cerceris tuberculata* to find its way back to its nest after having been removed to a distance.

Crabro elongatulus, V. der Lind. *C. luteipalpis*, *proximus*, *transversalis*, *hyalinus*, *obliquus*, and *propinquus*, Shuck., are all varieties of this species. A table of the allied British species is added: *C. aphidum* = *C. walkeri*, *C. palmarius* = *acutatus*, *C. albilabris* and *panzeri* belong to *Lindenius*, and *C. brevis* to *Entomognathus*; E. Saunders, Ent. M. M. xvii. pp. 3–7. *C. kollari*, Dahlb., var. *dallatorreanus*, from the Tyrol, described; Kohl, Z. Ferd. (3) xxiv. pp. 114 & 212.

Crossocerus tirolensis, Kohl, and *podagricus*, Herr.-Schäff., comparative description; *id. l. c.* pp. 213–215.

Lindenius pygmæus, Lep. (?), fully described; *id. l. c.* pp. 218-220.

Oxybelus meridionalis, Mocs., probably = *ambiguus*, Gerst.; a dark var. described; *id. l. c.* pp. 221-223.

New species :—

Trypoxylon scutigerum, Taschenberg, Z. ges. Nat. (3) v. p. 780, Abyssinia.

Oxybelus rufipes, id. *l. c.* p. 781, Abyssinia.

Crabro stygius, Kirby, Ent. M. M. xvii. p. 88, Oahu.

Crossocerus melanogaster and *heydeni*, Kohl, Z. Ferd. (3) xxiv. pp. 215 & 216, Tyrol.

Psen sumatranus, Ritsema, Notes Leyd. Mus. ii. p. 225, Sumatra.

Cerceris hortivaga, Kohl, *l. c.* p. 223, Tyrol.

Philanthus (*Trachypus*) *albo-pictus*, Taschenberg, *l. c.* p. 782, Abyssinia.

Scoliidæ and Mutillidæ.

Arribálzaga, F. L. Essayo sobre los Mutilidos del Partido del Baradero (Provincia de Buenos Aires). Nat. Arg. i. [1878], pp. 129–136, 172–185, 201–214, pl.

The known species are described and figured, in addition to one new genus, and several new species.

——. Sobre seis especies de *Mutilla* colleccionadas en Salta por E. L. Holmberg, durante su Viaje al Norte de la Republica Argentina. *L. c.* (1878) pp. 276–284.

41 species mentioned, 2 of which are described as new.

Saussure, H. de. Hyménoptères. Famille des Scoliides (Voyage au Turkestan de A. H. Fedtschenko). Bull. Sci. Nat. Mosc. xxvi. pp. 1–44, pls. ii.

A Russian work, with Latin diagnoses, like previous parts of the same publication. The *Scoliidæ* are divided as follows:—

A. Scolidæ non fossores: *Sapygii.*
B. Scolidæ fossores: (A) *Mutillii* (subfossores).
(B) *Scolidæ* (planefossores).
(*a*) *Scolii.*
(*b*) *Thynnii.*

The following known species are redescribed, and the fore-wings figured :—*Sapyga clavicornis*, L., and *exornata*, Gerst., *Myrmosa melanocephala*, Fabr., *Methoca ichneumonides*, L., *Tiphia femorata*, Fabr., and *minuta*, Van der Lind.; *Meria tripunctata*, Rossi, is also redescribed and figured, with varieties.

Fedtschenkia, g. n., *l. c.* p. 15. Allied to *Mutilla*; sexes nearly alike, winged; body shining; wings belonging to the second type, with 4 cubital cells. Type, *F. grossa*, sp. n., *l. c.* p. 15, pl. i. figs. 6 & 7, Turkistan.

Scraptopoda, Arribálzaga, Nat. Arg. i. (1878), p. 211. Allied to *Bradynobænus*; mandibles curved, obtuse; four hind tibiæ with a double row of short spines. Type, *S. pusilla*, sp. n., *l. c.* p. 212, Buenos Aires.

New species :—

Mutilla subnuda, fig. 6, p. 184, *viduata* (fig. 9, as *M. lugens*), p. 202, *pectinata*, fig. 10, p. 203, *parietina*, fig. 11, p. 204, *nobilitata*, fig. 13, p. 206,

occulta, fig. 15, p. 209, *leucotænia*, p 279, and *holmbergi*, p. 282, Arribálzaga, *l. c.* [1878], Buenos Aires.

Myrmosa radoszkowskii, Saussure, *l. c.* p. 12, pl. i. fig. 5, Turkistan.

Plesia fedtschenki, id. *l. c.* p. 19, pl. ii. fig. 12, Turkistan. (*P. tartara* on plate).

Discolia vollenhovenia, id. *l. c.* p. 22, pl. i. fig. 8, Samarcand.

Trielis fedtschenki, fig. 9, and *tartara*, figs. 10 & 11, *id. l. c.* p. 24, pl. i., Turkistan.

Meria tartara, *radialis*, and *timurella*, id. *l. c.* pp. 38–40, pl. ii. figs. 19–21, Turkistan.

Pseudomeria tamerlanella, id. *l. c.* p. 41, pl. ii. fig. 22, Turkistan (figured as *P. tartara*).

Sapyga rubripes, Texas, *proxima*, Colorado, *verticalis*, Nevada, *californica*, California, *nigripes*, *pumila*, Nevada, *emarginata*, *confluenta*, Colorado, *mœsta*, p. xx., *nevadica*, Nevada, *angustata*, California, *truncata*, *obscura*, *fulvicornis*, Nevada, *americana*, New York, *montana*, *elegans*, Nevada, and *coloradensis*, Colorado, p. xxi.; Cresson, Tr. Am. Ent. Soc. viii.

Scleroderma ephippium, S. S. Saunders, P. E. Soc. 1880, p. xxvii., Epirus, Corfu.

Formicidæ.

Adolph, E. Ueber das Flugel-geäder des *Lasius umbratus*, Nyl. Verh. Ver. Rheinl. xxxvii. pp. 35–53, pl. i.

Relates both to normal and abnormal neuration. (*Cf.* also *Insecta*: General Subject.)

Humphreys, J. T. An observation on the habits of the Black Ant (*Formica fusca*). N. Am. Ent. i. pp. 89–91.

On transferring an ant from one part of a marching column to another, it was invariably shunned by its companions.

Lubbock, [Sir] J. Observations on Ants, Bees, and Wasps. Part vii., Ants; with a Description of a new species of Honey Ant. J. L. S. xv. pp. 167–187, pl. viii. (*cf.* also Nature, xxii. pp. 184 & 185).

The following subjects are discussed, and the conclusions appended arrived at:—(1) Power of communication by something approaching to language: ants are at least able to summon others to their help. (2) Recognition of relations: this is not personal or individual, nor is it due to any sign or pass-word. (3) Workers breeding: their eggs only produce males. (4) Longevity: ants live at least five or six years. (5) Behaviour to strange queens: queens introduced into queenless nests are generally attacked and killed. (6) Sense of direction, and (7) hearing, and experiments with telephone: results inconclusive. (8) On the sting of *Formica*: the writer regards the ancestral ant as aculeate, and the sting of *Formica* as having become rudimentary, perhaps from disuse. (9) On the arrangement of nests. (10) On the treatment of *Aphides*: the ants carry the eggs indoors during the winter, and then place the young on the food-plant in spring.

McCook, H. C. The Shining Slavemaker. Notes on the Architecture and Habits of the American Slave-making Ant, *Polyergus lucidus*. P. Ac. Philad. 1880, pp. 376–384, pl. xix.

This paper does not admit of abridgment, but its general nature is sufficiently explained by the title.

Mayr, G. Die Ameisen Turkestan's, gesammelt von A. Fedtschenko. Tijdschr. Ent. xxiii. pp. 17–40.

The writer discusses the relations of this fauna to others, full lists being given of the ants of Siberia, Persia, and the Caucasian district. The ants of Turkistan are generally of pale colour, and frequently exhibit transitional forms between two species.

Captures of *Formicidæ* in Calabria ; Emery & Cavanna, Bull. Ent. Ital. xii. pp. 123–126.

List of *Formicidæ* captured at Tunis ; Emery, Ann. Mus. Genov. xv. pp. 389–398.

Indian ants produce a sound loud enough to be heard at a considerable distance, by scraping the apex of the abdomen on crisp leaves ; Peal, Nature, xxii. p. 583.

Harvesting and leaf-cutting ants in New Jersey ; Treat & Morris, Am. Ent. iii. pp. 225 & 226, 228 & 229, 264 & 265 ; the former are referable to *Phidole pennsylvanica* and *megacephala*.

On a new harvesting ant, with notes on its battles, &c. ; Morris, Am. Nat. xiv. pp. 669 & 670. (It is not clear whether *Pogonomyrmex crudelis*, Forel, or *Phidole pennsylvanica* is the species alluded to.)

Small ants fighting for the honey contained in the bodies of larger ones ; Miller, Am. Nat. xiv. p. 209.

Formica rufa kidnapping workers from another nest ; C. G. Bignell, Ent. M. M. xvi. pp. 267 & 268.

Mayr notices the following *Formicidæ* from Turkistan (Tijdschr. Ent. xxiii.) : *Camponotus sylvaticus*, Oliv., variation discussed, pp. 21–23. The following form a series of varieties of this species : *C. novæ-hollandiæ*, Mayr, *variegatus*, Sm. (= *pallens*, Nyl.), *maculatus*, Fabr., *cognatus* and *bacchus*, Sm., *sylvaticus*, Ol. (= *marginatus*, Latr.), and *æthiops*, Latr. The South American *C. bonariensis* and *simillimus*, Mayr, *sexguttatus*, Fabr., and *picipes*, Ol., may also belong to this species, as well as the fossil *C. mengii*, Mayr, which may be the original starting-point. *C. marginatus*, Latr. (= *fallax*, Nyl.), wide distribution noticed, p. 24 ; *Lasius*, sp., intermediate between *niger*, L., and *alienus*, Först., p. 26 ; *Formica cinerea*, Mayr, transitional forms, leading to *F. rufibarbis*, Fabr., and *subrufa*, Rog., p. 27 ; *Myrmica rubra*, L., Nylander's subspecies noticed, p. 34 ; *Tetramorium cæspitum*, variation, pp. 35 & 36 ; *Cardiocondyla elegans*, Emery, noticed, pp. 37 & 38 ; *Aphænogaster barbara*, Linn., and *structor*, Latr., transitional forms occur in Turkistan, but not in Europe, p. 33 ; *Phidole pusilla*, Heer, and *pallidula*, Nyl., are only doubtfully distinct, p. 38.

Myrmecocystus mexicanus, Wesm. Habits ; McCook, Am. Ent. iii. pp. 273 & 274.

Aphœnogaster barbara, Linn. Varieties from Tunis discussed; Emery, Ann. Mus. Genov. xv. pp. 392–397.

Dorylus helvolus, Linn. Supposed ♀ described and figured; Trimen, P. E. Soc. 1880, pp. xxiv. & xxv. fig.; also pp. xxxiii. & xxxiv.

New species :—

Camponotus inflatus, Lubbock, J. L. S. xv. p. 186, Adelaide (a new species of honey-ant); *C. fedtschenkoi* and *interjectus*, Mayr, Tijdschr. Ent. xxiii. pp. 23 & 24, Turkistan.

Formica aberrans, id. *l. c.* p. 27, Turkistan.

Cataglyphis pallida, id. *l. c.* p. 28, Turkistan.

Ischnomyrmex rhaphidiiceps, id. *l. c.* p. 31, Turkistan.

Monomorium barbatulum, id. *l. c.* p. 36, Turkistan.

Cremastogaster subdentata, id. *l. c.* p. 39, Turkistan.

Aphœnogaster (?) *schaufussi*, Forel, Ent. Nachr. vi. p. 465, Spain.

Chrysididæ.

Abeille de Perrin, E. Synopsis critique et synonymique des Chrysides de France. Ann. Soc. L. Lyon, xxxvi. pp. 1–107, pls. i. & ii. (details).

Not restricted to French species only. The introduction contains notes on habits, collecting, &c. Tables of genera and species are given, and several new species are described. The following known species are specially noticed:—*Homalus cæruleus*, Dahlb., and *spina*, Dahlb. (*nec* Lep.), renamed *viridiventris* and *superbus* respectively, p. 22; *Holopyga micans*, Dahlb. (*nec* Klug), renamed *cicatrix*, p. 28; *Chrysis cyanopyga*, var. *dominula*, from Toulon, noticed, p. 54; *C. analis*, Chevr. (*nec* Spin.), renamed *chevrieri*, p. 66; *C. cerastes* and *igniventris*, Ab., are sexes, p. 71; *C. ignita*, varr. *rutiliventris*, and *longula* noticed, p. 74, *unicolor*, Luc. (*nec* Dahlb.), renamed *lucasi*, p. 86; *C. bicolor*, Lep., var. *gribodoi*, noticed, p. 93.

Chrysis. Table of species belonging to Dahlbom's Phalanx i. (Chrysides ano integerrimo); Schmiedeknecht, Ent. Nachr. vi. pp. 195–197.

Hedychridium, g. n., Perrin, *l. c.* p. 35. Allied to *Hedychrum*; hooks of tarsi with a perpendicular hook near their middle, and ending in a single claw. To contain *H. anale*, *incrassatum*, *ahenum*, and *integrum*, Dahlb., *clavipes*, Ev., *roseum*, Rossi (and var. *femoratum*, Dahlb.), *nanum*, Chevr., *minutum*, Lep. (with var. *coriaceum*, Dahlb., and varr. nn. *homœopathicum*, *infans*, and *reticulatum*); add *H. gratiosum* and *sculpturatum*, spp. nn., *l. c.* pp. 37 & 39, France.

Homalus sculpticollis, France, and *appendiculus*, Ukraine, spp. nn., *id. l. c.* pp. 21 & 22.

Holopyga caudata, Bône, *deflexa*, Egypt, *miranda*, Corsica, Spain, and *bifrons*, Bône, spp. nn., *id. l. c.* pp. 28–31.

Hedychrum longicolle, sp. n., *id. l. c.* p. 34, France, Italy.

Chrysis sicula, Sicily, and *fenestrata*, France (? = *bidentata*, L., varr.), p. 51, *mulsanti*, S. France, p. 58, *mendax*, Lambessa, p. 59, *pustulosa*, S. France, p. 60, *sinuosiventris*, Dours (?), p. 62, *hydropica*, Marseilles, p. 65,

adulterina, Gavarnie, p. 69, *insoluta*, Madrid, p. 70, *uncifer*, Lorgnes, p. 72, *purpureifrons*, France, p. 78, *cæruleiventris*, Alps (?), p. 79, *angustifrons*, France, p. 81, *aureicollis*, Madrid, p. 82, *phryne*, p. 84, *fugax*, Lorgues, p. 86, *spinifer*, S. France, p. 88, *goliath*, Spain, p. 89, *varidens*, S. France, p. 91, *auro-tecta*, Corsica and Sardinia, p. 103, *id.* l. c. ; *C. blancoburgensis* and *thuringiaca*, Schmiedeknecht, Ent. Nachr. vi. pp. 174 & 193, Thuringia: spp. nn.

Ichneumonidæ.

Brischke, C. G. A. Die Ichneumoniden der Provinzen West- und Ostpreussen. I. Fortsetzung. iii. *Pimplariæ*. iv. *Ophionides*. Schr. Ges. Danz. iv. pp. 108–210.

The remarks on known species (many of which are redescribed) are too numerous to be abstracted. Tables of hosts are added as before.

Bridgman, J. B., & Fitch, E. A. Introductory Papers on *Ichneumonidæ*. Ent. xiii. pp. 25–33, 97–105, 179–183, 210–216, 297–334.

Contains a large amount of general information, and tables of genera and species up to the genus *Exophanes*, Wesm.

Kriechbaumer, —. Gezogene Schlupfwespen aus Dalmatien. Ent. Nachr. vi. pp. 73–75, 89–93.

Lists of species and hosts; a few new species are described, and remarks on known ones added.

List of *Ichneumonidæ* new to Holland; Snellen Van Vollenhoven, Tijdschr. Ent. xxiii. p. xv.

Undetermined Ichneumon larva preying on locust eggs; 1st Rep. Ent. Comm. on Rocky Mountain Locust, pp. 304 & 305, fig. 37.

Ichneumonides.

Holmgren, A. E. Adnotationes ad "Ichneumonologiam Suecicam." Ent. Tidskr. i. pp. 12–32, 76–87.

Notes on known species, and descriptions of new ones. The following known species are specially noticed:—*Ichneumon coqueberti* (= *similatorius*, Tischb.), *comitator*, *bucculentus*, Wesm., *terminatorius*, Grav., *melanotis*, Holmgr., *gradarius* and *refractorius*, Wesm., *septentrionalis* and *thomsoni*, Holmgr., *hæmatonotus* and *gravipes*, Wesm., *majusculus*, Tischb., *balteatus*, Wesm. (♂ = *zonellus*, Holmgr.), *zonalis*, *punctus*, and *nigritarius*, Grav., *infidus*, Wesm., and *dissimilis*, Gray (= *zephyrus* and *jocularis*, Wesm., = *punctifrons*, Holmgr.).

Ichneumon. Holmgren notices *I. nigritarius*, Grav., and redescribes *I. infidus*, Wesm., and *dissimilis*, Grav.; Ent. Tidskr. i. pp. 85–87. Kriechbaumer (CB. Ver. Regensb. xxxiv.) describes the male of his *Ichneumon 9-albatus* (pp. 51–53), the supposed male of *I. mordax* (pp. 83–86), and a blue species which may be *I. chalybeatus* or *patruelis*, Holmgr. (pp. 99–103). He also (Ent. Nachr. vi.) describes the males of *I. discriminator*, Wesm. (pp. 209–213), and *stramentarius*, Grav. (pp. 157–165), and remarks that *I. melanocerus*, Wesm., = *fabricii*, Schrank (pp. 121–124).

Amblyteles wesmaeli, Kriechb., = *Ichneumon 7-guttatus*, Grav., ♀; Kriechbaumer, Ent. Nachr. vi. pp. 89–93.

Herpestomus, sp. from Norwich described; Bridgman, Ent. xiii. p. 55.

Ichneumon urticarum, p. 23, *bistrigosus*, p. 25, *nothus*, *napæus*, p. 26, *silvanus*, p. 27, *clitellarius*, p. 31, *batis*, p. 82, and *inops*, p. 83, Holmgren, *l. c.*, Sweden, &c.; *I. freyi*, Simplon, *tri-albatus*, Alps, and *acosmus*, Jura, Kriechbaumer, MT. schw. ent. Ges. vii. pp. 12–14 : spp. nn.

Cryptides.

Vollenhoven (Pinacographia, pl. xli.) figures the following known species:—*Mesostenus ligator*, Grav., *gladiator*, Scop., *obnoxius*, Grav., *Cyrtocryptus brachycentrus*, Grav., *echthroides*, Ratz., *pygoleucus*, Grav., *nasutus*, Thoms., and *carnifex*, Grav.

Phygadeuon. Two undetermined species from Norwich described. Bridgman, Ent. xiii. pp. 53 & 54.

Cryptus titillator is probably parasitic on the larva of *Pompilus*; Brischke, Ent. Nachr. vi. p. 27.

Mesostenus obnoxius, Grav., and other parasites on *Zygænidæ* discussed; Bignell, Fitch & Bridgman, Ent. xiii. pp. 16–19.

Cecidonomus, g. n., Bridgman, Ent. xiii. p. 264. Intermediate between *Phygadeuon* and *Hemiteles*; to contain *C. westoni*, l. c. p. 264, and *gallicola* and *C.* (?) *rufus*, p. 265, Norwich, spp. nn.

Brachycyrtus, g. n., Kriechbaumer, CB. Ver. Regensb. xxxiv. p. 161. Allied to *Hemiteles*, but with long clavate antennæ. Type, *B. ornatus*, sp. n., *l. c.* p. 163, Munich.

Ophionides.

Vollenhoven (Pinacographia, pl. xliii.) figures the following known species:—*Anomalon biguttatum*, and *fibulator*, Grav., *perspicuum*, Wesm., *canaliculatum*, Ratz., *bellicosum*, Wesm., var. *melanobatum*, and *tenuicorne*, Grav., *Trichomma fulvidens*, Wesm., and *enecator*, Rossi.

Ophion macrurum, Cress., noticed and figured; Riley, Am. Ent. iii. p. 134, fig. 52.

Mesochorus olerum and *fulgurans* and *Casinaria vidua* parasitic on *Abraxas grossulariata*, Bignell, Ent. xiii. pp. 245 & 246.

Scolobates crassitarsus, Grav. (= *auriculatus*, Fabr.), and its varieties discussed; R. v. Stein, Ent. Nachr. vi. pp. 103–106.

New species:—

Anomalon thoracicum, *carinatum*, p. 136, and *flavitarsum*, p. 137, Brischke, Schr. Ges. Danz. (2) iv., Prussia. *A.* (*Habronyx*) *gigas*, Kriechbaumer, Ent. Nachr. vi. p. 75, Dalmatia.

Paniscus tarsatus, Brischke, *l. c.* p. 138, Prussia. *P. thoracicus*, Woldstedt, S. E. Z. xli. p. 174, Amu Daria.

Campoplex affinis, p. 140, *rufo-niger*, *petiolaris*, *brevicornis*, p. 141, *tibialis*, *bicolor*, *sericeus*, p. 142, *spinulosus* and *exsculptus*, p. 143, Brischke, *l. c.*, Prussia.

Cymodusa flavipes and *elachistæ*, id. *l. c.* pp. 144 & 145, Prussia.

Casinaria pallipes, id. *l. c.* p. 148, Prussia.

Thymaris pulchricornis, id. *l. c.* p. 145, Prussia.

Symplacis basalis, id. *l. c.* p. 146, Prussia.

Limneria excavata, p. 149, *nitida*, p. 150, *rugulosa*, *ovata*, *coxalis*, p. 151, *tarsata*, *varians*, p. 153, *clausa*, *procera*, p. 154, *ramidula*, *clypearis*, *gibba*, p. 155, *thoracica*, *elongata*, p. 156, *abbreviata*, *solitaria*, *depressa*, p. 157, *umbrata*, *albicans*, *contracta*, p. 158, *gibbula*, *cylindrica*, p. 159, *peregrina*, *rostralis*, p. 160, *prussica*, *carbonaria*, *longicornis*, p. 161, *clavicornis*, *occulta*, p. 162, *cognata*, p. 164, *laticeps*, p. 167, *agilis*, *signata*, p. 168, *valida*, *abnormis*, *aliena*, p. 169, *breviseta*, *erratica*, *cingulata*, p. 170, *clypeata*, *proterva*, p. 171, *ensifera*, p. 172, *stigmatica* and *transiens*, p. 173, and varr. *incompleta* and *pumila*, p. 174, *id. l. c.*, Prussia (Königsberg, &c.).

Canidia cingulata and *umbrata*, id. *l. c.* p. 176, Prussia.

Dimophora robusta, p. 176, *similis* and *cognata*, p. 177, *id. l. c.*, Prussia.

Atractodes ruficornis, id. *l. c.* p. 178, Prussia.

Exolytus productus, id. *l. c.* p. 179, Prussia.

Mesochorus stigmaticus, p. 183, *pallidus*, *brunneus*, p. 184, *rufo-niger*, *fuscicornis*, p. 185, *sulphuripes*, *petiolaris*, *pictus*, p. 186, *ocellatus*, *femoralis*, p. 187, *sericeus*, *gracilentus*, p. 188, *rufipes*, *ruficornis*, *clavatus*, p. 189, *gracilis*, *dispar*, *pallipes*, p. 190, *crassipes*, *albitarsis*, p. 191, *nigriceps* and *striatus*, p. 192, *id. l. c.*, Prussia.

Thersilochus tripartitus, *ensifer*, *stramincipes*, p. 194, *brevis*, *longulus*, *dilatatus*, p. 195, *sericeus* and *rufiventris*, p. 196, *id. l. c.*, Prussia.

Tryphonides.

Vollenhoven (Pinacographia, pl. xlii.) figures the following known species:—*Acrotomus lucidulus*, Grav., *orbitatorius*, Schiödte, *insidiator*, Holmgr., *Exenterus bohemani*, and *erosus*, Holmgr., *lituratorius*, L., *apiarius*, Grav., *marginatorius*, Fabr., and *oriolus*, Hart.

Perilissus fumatus, Bridgman, Ent. xiii. p. 54, Norwich; *P. vollenhoveni*, Grobodo, Bull. Ent. Ital. Resoconti, 1880, p. 8, Calabria: spp. nn.

Bassus (*Zootrephes*, Först.) *hilaris*, sp. n., Woldstedt, S. E. Z. xli. p. 175, N. Siberia.

Pimplides.

Rhyssa. Action of ovipositor described; Quay, Am. Ent. iii. p. 219. *R. superba*, Schrank, noticed; Brauns, Arch. Ver. Meckl. xxxii. p. 76.

New species:—

Acœnitus canadensis, Provancher, Nat. Canad. xii. p. 10, Canada.

Epirhyssa cuvieri, id. *l. c.* p. 17, Canada.

Ephialtes discolor, Brischke, Schr. Ges. Danz. (2) iv. p. 110, Prussia.

Pimpla æqualis and *4-cingulatus*, Provancher, *l. c.* pp. 36 & 38, Canada.

Clystopyga canadensis, id. *ibid.*, Canada.

Glypta rufipes, Brischke, *l. c.* p. 117, Prussia.

Lissonota rubricosa, *maculata*, p. 119, *rufipes*, *pleuralis*, p. 120, *basalis*, *nigra*, *scabra*, p. 123, and *assimilis*, p. 124, *id. l. c.*, Prussia.

Phytodietus rufipictus, id. *l. c.* p. 126, Prussia.

Polysphincta acuta, Provancher, *l. c.* p. 44, Canada.

Echthrus pediculatus, id. *l. c.* p. 99, Canada. *E. annulatus*, Brischke, *l. c.* p. 128, Prussia.

Odontomerus canadensis (= *propinquus*, ♂, Cress.), Provancher, *l. c.* p. 102, Canada.

Braconidæ.

Reinhard, H. Beiträge zur Kenntniss einiger Braconiden-Gattungen. 5tes Stück. xvi. Zur Gattung *Microgaster*, Latr. Deutsche E. Z. xxiv. pp. 353–370.

Includes dichotomous tables of *Microgaster*, *Microplitis*, and *Apanteles*. The following known species are redescribed, or specially noticed :— *Microgaster abdominalis*, Nees, ♀; *M. rugulosus*, Nees, and *opacus*, Ruthe, are sexes; *M. subincompletus*, Ratz., = *globatus*, L.; *M. nigricans*, Nees, and *messorius* and *meridianus*, Hal., = *tibialis*, Nees; *M. marginatus*, Nees, = *calceatus*, Hal.; *M. consularis*, Hal., and *dilutus*, Ratz., = *connexus*, Nees; *Microplitis ratzeburgi*, Ruthe, = *fumipennis*, Ratz.; *M. ingratus*, Hal., ? = *ocellatæ*, Bouché, *M. parvulus*, Ruthe, = *spectabilis*, Hal.; *M. tau*, Ratz., = *sordipes*, Nees; *M. gracilis*, Ruthe (*nec* Cast.), renamed *M. strenuus*; *Apanteles solitarius* (? = *lineola*, Hal.), ♀ described: *A. carbonarius*, Wesm., ♀ described; *A. ruficrus*, Hal., *ordinarius*, Ratz., *congestus*, Nees (= *globatus*, Bouché, *intricatus*, Hal., and *perspicuus*, Wesm.), *affinis*, Nees (= *vinulæ*, Bouché), and *rubripes*, Hal. (= *gastropachæ*, Bouché), fully redescribed.

Vollenhoven (Pinacographia, pl. xliv.) figures the following known species :—*Meteorus albitarsis*, *chrysophthalmus*, *ictericus*, and *abdominalis*, Nees, *versicolor* and *fragilis*, Wesm., and *scutellator*, Nees.

Sigalphus curculionis and *Porizon conotracheli* noticed and figured ; Gott, Rep. E. Soc. Ont. 1879, p. 86, figs. 56 & 57.

Sigalphus curculionis, Fitch, noticed & figured ; Am. Ent. iii. pp. 231 & 232, figs. 49 & 50.

Gamosecus, g. n., Provancher, Nat. Canad. xii. p. 167. Allied to *Microctonus*, Wesm., but the first cubital and discoidal cells are united. Types, *G. nigrita* and *mellinus* (fig. 15, wing), spp. nn., *l. c.* pp. 167 & 168, Canada.

New species :—

Bracon lævis (fig. 9, wing), *inquisitor*, p. 138, *striatus*, p. 140, *obliquus*, *ornatus*, *æqualis*, p. 141, *longicaudus*, *rufo-variegatus*, *lut*[*e*]*us*, p. 142, *nigro-pectus*, *apicatus*, *nanus*, p. 143, and *pygmæus*, p. 144, *id. l. c.*, Canada.

Exothecus prodoxi, Riley, Am. Ent. iii. p. 156, parasitic on *Prodoxus decipiens*, South Carolina.

Rhogas quebecensis (fig. 10, wing), and *sancti-hyacinthi*, Provancher, *l. c.* pp. 145 & 146, Canada.

Rhytidogaster bicolor, Cresson, Tr. Am. Ent. Soc. viii. p. xvii., Northern States.

Microgaster nobilis, Frankfort, p. 356, *minutus* and *tiro*, Dresden, p. 357, Reinhard, Deutsche E. Z. xxiv. *M. utilis*, French, Canad. Ent. xii. p. 42 [Illinois ?].

Microplitis eremita, Reinhard, *l. c.* p. 360 [Dresden ?].

Apanteles tetricus, p. 367, *villanus*, Dresden, p. 368, *acuminatus*, S. Germany, p. 370, *id. l. c.* (The following are also indicated as new in the table, but the full descriptions have not yet appeared) *A. vanessæ*, *lictorius*, *scabriculus*, *ultor*, *suevus*, p. 364, *nanus*, *vipio*, *longipalpis*, p. 365, *lineatus*, *corvinus*, *merula*, *fraternus*, *pallipes*, and *rubens*, p. 366.

Syngaster cingulatus, *bæticatus*, p. 162, *fartus* (fig. 11, wing), and *macilentus*, p. 163, Provancher, *l. c.*, Canada.

Spathicus laflammii, id. *l. c.* p. 164, fig. 12, wing, Canada.

Opius pallipes, id. *ibid.* (fig. 13, wing), Canada.

Aphidius (?) *citraphis*, Ashmead, Orange Insects, p. 70, Florida.

Rhopalophorus tauricornis, Provancher, *l. c.* p. 168 (fig. 16, wing), Canada.

Eubadizon submucronatus (fig. 18, wing) and *gracilis*, id. *l. c.* p. 171, Canada.

Macrocentrus mellipes (fig. 19, wing), p. 172, *longicornis* and *pectoralis*, p. 173, *id. l. c.*, Canada; *M. iridescens*, French, *l. c.* p. 43 [Illinois ?].

Phylax palliventris, p. 174, *rufipes* (fig. 20, wing) and *cinctus*, p. 175, Provancher, *l. c.*, Canada.

Agathis quæsitor (fig. 21, wing), p. 176, *perforator*, *femorator*, and *tibiator*, p. 177, *id. l. c.*, Canada.

Microdus quebecensis and *bicolor*, id. *l. c.* pp. 178 & 179, Canada.

Stephanus cinctipes, Cresson, *l. c.* p. xviii., Washington Territory.

Anisopelma lycti, *utilis*[*-le*], and *minima*[*-mum*], id. Am. Ent. iii. p. 24, United States.

Evaniidæ.

Aulacus editus, Nevada, California, *abdominalis*, Georgia, p. v., and *minor*, Nevada, p. vi., spp. nn., Cresson, P. Am. Ent. Soc. viii.

Chalcididæ.

Cameron, P. Notes on a new species of *Torymus* from Scotland, with notes on other British species of the genus, &c. Ent. M. M. xvii. pp. 40 & 41.

Includes directions for setting *Chalcididæ*.

Chalcis, sp. attacking Rocky Mountain locust; Lemmon, 2nd Rep. U.S. Comm. on Rocky Mountain Locust, p. 270.

Palmon pachymerus, Dalm. On the emergence of the larvæ from the egg-cases of *Mantis*; Girard, Bull. Soc. Ent. Fr. (5) x. pp. cxxxviii. & cxxxix.

Eupelmus (*Antigastra*) *mirabilis*, Walsh. Habits; Howard, Canad. Ent. xii. pp. 209 & 210.

Acerophagus, g. n., E. A. Smith, N. Am. Ent. i. p. 83. Affinities not stated. Head wider than thorax; antennæ 9-jointed, 2nd joint one-third as long as the remaining 8 taken together; joints 1, 3, 5–8 shortest, 9th large, forming a club; antennæ inserted widely apart; tarsi 5-jointed,

stigmal branch long, strong, and straight; ovipositor exserted. Type, *A. coccois*, sp. n., *l. c.* p. 84, parasitic on *Pseudococcus aceris*, in America.

Signiphora, g. n., Ashmead, Orange Insects, p. 30. Affinities not stated; type, *S. flavo-palliatus*, sp. n., *l. c.* p. 29, pl. ii. figs. 2, 3, 6, 8, 12 & 13, Florida.

Caloptenodia ovivora, g. & sp. nn., Riley, i. Rep. U.S. Ent. Comm. on Rocky Mountain Locust, p. 306, fig. 38 ; = *Scelio famelicus*, Say, *id. op. cit.* ii. p. 270.

Torymus campanulæ, sp. n., Cameron, Ent. M. M. xvii. p. 40, Clydesdale.

Eupelmus reduvii [Washington?] and *floridanus*, Florida, spp. nn., Howard, Canad. Ent. xii. pp. 207 & 209.

Eulophus comstocki, sp. n., *id. l. c.* p. 159, parasitic on cotton worm.

Stenomesius (?) *aphidicola*, sp. n., Ashmead, Orange Insects, p. 67, fig. 21, Florida.

Trichogramma flavus [*-vum*], sp. n., *id. l. c.* p. 33, pl. i. fig. 4, Florida.

Proctotrypidæ.

Vollenhoven (Pinacographia, pl. xlv.) figures the following known species :—*Iphitrachelus lar*, Hal., *Inostemma bosci*, Jur., *melicerta* and *lycon*, Walk., *Leptacis scutellaris*, Thoms., *Isocybus ruficornis*, Latr., *Epimeces subulatus*, Nees, and *phragmitis* [*-tæ*], Schrank.

Didictyum, g. n., Riley, Am. Ent. iii. p. 52. Allied to *Basalys* ; type, *D. zigzag*, sp. n., *l. c.* figs. 13 & 14, parasitic on *Phora aletiæ* in Alabama. The genus = *Hexaplasta*, Först. (*l. c.* p. 293 ; *cf.* also Riley, Cotton Worm, p. 44).

Proctotrypes meridionalis, sp. n., Gribodo, Bull. Ent. Ital., Resoconti, 1880, p. 8, Calabria.

Telenomus (*Phanurus*) *penthimiæ*, sp. n., Lichtenstein, Le Nat. ii. p. 206, parasitic on *Penthimia atra*, Gironde.

Cynipidæ.

Ormerod, E. A. Undescribed Oak-Galls. Ent. xii. pp. 193 & 194, woodcuts.

Probably belonging to the genera *Aphilothrix* and *Andricus*.

Uhlmann, J. Kleiner Beitrag über Eichengallen aus der Nähe Berns, Juli, 1880. MT. schw. ent. Ges. vii. pp. 23–32.

27 species enumerated.

Captures of *Cynipidæ* in Worcestershire ; Fletcher, Ent. xiii. pp. 10–12.

Notes on Scotch *Cynipidæ* ; Cameron, Ent. M. M. xvi. pp. 266 & 267.

Wachtl notices the galls of *Cynips majalis* and *Andricus burgundus*, Gir., *A. circulans*, Mayr, and *Aulax jaceæ*, Schenck, and figures the galls of the last ; Verh. z.-b. Wien, xxx. pp. 544 & 545.

Biorrhiza aptera and *Andricus terminalis*, Fabr., are different forms of the same species; Beijerinck, Zool. Anz. iii. pp. 179 & 180, and Ent. Nachr. vi. pp. 45 & 46.

Cynips, sp.: new gall noticed; Am. Ent. iii. p. 153. *C. kollari*: list of insects bred from its galls; Fitch, Ent. xiii. pp. 252–263, fig. *C. vitis-pomum*, W. & R., noticed, and gall figured; Am. Ent. iii. p. 129, fig. 119.

Diplolepis quercus-ilicis, Fabr., discussed; Karsch, Z. ges. Nat. (3) v. pp. 295–297.

New species:—

Andricus adleri, Mayr, SB. z.-b. Wien, xxx. p. 8, Vienna; *A. cryptobius*, Wachtl, *op. cit.* p. 538, pl. xviii. figs. 3 & 3 *b* (galls), Schönbrunn.

Spathogaster (*Ameristus*, Först.) *obtecta*, figs. 4 & 4 *c* (galls), and *S.* (*A.*) *aggregata*, figs. 5 & 5 *a* (galls), *id. l. c.* pp. 540 & 541, pl. xviii., Schönbrunn.

Isocolus rogenhoferi, id. *l. c.* p. 542, pl. xviii. figs. 6 & 6 *e* (galls), Vienna.

Cynips quercus-mellaria, Riley, Am. Ent. iii. p. 298, Colorado. Name proposed for the oak-gall whence the Honey Ant (*Myrmecocystus hortus-deorum*, var.) is said to obtain supplies of grape-sugar.

Diplolepis quercus-macrocarpæ, figs. 1, 1 *a–b*, Texas, *setifer*, figs. 2, 2 *a–d*, Mexico, p. 291, *q.-obtusilobæ*, figs. 3, 3 *a–b*, North America, p. 293, *q.-rubræ*, figs. 4, 4 *a* & *b*, N. America, p. 293, and *spongiosus*, figs. 5, 5 *a*, Texas, p. 295, Karsch, Z. ges. Naturw. (5) v. pl. vi.

Xestophanes tormentillæ, Schlechtendal, Ent. Nachr. vi. p. 176, Zwickau.

Uroceridæ.

Uroceridæ. A popular general article on the family; W. H. Harrington, Canad. Ent. xii. pp. 95–99.

Sirex gigas piercing holes in folded garments lying over the board from which it emerged; Xambeu, Bull. Soc. Ent. Fr. (5) x. p. xciii.

Xylœcematium fuscicorne and *magus* noticed; Brauns, Arch. Ver. Meckl. xxxii. pp. 75 & 76.

Xiphydria rufiventris, Cresson, Tr. Am. Ent. Soc. viii. p. 34, New York.

Urocerus cæruleus, Vancouver's Island, p. 34, *behrensi*, California, *fulvus*, *morrisoni*, Colorado, Washington Territory, &c., p. 35, and *tarsalis*, Washington Territory, p. 52, *id. l. c.*

Tenthredinidæ.

Vollenhoven, S. C. Snellen van. De inlandsche Bladwespen in hare gedaantewisseling en levenswijze beschreven. Een-en-twintigste Stuk. Tijdschr. Ent. xxiii. pp. 4–16, pls. i.–iii.

Includes life-histories of *Selandria fulvicornis*, Fabr., p. 4, pl. i. figs. 1–5; *Pœcilosoma pulveratum*, Retz. (= *Tenthredo obesa*, Klug, and *leucozonias*, Hart.) p. 7, pl. ii.; *Nematus perspicillaris*, Klug (*nec* Ratz., but = *melanocephalus*, Hart.), p. 10, pl. iii. upper figs.; and *Dolerus hæmatodes*, Schr., p. 14, pl. iii., lower figs.

Westwood, J. O. A monograph of the Sawflies composing the Australian genus *Perga* of Leach. P. Z. S. 1880, pp. 359–379, pls. xxxiii.–xxxvii.

Plate xxxiii. is devoted to details. The number of species is raised to

35, and the few previously known are redescribed, viz.: *P. dorsalis*, Leach (♀ = *scutellata*, Westw.), *polita*, Leach, *kirbii*, Leach, pl. xxxv. figs. 3 & 4, *bicolor*, Leach, *latreillii*, Leach, pl. xxxvi. fig. 3, *bella*, Newm., *ferruginea*, Leach, *lewisi*, Westw., *scabra*, Newm., and *ventralis*, Guér.

P. Cameron makes the following synonymic notes:—*Tenthredo pista*, Klug, = *viridis*, L., *T. viridis*, Klug, = *T. mesomelas*, L., *Lyda punctata*, Fabr. ? = *T. nemoralis*, L., *Dolerus nigro-cæruleus* and *fuscipennis*, Smith, are probably sexes, and these, as well as *Macrophya vexator* and *luctifera*, Smith, belong to *Emphytus*; *Selandria nigriceps*, Smith, is a *Monophadnus*; *Derecyrta deceptus*, Smith, is probably a *Xiphydria*; *Selandria grandis*, Zadd., = *sixi*, Voll., *Fenusa melanopoda*, Cam., = *nigricans*, Thoms., = *pumila*, Zadd.; *Nematus curtispina*, Thoms., is distinct from *miliaris*. Ent. M. M. xvi. pp. 220, 221, 250, & 265.

P. Cameron (Tr. E, Soc. 1880) regards the change of colour in certain larvæ of *Tenthredinidæ*, &c., as protective, and correlated with changes of habits at different stages of their existence (pp. 71–73). He also remarks on dimorphous larvæ (pp. 73 & 74), and on the use of the hairs in green larvæ (pp. 76 & 77). As suggested by Meldola and Lubbock, they probably prevent the larvæ from casting a sharply defined shadow on the leaf, but they may also serve as a protection against the attacks of ants or other carnivorous insects. Finally (pp. 76–79) he discussed parthenogenesis in the *Tenthredinidæ*, which appears to be very general in the family. Out of about 330 British species, the males of 53 are unknown, while those of 54 others are so rare that the author has never seen them.

R. von Stein describes the larvæ of *Emphytus cingillum* and *patellatus*, *Tenthredo scalaris*, *Selandria luteola*, Klug, and *S. serva*, Fabr.; Ent. Nachr. vi. pp. 246–252.

Pristiphora grossulariæ and *Selandria rosæ* noticed; Nat. Canad. xii. pp. 126 & 127.

Trichiosoma triangulum, Kirb., var. *aleutiana*, from the Aleutian Islands described; Cresson, Tr. Am. Ent. Soc. viii. p. 1.

Lophyrus rufus and parasites noticed; Brischke, Ent. Nachr. vi. p. 93.

Nematus. General remarks on the difficulties which beset the study of the genus; Brischke & Zaddach, Ent. Nachr. vi. pp. 229–232. Parthenogenesis: Fletcher, Ent. M. M. xvi. pp. 269 & 270, xvii. p. 21.

Selandria rosæ. Natural history; Am. Ent. iii. pp. 115 & 116, figs. 42 & 43.

Dolerus puncticollis and *liogaster*, and *Pœcilosoma longicorne*, recorded as new to Britain; Cameron, Ent. M. M. xvi. pp. 249 & 250.

Allantus. British species tabulated and discussed; *id. l. c.* pp. 221–224, 247 & 248.

Tenthredo velox, Fabr., redescribed, and the allied species tabulated; *id. l. c.* pp. 248 & 249. *T. fulvicornis*, Klug, destructive to plums, &c.; A. B., Feuill. Nat. x. p. 147.

Lyda arvensis, Panz., = *depressa*, Panz., *nec* Schr., = *alpina*, Klug, = *klugi*, *saxicola*, *abietina*, *annulata*, and *annulicornis*, Hart., but *hypertrophica* is distinct; Vollenhoven, Tijdschr. Ent. xxiii. pp. xiv. & xv.

Macrocephus ulmariæ, Schlecht. (? = *Phyllacus giraudi*, Perris). Details figured; Schlechtendal, Ent. Nachr. vi. pp. 189 & 190, pl. i.

Praia, g. n., Wankowicz, in André, Spec. Hym. i. fasc. 6, advts. p. 3. Allied to *Cimbex* and *Trichiosoma*; antennæ 7-jointed, last 2 joints forming the club; fore-wings with 2 radial and 3 cubital cells, the first receiving the first recurrent nervure, the second interstitial; lanceolate cell contracted. Type, *P. taczanowskii*, sp. n., *l. c.*, Minck.

Cimbex rubida, Nevada, California, and *semidea*, White Mountains, p. 1, and *pacifica*, Washington Territory, p. 51, Cresson, Tr. Am. Ent. Soc. viii.

Zaræa americana, id. *l. c.* p. 1, California.

Perga klugi, figs. 1 & 2, p. 363, *schiodtei*[*schiœdtii*], figs. 3 & 4, *brullei*[*-œi*], fig. 6, p. 364, *vollenhovii*[*-veni*], fig. 5, Australia, *ritsemei*[*-mœ*], Adelaide, fig. 7, pl. xxxiv., *esenbecki*, Swan River, fig. 5, p. 365, *gravenhorsti*, Australia, fig. 7, pl. xxxv., *christii*, Swan River, pl. xxxvii. fig. 2, p. 366, *guerini*, pl. xxxv. fig. 1, *cameroni*, Australia, pl. xxxvii. fig. 3, p. 367, *fœrsteri*, Australia, pl. xxxvi. fig. 1, *cressoni*, Swan River, pl. xxxvii. fig. 1, *walkeri*, fig. 5, p. 368, *dalmanni*, fig. 2, pl. xxxvi., *hartigi*, p. 369, *peletieri*, pl. xxxv. fig. 6, *newmanni*, p. 370, *dahlbomi*, pl. xxxv. figs. 3 & 4, *spinolæ*, pl. xxxvi. fig. 4, p. 371, *macleaii*[*-leayi*], pl. xxxv. fig. 2, p. 372, *smithi*, Australia, pl. xxxvi. fig. 6, p. 375, *leachi*, Melbourne, *halidaii*[*-dayi*], fig. 5, Adelaide, p. 377, *jurinei*[*-nii*], fig. 6, Melbourne, Swan River, and *mayri*, fig. 7, Swan River, pl. xxxvii. p. 378, Westwood, P. Z. S. 1880.

Sericocera edwardii, Cresson, *l. c.* p. 2, Mazatlan.

Schizocera zaddachi, André (= *axillaris*, Zadd., *nec* Spin.), Spec. Hym. i. p. 53, Germany; *S. krugi*, Porto Rico, *brunniventris*, p. 2, *maura*, (*S.* ?) *invita*, Nevada, p. 3, and *S. tristis*, Washington Territory, p. 52, Cresson, *l. c.*

Ptilia mexicana, id. *l. c.* p. 3, Mexico.

Hylotoma sanguinicollis, André, *l. c.* (7me fasc. cover), p. 3, Erivan; *H. mellina*, Cresson, *l. c.* p. 3, Nevada.

Cladius ramicornis (Rondani, MS.), André, *l. c.* p. 80, Germany.

Pristiphora jocularis, Cresson, *l. c.* p. 3, Nevada.

Evura albicincta, id. *l. c.* p. 4, Nevada.

Nematus peletieri (= *pallipes*, Lep., *nec* Fall.), Paris, p. 111, *emarginatus*, S. France, p. 119, *tischbeini* (= *rufipes*, Tischb., *nec* Lep.), Germany, p. 120, *fennicus*, Finland, p. 133, *testaceipes*, Geneva, p. 144, *leuco-carpus*, Valais, p. 145, *rubidicornis*, Jura, p. 146, *nigritarsis*, S. France, p. 151, *fœrsteri* (= *brevicornis*, Först., *nec* Dahlb.), Aix-la-Chapelle, p. 152, *meridionalis*, Pyrenees, p. 154, *albitarsis*, Switzerland, p. 159, André, l. c.; *N. rapax*, Nevada, *vicinalis*, California, *nigro-femoratus*, *latus*, p. 4, *iridescens*, *parvus*, *palliventris*, *ruralis*, p. 5, *lutcipes*, Nevada, *dimmocki*, Mount Washington, *nigro-pectus*, Nevada, *pallifrons*, Texas, p. 6, *militaris*, White Mountains, *notabilis*, Massachusetts, *latifasciatus*, White Mountains, *edwardsi*, California, p. 7, *limbatus*, Illinois, *corylus*[*-li*], Pennsylvania, *discolor*, Colorado, p. 8, *agilis*, *nevadensis*, Nevada, *pectoralis*, Colorado, Nevada, p. 9, *dorsivittatus*, *mellinus*, Nevada, and *suadus*, White Mountains, p. 10, Cresson, *l. c.*

Aulacomerus (?) *ebenus*, id. *l. c* p. 10, Colorado.

Emphytus fumatus, André, *l. c.* p. 249, Switzerland; *E. improbus*, Nevada, and *stramineipes*, Washington Territory, Cresson, *l. c.* pp. 11 & 52.

Dolerus fennicus, Finland, p. 269, *gessneri*, Switzerland, p. 273, *lucens*, Hungary, p. 277, André, l. c.; *D. coloradensis*, Colorado, and *tibialis*, Washington Territory, Cresson, *l. c.* pp. 11 & 52.

Dineura luteipes, id. *l. c.* p. 11, Maine.

Mesoneura albipes, id. *ibid.*, Nevada.

Selandria vollenhoveni, Gribodo, Bull. Ent. Ital. Resoconti, 1880, p. 7, Calabria; *S.* (*Blennocampa*) *carbonaria*, Georgia, *S.* (*B.*) *parva*, Colorado, *S.* (*B.*) *floridana*, Florida, *S.* (*B.*) *bipartita*, Texas, *S.* (*Monophadnus*) *diluta*, Canada, Missouri, *S.* (*M.*) *nigella*, Nevada, p. 12, *S.* (*M.*) *irrogata*, Colorado, *S.* (*M.*) *nevadensis*, *S.* (*M.*) *montivaga*, Nevada, *S.* (*M.*) *rileyi*, Missouri, *S.* (*M.*) *parca*, Texas, p. 13, *S.* (*M.*) *scelesta*, Nevada, Colorado, *S.* (*Hoplocampa*) *spissipes*, *S.* (*H.*) *gentilis*, *S.* (*H.*) *lenis*, *S.* (?) *sodalis*, p. 14, *S.* (*Eriocampa*) *obscurata*, Colorado, *S.* (*E.*) *belfragii*, Texas, *S. decolorata*, Colorado, and *curialis*, Mexico, p. 15, Cresson, *l. c.*

Athalia scutellariæ, Cameron, Ent. M. M. xvii. p. 66, Gloucester.

Allantus opimus, Vancouver's Island, p. 15, *ornaticeps*, *nigriceps*, p. 16, *elegantulus*, Nevada, *limbatus*, California, *afflictus*, *nevadensis*, Nevada, p. 17, and *occidaneus*, Colorado, New Mexico, p. 18; Cresson, *l. c.*

Macrophya annulipes, *maura*, Nevada, *jugosa*, *subviolacea*, California, p. 18, *oregona*, Oregon, *succincta*, Georgia, Texas, *bicolorata*, California, p. 19, and *texana*, Texas, p. 52, *id. l. c.*

Strongylogaster fidus, Colorado, Nevada, California, *tibialis*, Nevada, p. 19, *rubripes*, Colorado, *politus*, Canada, and *soriculatipes*, Canada, Illinois, p. 20, *id. l. c.*

Tenthredo obscuripennis, Nevada, California, *scævola*, p. 20, *lacticincta*, *suavis*, *luteipes*, Nevada, *bella*, Colorado, p. 21, *parvula*, California, *nupera*, *rubella*, Nevada, *ferrugineipes*, Colorado, *sectilis*, Colorado, Nevada, p. 22, *morosa*, Colorado, *rubeola*, Nevada, *mimula*, *occidentalis*, Colorado, *lateraria*, California, *addenda*, Colorado, Nevada, p. 23, *vittatipes*, *rubens*, Nevada, *diluta*, California, and *edwardsi*, Nevada, California, p. 24, *id. l. c.*

Lophyrus lateralis, Georgia, *rileyi*, Florida, *fulviceps*, Nevada, p. 25, *melliceps* and *suffusus*, Massachusetts, p. 26, *id. l. c.*

Lyda discolor, Canada, Pennsylvania, Nevada, *verticalis*, California, p. 26, *similaris*, *morrissoni*, Nevada, *atripes*, North Carolina, p. 27, *luteomaculata*, White Mountains, *nevadensis*, *montivaga*, *nigripes*, p. 28, *rufiventris*, *terminalis*, Nevada, *bucephala*, California, *brunniceps*, White Mountains, *marginiventris*, New York, p. 29, *albo-marginata*, Colorado, *nigrita*, *atrata*, Nevada, *ochreipes*, White Mountains, p. 30, *pullata*, Missouri, *perplexa*, Massachusetts, *fascipennis*, White Mountains, *semidea*, Mount Washington, p. 31, *nigro-pectus*, *melliventris*, Nevada, *rufo-cincta*, Colorado, and *rileyi*, Missouri, p. 32; *id. l. c.*

Cephus rufiventris, California, *abdominalis*, Nevada, *bifasciatus* and *fasciatus*, Colorado, *id. l. c.* p. 33.

Xyela major, id. *l. c.* p. 34, Texas.

LEPIDOPTERA.

BY

W. F. Kirby, M.E.S., &c.

The General Subject.

Aurivillius, C. Des caractères sexuels secondaires chez les Papillons diurnes. Ent. Tidskr. i. pp. 163–166.

Relates to colour, legs, nervures, plumules, palpi, &c.

——. Ueber sekundäre Geschlechtscharaktere nordischer Tagfalter. Bihang Sv. Ak. Handl. v. No. 25, pp. 50, pls. iii.

Relates chiefly to the scales of the wings, many of which are described and figured; but also contains remarks on sexual variations in colour, legs, and scent-organs.

Berg, C. Apuntes Lepidopterológicos. An. Soc. Arg. x. pp. 34–44 & 230–232.

Includes notices of various known species of *Mimallo*, *Bolocera*, *Streblota*, and *Heliconisa*, and of 3 larvæ of other *Bombyces*.

Boll, J. Ueber Dimorphismus und Variation einiger Schmetterlinge Nord-Amerika's. Deutsche E. Z. xxiv. pp. 241–248 [from Verh. Ver. Hamb. iii.; *cf.* Zool. Rec. xv. *Ins.* p. 161].

Breitenbach, W. Ueber die Function der Saftbohrer der Schmetterlingsrüssel. Ent. Nachr. vi. pp. 29–34.

The "Saftbohrer" is an organ exhibiting various forms, which the writer has previously described as existing at the end of the proboscis of *Lepidoptera*. He considers it to be intended to pierce the soft portions of plants, and to be also an organ of taste.

Buchecker, H. Systema Entomologiæ, sistens insectorum, classes, genera, species. Munich: 1880 [P], 6 parts, 8vo. *Lepidoptera*, ii. pls. i.–viii. & l.–lviii., viii. pls. i.–xxx.

The volume on *Neuroptera* of this general illustrated work on Entomology was noticed in Zool. Rec. xv. *Ins.* p. 252. The six parts of *Lepidoptera* mentioned above are all that have come under the Recorder's notice, and contain figures, with occasional drawings of neuration and

external structure, illustrating many species belonging to the genera *Hestia*, *Ideopsis*, *Heliconius*, *Cocytia*, *Phœgorista*, and *Castnia*, the last being divided into smaller genera.

BURGESS, E. The structure and action of a Butterfly's Trunk. Am. Nat. xiv. pp. 313–319, woodcuts.

The proboscis of *Danaus archippus* is described as a typical example.

BUTLER, A. G. On synonyms of Heterocerous *Lepidoptera*. Tr. E. Soc. 1880, pp. 55–57.

Synonymic notes, not admitting of abridgment, on a number of *Bombyces* (*Lithosiidæ*, &c.) described by Snellen & Möschler.

——. A Butterfly. Sci. for All, 1880, pp. 65–72, woodcuts.

A good popular account of the general structure of butterflies.

CHOLODKOWSKY, N. Ueber die Hoden der Schmetterlinge. Zool. Anz. iii. pp. 115–117, 214, & 215.

There are four types of testes in *Lepidoptera* :—

I. Two placed close together (*Hepiolus*, which exhibits the original type of the organs).

II. Two simple testicles (*Pygœra anachoreta*).

III. One testicle in a capsule (unconnected with it, and apparently analogous to the scrotum of vertebrate animals) which is constricted in the middle (*Lycœna œgon*).

IV. One simple testicle (*Pieris*, *Vanessa*, *Argynnis*, &c.).

The internal structure of all these forms are very similar, as each seminal vessel consists of four tubes, even in the larva and embryo.

DARWIN, C. The sexual colours of certain Butterflies. Nature, xxi. p. 237 ; Kosmos, vii. pp. 72–74.

The male probably displays his bright colours to the female by inherited instinct.

DISTANT, W. L. The Natural Classification and Geographical Distribution of Butterflies. Rep. Dulwich Soc. iii. pp. 45–48.

A popular lecture.

EDWARDS, W. H. Experiments upon the effect of cold applied to chrysalids of Butterflies. Psyche, iii. pp. 1–4, 15–19, 75, 76.

Relates chiefly, but not exclusively, to *Papilio ajax*.

FLETCHER, J. Nature-printed Butterflies. Canad. Ent. xii. pp. 1-3.

HESS, W. Bilder aus dem Leben schädlicher und nützlicher Insecten. Die Schmetterlinge. Leipzig: 1880, p. 200.

[Not seen by the Recorder.]

KIRBY, W. F. Catalogue of the *Lepidoptera* (*Rhopalocera*, *Sphingidæ*, *Castniidæ*, and *Uraniidæ*) in the Museum of Science and Art, Dublin, with remarks on new or interesting species. P. R. Dubl. Soc. (2) ii. (April, 1880) pp. 292–340.

——. Introductory Papers on *Lepidoptera*. Nos. xv. & xvi. *Nymphalidæ—Nymphalinæ* (*Cyrestis* to *Hypolimnas*). Ent. xiii. pp. 5–7, 266, & 267.

MAROTT, J. P. Emigrations et Apparitions de certains Lépidoptères. Feuill. Nat. x. pp. 115–117.

When a species is produced in extraordinary abundance, the specimens exhibit obvious degeneracy, their reproductive powers are impaired, and most of the larvæ which spring from their eggs perish. When one species is unusually abundant in any particular locality, the numbers of other species are less than usual, in proportion.

KEFERSTEIN, A. Betrachtungen über die Entwickelungsgeschichte der Schmetterlinge und deren Variation. Erfurt: 1880, 8vo, pp. 116.

A compendium of general observations on the structure, development, and variation of *Lepidoptera* in all their stages.

RILEY, C. V. Philosophy of the Pupation of Butterflies, and particularly of the *Nymphalidæ*. Am. Ent. iii. pp. 161–167, figs. 65–70; P. Am. Ass. xxviii. pp. 1–7, figs. 1-6; Bull. Phil. Soc. Wash. iii. pp. 41–43 (Sm. Misc. Coll. xx.).

The mode of suspension is fully discussed and illustrated.

RÖSSLER, A. Ueber Nachahmung bei lebenden Wesen (Organismen), insbesondere den Lepidopteren, mit einer Betrachtung über die Abstammungslehre. JB. Nass. Ver. xxxi. & xxxii. pp. 232–244.

An article of a general character.

——. Versuch die Grundlage für eine natürliche Reihenfolge der Lepidopteren zu finden. *L. c.* pp. 220–231.

An attempt to trace out the analogies existing between the various groups of *Lepidoptera*. Thus, for example, the following arrangement is proposed for the Butterflies, corresponding to the main groups of *Lepidoptera*:—

I. Most highly organised Butterflies; *Papilionidæ* (larvæ somewhat resembling those of the *Saturniidæ*).
II. Most typical Butterflies; *Pieridæ* and *Nymphalidæ*.
III. Sphingiform Butterflies; *Hesperiidæ* and *Castniidæ*.
IV. Bombyciform Butterflies; *Parnassius*, &c.
V. Noctuiform Butterflies; *Satyridæ*.
VI. Geometriform Butterflies; *Heliconiidæ* and (?) *Lemoniidæ*.
VII. Micro-Lepidopteriform Butterflies; *Lycænidæ*.

The various groups of *Heterocera* are also classified, more or less completely, but in a similar manner.

SCHØYEN, W. M. Prioritätsberechtigte Lepidopteren-Namen aus H. Ström's entomologischen Abhandlungen. S. E. Z. xli. pp. 134–136.

Besides noticing synonyms of older species, 3 of Ström's names are restored, which will be noticed in their places.

SPÅNGBERG, J. Sur les nervules des ailes chez nos Papillons diurnes. Ent. Tidskr. i. pp. 154–156.

The principal nervures, in the writer's nomenclature, are the costal, subcostal, radial, ulnar, transverse, anal, axillary, and dorsal; the last is absent in the *Rhopalocera*.

WEISMANN, A. Studies in the Theory of Descent; with notes and additions by the author. Translated and edited, with notes, by R. Meldola, with a prefatory notice by C. Darwin. Part i. On the Seasonal Dimorphism of Butterflies. London: 1880, 8vo, pp. 160, pls. ii.

The original work was fully noticed in Zool. Rec. xii. pp. 404 & 405. The additions consist of further experiments of Weismann's on *Araschnia levana* and *Pieris rapæ* and *napi*, and of a compendium of W. H. Edward's published observations on *Papilio ajax*, *Phyciodes tharos*, and *Grapta interrogationis*. Weissmann adds some conjectural explanations of the results of Edward's experiments on the latter insect.

Europe.

HARTMANN, A. Die Kleinschmetterlinge des europäischen Faunengebietes. Erscheinungszeit der Raupen und Falter, Nahrung und biologische Notizen. MT. Münch. ent. Ver. iv. pp. 1–122.

Contains the conclusions of the paper mentioned in Zool. Rec. xvi. *Ins.* p. 123. A complete index of species is added.

MÖSCHLER, H. B. Die Familien und Gattungen der europäischen Tagfalter. Abh. Ges. Görlitz, xvi. pp. 136–213, pls. i.–iii.

49 genera are admitted as belonging to the fauna of Europe and the adjacent regions. These are fully characterized, and figures of antennæ and neuration are given. They are divided into the following 9 families: *Papilionidæ*, *Pieridæ*, *Lycænidæ*, *Erycinidæ*, *Libytheidæ*, *Nymphalidæ*. *Satyridæ*, *Danaidæ*, and *Hesperiidæ*.

RAGONOT, E. L. Notes on unknown or little-known larvæ of *Micro-Lepidoptera*. Ent. M. M. xvi. pp. 271–273, xvii. pp. 15–17.

Relates to *Scopula*, *Lemiodes*, *Stenopteryx*, *Scoparia*, *Platytes*, *Crambus*, *Eromene*, and *Schœnobius*.

Parts 23–34 of W. F. Kirby's "European Butterflies and Moths," and Parts 13–23 of S. L. Mosley's "Illustrations of European Butterflies" have appeared during the year.

British Isles:—

VAUGHAN, H. The *Micro-Lepidoptera* of the Shetland Isles. Ent. xiii. pp. 291-293, pl. iv.

18 species noticed, 1 new.

WEIR, J. J. The *Macro-Lepidoptera* of the Shetland Isles, Ent. xiii. pp. 249–251, 289–291, pls. iii. & iv.

25 species recorded. It is remarkable that whereas many of the species are darker and duller than southern forms, others are lighter. The only butterfly obtained was *Pyrameis cardui*.

S. L. Mosley has published Parts vi.–viii. of his "Illustrations of varieties of British Lepidoptera," containing varieties of *Crocallis elinguaria*, *Gnophos obscurata*, *Strenia clathrata*, *Fidonia atomaria*, and

piniaria, *Lycæna ægon*, *argiolus*, *arion* (= *alcon*, Steph.), *agestis*, *alexis*, *adonis*, *corydon*, *Thecla rubi*, *betulæ*, *w-album*, *quercus*, and *Chelonia caia*.

Localities for beginners; Carrington, Ent. xiii. pp. 74–80, 121–125, 169–177.

Captures (1879), Ent. xiii. pp. 91 & 92; Andover, Sci. Goss. xvi. p. 237; Dover, Ent. pp. 283 & 284; Croydon, *l. c.* pp. 221 & 222; Harwich, *l. c.* p. 92; Hendon, *l. c.* pp. 231–233. West of Ireland, Ent. M. M. xvii. pp. 79–82; Isle of Wight, Ent. xiii. pp. 38–42; Kent, *l. c.* p. 163; North Lancashire, *l. c.* pp. 105–109; near London, Ent. M. M. xvii. pp. 136 & 137; Norfolk, Tr. Norw. Soc. iii. pp. 28–33; New Forest, Ent. xiii. pp. 92, 93, 183, 184, 206, & 207, Sci. Goss. (woodcuts), pp. 195–197; Pembrokeshire, Ent. M. M. xvii. p. 91; Plumstead, Ent. xiii. pp. 65 & 66; Sussex, Ent. M. M. xvii. pp. 124–126, Wicken, Ent. xiii. pp. 184 & 185; Worcestershire, *l. c.* pp. 64 & 65; Yorkshire, *l. c.* pp. 218 & 219; Ent. M. M. xvi. p. 211, xvii. pp. 136 & 137, Tr. Yorksh. Union, iii. Ser. D, pp. 71–80.

France.

Millière, P. Lepidoptérologie. 5e fasc. Mém. Soc. Cannes, viii. pp. 109 *et seq.* 3 pls.

[Not seen by the Recorder.]

Captures of rare French *Lepidoptera*, Foucart, Le Nat. ii. pp. 253 & 254; in the Alps of Dauphiné and Piedmont, Forbes, Ent. M. M. xvi. pp. 256–259; at Malzeville, near Nancy, Riston, Feuill. Nat. x. p. 32; near St. Martin-Lantosque, Millière, Le Nat. ii. pp. 228 & 230.

Germany & Austria.

Büttner, F. O. Die Pommerschen, insbesondere die Stettiner Microlepidopteren. S. E. Z. xli. pp. 383–473.

Contains notes on localities, times of appearance, habits, and transformations.

Fuchs, A. Microlepidopteren des Rheingaues. S. E. Z. xli. pp. 227–248.

Contains notes on 57 species, 1 new.

Hering, —. Die Geometriden Pommerns. S. E. Z. xli. pp. 309–326.

List of species, with localities and times of appearance,

Höfner, G. Die Schmetterlinge des Lavanthales und der beiden Alpen Kor und Sanalpe. i. Nachtrag. JB. nat. Kärnten, xiv. pp. 259–266.

[Not seen by the Recorder.]

Kayser, J. C. Deutschlands Schmetterlinge, mit Berücksichtigung sämmtlicher Europäischen Arten. 1te Lief. Leipzig: 1880, 8vo.

To be completed in thirty-eight weekly parts.

Catalogue of *Lepidoptera* of the neighbourhood of Leipzig (*Rhopalocera-Syntomidæ*); Z. wiss. Zool. (3) v. pp. 756–763.

Table of the butterflies of Schleswig-Holstein; G. Dahl, Schr. Ver. Schlesw.-Holst. iii. pp. 52-59.

Catalogue of the *Macro-Lepidoptera* of Eutin; *id. l. c.* pp. 35–51.

Captures at Lüneburg, Rüst, Ent. Nachr. vi. pp. 281–286; at Kissingen and at Münster-am-Stein, Maassen, S. E. Z. xli. pp. 158–174; in the Black Forest, &c., Bryan, Sci. Goss. xvi. pp. 252–254, woodcuts; in the Engadine, 1876 & 1878, Homeyer, JB. Nass. Ver. xxxi. & xxxii. pp. 84–115.

Notes on the following moths taken at heath-blossoms, &c., from August to October, 1879, Fuchs, S. E. Z. xli. pp. 88–97 :—*Agrotis saucia*, *neglecta*, *glareosa*, *margaritacea*, *Caradrina superstes*, *Mesogona acetosellæ*, *Ammoconia vetula*, *Orrhodia veronicæ*, *Acidalia degeneraria* and *bilinearia*, *Zonosoma albi-ocellaria*, *Gnophos dumetata*, and *Cidaria salicata*.

Switzerland.

Frey, H. Die Lepidopteren der Schweiz. Leipzig: 1880, 8vo, pp. xxvi. & 454 (*cf.* Ent. M. M. xvii. pp. 118 & 119).

The Introduction contains general observations on Switzerland and its *Lepidoptera*. 2508 species, or (approximately) 2829 species and varieties together, are met with in the country. The body of the work consists of observations on the food-plants, times of appearance, and localities of each species. Several new species and varieties are described, chiefly belonging to the *Micro-Lepidoptera*.

Italy.

Curò, A. Saggio di un Catalogo dei Lepidotteri d'Italia. Bull. Ent. Ital. xii. pp. 51–92, 111–115, 153–191.

Includes the *Pyrales* and *Tortrices*, besides additions to the list of *Macro-Lepidoptera*.

Fiori, A. Contribuzione allo studio dei Lepidotteri del Modenese e del Reggiano. Bull. Ent. Ital. xii. pp. 192–230.

Includes a list of 364 species, to the end of the *Noctuæ*.

Russia.

Additions to the *Lepidoptera* of Livonia, Esthonia, Curland, and Œsel; Sintenis, Arch. Livl. ix. pp. 217–220.

Notes on rare *Lepidoptera* of the Baltic provinces; Zander, SB. Ges. Dorp. v. pp. 150–163.

Scandinavia.

Schneider, J. S. Lepidopterologiske bidrag til Norges arktiske fauna. Tromsö Mus. Aarsh. iii. pp. 53–95.

97 species observed at 67° N. Lat., and 52 at 68° N., enumerated.

Schφyen, W. M. Oversigt over de i Norges arktiske Region fundune Lepidoptera. Arch. Math. Naturw. v. pp. 119–228, pl.

A most valuable contribution to Arctic Zoology, including tables of the circumpolar distribution of a large number of species. The writer divides the high northern forms into 3 groups: (1) Arctic, (2) Alpine-Arctic, and (3) Southern, *i.e.*, species whose range extends over Northern as well as Central Europe; 300 species are then discussed, often in great detail.

THESENIUS, K. F. Bidrag till Skandinaviens Fjärilsfauna. Ent. Tidskr. i. pp. 99–101, 196–198, & 214 & 215.

Short notes on Swedish butterflies.

Additions to the Lepidopterous fauna of Norway ; Schφyen, N. Mag. Naturv. xxv. pp. 301–309.

Captures of butterflies in Central Scania ; C. Lindequist, Ent. Tidskr. i. pp. 104–107.

Asia.

BUTLER, A. G. On a Collection of *Lepidoptera* from Candahar. P. Z. S. 1880, pp. 403–415, pl. xxxix.

28 species mentioned, taken by Major Howland Roberts, at Rokeran, six miles from Candahar, the transformations of several being described. The full list is as follows: *Danais chrysippus*, L., *plexippus*, L., *Hipparchia parisatis*, Koll., *thelephassa*, Hübn., *Epinephile roxane*, Feld., *interposita*, Ersch., *Pyrameis cardui*, L., *Melitæa robertsi* (n. s.), *Lampides bœtica*, L., *contracta* (n. s.), *Lycœna persica*, Bien., *bracteata* (n. s.), *Scolitantides cashmirensis*, Moore, *Chrysophanus stygianus* (n. s.), *Colias helichtha*, Led., *erate*, Esp., *sareptensis*, Staud., *Teracolus faustus*, Ol., *Belenois mesentina*, Cram., *Synchloe daplidice*, L., *iranica*, Bien., *Ganoris manni*, Mayer, *Erinnys marrubii*, Herr.-Schäff., *Chœrocampa cretica*, Boisd., *Deilephila robertsi* (n. s.), *Eusmerinthus kindermanni*, Led., *Deiopeia pulchella*, L., and *Apopestes phantasma*, Ev.

——. On a Second Collection of *Lepidoptera*, made in Formosa, by H. E. Hobson. *L. c.* pp. 666–691.

155 species enumerated, including several new genera and species. 80 butterflies are now known from Formosa.

——. On a Small Collection of *Lepidoptera* from Western India and Beloochistan. Ann. N. H. (5) v. pp. 221–226.

33 species noticed, 5 new.

MOORE, F. The *Lepidoptera* of Ceylon. Part i., 4to. London : 1880, pp. 40, pls. xviii.

The text extends to *Junonia*, and the plates to *Discophora*. All the genera and species of the fauna are fully described. Many new genera are proposed, and most of the species described are figured, with their transformations. At the head of each sub-family stand notices of their habits, by Thwaites.

SNELLEN, P. C. T.,—in "Midden-Sumatra. Reizen en Onderzoekingen der Sumatra-Expeditie, uitgerust door het Aardrijkskundig Genootschap 1877-1879, beschreven door de Leden der Expeditie, onder Toezicht van Prof. P. J. Veth." Leyden : 1880, roy. 8vo, vol. iv.—1ste Aflevering. Naturlijke Historie. Pt. 8, *Lepidoptera*, met eene Inleiding door J. F. Snelleman, pp. 84.

339 species mentioned, many new. Varieties, &c., are also noticed.

Wood-Mason, J. List of Diurnal *Lepidoptera* from Port Blair, Andaman Islands, with descriptions of some new or little known species, and of a new species of *Hestia* from Burmah. J. A. S. B. xlix. pt. ii. pp. 223–243, pl. xiii.

88 species enumerated from Port Blair.

A few *Lepidoptera* from the Dutch East Indies noticed; Snellen, Tijdschr. Ent. xxiii. pp. xiii. & xiv.

Africa and Madagascar.

Butler, A. G. On a Collection of *Lepidoptera* from Madagascar, with descriptions of new genera and species. Ann. N. H. (5) v. pp. 333–344, & 384–395.

Chiefly species collected at Fianarantsoa by W. D. Cowan.

Gooch, W. D. Notes on the *Lepidoptera* of Natal. Ent. xiii. pp. 226–231, & 273–276.

Mabille, P. Diagnoses Lepidopterum [sic] Malgassicorum. CR. Ent. Belg. xxiii. pp. xvi.–xxvii.

——. Note sur une collection de Lépidoptères recueillis à Madagascar. *L. c.* pp. civ.–cix.

Obertiür, C. Spedizione Italiana nell' Africa Equatoriale. Resultati Zoologici. I. Lepidotteri. Ann. Mus. Genov. xv. pp. 129–187, pl. i.

A short sketch of the expedition, and a map of Abyssinia is prefixed to this paper. 118 species in all are enumerated, including some new ones.

Plötz, C. Verzeichniss der vom R. Buchholz in West-Africa gesammelten Schmetterlinge. S. E. Z. xli. pp. 76–88, 189–206, 298–307, 477 & 478.

A considerable number of new species are described in these papers.

Saalmüller, M. Neue Lepidopteren aus Madagaskar die sich im Museum der Senckenbergschen naturforschenden Gesellschaft befinden. Ber. Senck. Ges. 1879–1880, pp. 258–310.

93 species from Nossi-Bé described.

Spiller, A. J. Notes on the *Rhopalocera* of Natal. Ent. xiii. pp. 1–5, 55–58, & 80–83.

Chiefly relates to the habits of the perfect insects.

Australasia.

Butler, A. G. On a Collection of *Lepidoptera Heterocera* from Marlborough Province, New Zealand. Cist. Ent. ii. pp. 541–562.

32 species enumerated, several new.

——. On two small consignments of *Lepidoptera* from the Hawaiian Islands. Ent. M. M. xvii. pp. 6–9.

19 species mentioned, 7 new.

Hutton, F. W. Contributions to the Entomology of New Zealand. Tr. N. Z. Inst. xii. pp. 272–274.

Corrections of former papers on the transformations of New Zealand *Lepidoptera*, and some additional descriptions of larvæ and pupæ.

Oberthür, C. Étude sur les Collections de Lépidoptères Oceaniens appartenant au Musée civique de Gènes. Ann. Mus. Genov. xv. pp. 461–530, pls. ii.–iv.

233 *Rhopalocera* are enumerated, with copious remarks of more or less importance, few of which can be noticed here. 3 moths (presumably new) are figured, without text.

Meyrick's Notes on Australian *Micro-Lepidoptera*, translated from Ent. M. M. xv. pp. 70 & 71, with remarks, by Zeller, S. E. Z. xli. pp. 223–227.

North and Central America.

Godman, F. D., & Salvin, O. Biologia Centrali-Americana [*vide* General Subject]. *Rhopalocera*, pp. 57–88, pls. v.–viii.

Extends from *Hymenitis* to *Euptychia*.

Part ix. of the second series of W. H. Edwards' "Butterflies of North America" appeared in 1880.

Catalogue of *Lepidoptera* of Cincinnati, to end of *Pyralidæ*; Dury, J. Cincinn. Soc. i. pp. 12–23.

List of diurnal *Lepidoptera* of Illinois; C. E. Worthington, Canad. Ent. xii. pp. 46–49.

Captures in Florida, new to the United States; W. H. Edwards, Psyche, iii. p. 114: of Butterflies at Portland, Maine, and in Nebraska; Lyman & Carpenter, Canad. Ent. xii. pp. 7–9 & 252.

South America.

Burmeister, H. Atlas de la Description Physique de la République Argentine. 5me section, 2de partie. Lépidoptères, livr. 1 & 2, fol. Buenos Aires: 1879–80, pp. 64, pls. xxiv. and a supplementary plate.

The text to this work was noticed in Zool. Rec. xv. *Ins.* p. 169, and the plates were there quoted from it, but were not published till later. The text accompanying the Atlas includes lists, and often a complete classification of the Brazilian species of several of the more important genera, and many additional observations. The plates represent perfect insects, neuration, and transformations.

Godman, F. D., & Salvin, O. A List of Diurnal *Lepidoptera* collected in the Sierra Nevada of Santa Marta, Colombia, and the vicinity. Tr. E. Soc. 1880, pp. 119–132, pls. iii. & iv.

294 species mentioned, 16 of which are described and figured as new.

Gosse, P. H. The Butterflies of Paraguay and La Plata. Ent. xiii. pp. 193–295, pl. ii.

A few species are described and figured as new. The *Hesperiidæ* are not included in this paper.

List of *Lepidoptera* and their Hymenopterous parasites; Fitch, Ent. xiii. pp. 67–69.

On collecting *Lepidoptera*; E. Pilati, Feuill. Nat. x. pp. 118 & 119.

New cyanide moth-trap; Westcott, Rep. E. Soc. Ont. 1879, pp. 24 & 25, and Ent. xiii. p. 168.

Captures of *Lepidoptera* at ripe fruit; Dupuy, Le Nat. ii. p. 327.

Plum-blossom attractive to moths; R. South, Ent. M. M. xvi. pp. 230 & 231.

Moths attracted by juice exuding from the buds of young oaks; J. E. Bates, Canad. Ent. xii. p. 20.

On *Lepidoptera* injurious to the vine, &c.; Targioni-Tozzetti, Atti Soc. Ital. xxii. pp. 202–204.

Lepidoptera trapped by flowers; Am. Ent. iii. p. 75.

Remarks on the unusual abundance of various *Lepidoptera*; F. Chambolle, Feuill. Nat. x. p. 145.

On the causes which influence the rarity of *Lepidoptera*; Zander, SB. Ges. Dorp. v. pp. 163–171.

Migrations of *Lepidoptera*; Le Nat. ii. pp. 149, 150, & 226.

On the migrations of Butterflies (with woodcut of *Danais archippus*); Am. Ent. iii. pp. 100–102 & 226, and Canad. Ent. xii. pp. 133–137.

Odour of various *Lepidoptera*; Le Nat. ii. pp. 164, 169, 174, 181, 187, 188, 225, & 237.

Food of Butterflies in the perfect state; Lelièvre, Le Nat. ii. p. 174.

On rearing various hibernating and other *Lepidoptera*; Grapes, Ent. xiii. pp. 140 & 141.

The emergence of *Lepidoptera* from the pupa is not affected so much by temperature as by the amount of moisture in the atmosphere, and the surroundings of the pupa; Rüst, Ent. Nachr. vi. p. 286.

On forcing *Lepidoptera*; Shuttleworth, Ent. xiii. pp. 95 & 96.

The anal appendages of suspended pupæ of *Lepidoptera* consist of two processes attached to the 12th segment, corresponding to the claspers of the larvæ, and provided with recurved hooks, by which they attach themselves; Künckel, C. R. xci. pp. 395–397.

Supposed variability in the number of moults in Lepidopterous larvæ; Buckler, Ent. M. M. xvii. pp. 42 & 43.

Disease among Lepidopterous larvæ; Fallou, Bull. Soc. Acclim. (3) vii. pp. 724 & 725.

On describing larvæ; Coquillett & French, Canad. Ent. xii. pp. 108 & 140.

Note on egg-state of *Lepidoptera*; Wailly, Ent. xiii. pp. 63 & 64.

On rearing Butterflies from the egg; W. H. Edwards, Ent. Nachr. vi. p. 59.

On Nature-printed Butterflies; Fletcher, Rep. E. Soc. Ont. 1879, pp. 88 & 89.

Colours of Butterflies' wings affected by carbolic acid; Edwards & Wilson, Psyche, iii. pp. 87 & 88.

Enormous prices formerly paid for *Lepidoptera*; Dohrn, S. E. Z. xli. pp. 141 & 142.

PAPILIONIDÆ.

OBERTHÜR, C. Études d'Entomologie. Faunes Entomologiques: descriptions d'insectes nouveaux. IV. Catalogue raisonné des *Papilionidæ* de la Collection de C. Oberthür. Rennes: Dec. 1879, 8vo, pp. xvii. & 117, pls. vi. [apparently not published till 1880].

The genera are placed in the following order, and the figures in brackets denote the number of species noticed:—*Calinaga* (1), *Davidina* (1), *Parnassius* (21), *Eurycus* (1), *Doritis* (1), *Luehdorfia* (1), *Euryades* (2), *Hypermnestra* (1), *Thais* (3). *Sericinus* (3), *Armandia* (1), *Tinopalpus* (1), *Ornithoptera* (17), *Papilio* (325), *Leptocircus* (1). The following are the most important observations on known species:—*Parnassius clodius*, Mén., the Californian specimens figured by Edwards as *clarius* are probably only varieties of *clodius*; *P. jacquemonti*, Boisd., is figured, pl. ii. fig. 5; *P. jaquemonti*, Gray, is distinct, and renamed *epaphus* (p. 23); *Thais polyxena*, Hübn., var. *rufescens* from Moravia noticed (p. 25); *Ornithoptera priamus*, varieties discussed (pp. 27–29; all the green *Ornithopteræ* are regarded as local forms, *urvilliana*, *cræsus*, and *lydius*, being regarded as distinct); *O. criton*, Feld., var. *papuana* from Amberbaki described (p. 31); *O. hephæstus*, Feld., var. ♀ noticed, pp. 31 & 32; *O. helicaon*, Boisd., ab. *rutilans* from Java, described and figured, p. 32, pl. i. fig. 2; *P. memnon* and *androgeos*, Cram., variation discussed, pp. 34–37, 111 & 112; *P. deiphontes*, Feld., var. *flava* from Ternate noticed, p. 38; *P. antiphus*, Fabr., var. *periphus* from Borneo noticed and figured, p. 43, pl. vi. fig. 2; *P. polydorus*, Linn., var. *papuana*, from N.W. New Guinea; *P. jophon*, Gray, and *annæ*, Feld., = *polyphontes*, Boisd., varr., p. 44; *P. severus*, Cram., variation noticed, especially var. *minor* from Sanghir, p. 46; *P. pammon*, Linn., variation noticed, including var. *alcinder* from Celebes, pp. 47, 48, 113, & 114, pl. vi. fig. 4; *P. ormenus*, Guér., *amphitrion*, Cram., and *brutus*, Don., variation discussed, pp. 49–52; *P. disparilis*, Boisd., var. *nana* from the Seychelles noticed, p. 54; *P. leonidas*, Fabr., var. (?) or sp. n. (?) *pelopidas* from Zanzibar described and figured, p. 55, pl. v. fig. 1; differences between *pylades*, Don., *anthemenes*, Wallengr., and *morania*, Angas, discussed, pp. 56 & 57; *P. erithonius*, Cram., var. *demolinus* from China noticed, p. 57; *P. agamemnon*, Linn., var. *rufescens* from China and *anura* from Borneo noticed, p. 58; *P. laglaizii*, Depuiset, notice of capture, pp. 60 & 61; *P. autosilaus*, Boisd., p. 66, and *archesilaus*, Feld., var. *macrosilaus*, Bates, p. 67, noticed; *P. machaon*, L., var. *saharæ* from Laghuat noticed, p. 68; *P. thoas*, Linn., noticed, p. 70; *P. ctesias*, Feld., var. *bari* from Cayenne described, p. 72, pl. v. fig. 3; *P. lenæus*, Doubl., variation noticed, pp. 72 & 73; *P. hippodamus*, Boisd., var. *fulva* from Colombia, noticed, p. 74; *P. marchandi*, Boisd., var. *panamensis* noticed, p. 75; *P. torquatinus*, Esp., ab. *melania* from Brazil noticed and figured, p. 78, pl. iii. fig. 3; *P. torquatus*, Cram., variation noticed, pp. 78 & 79; *P. isidorus*, Gray, var. *flavescens*, Oberthür, from Colombia, noticed, p. 79; *P. xeniades*, Hew., var. *isus* from Colombia noticed, p. 81; *P. telmosis*, Boisd., variation described, pp. 82 & 83. *P. erithalion*, Boisd.: the following forms are included under this:—[♂ ♂] (1) *cauca* (Staud.,

MS.), from Colombia, (2) intermediate form, (3) *pyrochles*, Gray, p. 84, (4) *zeuxis*, Gray, (5) *osyris*, Feld., p. 85, (6) *serapis*, Boisd., p. 86; [♀ ♀] (1) *erithalion*, Boisd., (2) *zeuxis*, Gray, (3) *alyattes*, Feld., (4) *idalion*, Feld., (5) *osyris*, Feld., p. 87, and ab. (?) *equestris* [= *P. lacydes*, Hew.] from Quito, p. 88, pl. v. fig. 2. *P. tarquinius*, Boisd., variation noticed, pp. 88–90; *P. lysander*, Hübn., var. *bari* from Guiana described and figured, p. 91, pl. iv. fig. 3; *P. æneides*, Esp., and *eurimedes*, Cram., variation described, pp. 94–96; *P. phaon*, var. *immarginatus* from Mexico noticed, p. 97; *P. philenor*, Linn., var. *acauda* from a doubtful locality noticed, p. 98; *P. dissimilis*, Linn., var. *flavo-limbatus* from the Andamans noticed, p. 101; *Parnassius corybas*, var. *tianschanica* (Staud., MS.) from Kuldja and Thianshan noticed. p. 108; *Luehdorfia puziloi*, Ersch., variation noticed, p. 109; *Ornithoptera holiphron*, Boisd., ab. *pallens* from Celebes, and *amphrisius*, Fabr., ab. *cuneifera* from Java, noticed, p. 110; *Papilio glycerion*, var. *mandarinus* from Moupin and Kwa-Chow noticed, pp. 114 & 115; *P. torquatus*, var. *b*, Gray, from Teffé, named *flavida*, p. 115; *P. orchamus*, Boisd., noticed and figured, p. 116, pl. vi. fig. 3.

Euryades duponcheli. Larva described; Burmeister, Atlas, p. 54.

Papilio hector roosting in flocks; Eaton, Ent. M. M. xvi. p. 276. *P. castor* and allies discussed; *P. pollux* is regarded as a dimorphous form of ♀: Wood-Mason, J. A. S. B. xlix. pt. 2, pp. 144–149, pl. viii. fig. 2, & pl. ix. figs. 1 & 2. *P. clytia*, var. *flavo-limbatus*, Oberth., redescribed; *id. l. c.* p. 288. *P. merope* and *niveus*: variation discussed; Oberthür, Ann. Mus. Genov. xv. pp. 146-148 & 182. *P. merope* and *cenea* said to have been taken *in coitu*; Rutherford, P. E. Soc. 1880, pp. xxxii. & xxxiii. *P. oregonia*, Edw., *brevicauda* (transformations), and *bairdi*, Edw., fully described and figured; Edwards, Butt. N. Am. ii. *Pap.* pls. vii., viii. B, & x. *P. ajax* var. *marcellus* bred deficient of one hind-wing; W. H. Edwards, Psyche, iii. p. 114. *P. archidamas*, Boisd., = *bias*, Roger; Kirby, P. R. Dubl. Soc. (2) ii. p. 324. *P. cresphontes* and *turnus* described and figured; W. Saunders, Rep. E. Soc. Ont. 1878, pp. 60 & 61, fig. 38, & 1879, p. 73, figs. 40 & 41. *P. mentor*, Boisd., ♀ described; Burmeister, Atlas, p. 61.

Davidina, g. n., Oberthür, Études Ent. iv. pp. 19 & 108. Antennæ short, with a moderately thick club; palpi prominent; body and abdomen slender; wings entire, rounded, with prominent nervures; a forked nervure within each discoidal cell. Type, *D. armandi*, sp. n., *ll. c.* pl. ii. fig. 1, N. China.

New species:—

Calinaga davidis, from Moupin, mentioned, but not described; Oberthür, *l. c.* p. 107.

Parnassius davidis, id. *l. c.* pp. 23 & 108, pl. ii. fig. 2, N. China. (Remarkable for its black fringes.)

Ornithoptera jupiter, id. *l. c.* p. 31, pl. i. fig. 1, Java.

Papilio erioleuca, p. 33, pl. iii. fig. 1, Darjiling, *scævola*, p. 37, pl. vi. fig. 1, China?, *westwoodi*, p. 41, pl. iii. fig. 2, New Caledonia, *epaminondas*,

p. 62, pl. iv. fig. 1, Andamans, *herodotus*, p. 71, pl. iv. fig. 2, Brazil, *thyastinus*, p. 75, pl. ii. fig. 3, Ecuador, *sebastianus*, p. 76, pl. ii. fig. 4, Brazil, *id.* l. c.; *P. albertisi*, New Guinea, pl. ii. fig. 1, and *beccarii*, Amboina, pl. iii. figs. 1 & 2, *id.* Ann. Mus. Genov. xv. pp. 469 & 475; *P. abrisa*, Madras or British Burma, and *tibullus* (= *merope*, var. ?) Zanzibar, Kirby, P. R. Dubl. Soc. (2) ii. pp. 338 & 339; *P. dravidarum* (= *abrisa*, Kirb.), Wood-Mason, P. A. S. B. 1880, p. 184, & J. A. S. B. xlix. pt. 2, p. 144, pl. viii. fig. 1, Mysore, Trevandrum; *P. læstrygonum* (= *epaminondas*, Oberth.), *id.* P. A. S. B. 1880, p. 102, & J. A. S. B. xlix. pt. 2, p. 178, pl. vi. figs. 1 & 2, Andamans; *P. goldiei*, pl. lvi. fig. 6, and *lesches*, Godman & Salvin, P. Z. S. 1880, pp. 613 & 614, New Guinea; *P. homeyeri*, Plötz, S. E. Z. xli. p. 306, Pungo-N'dongo, W. Africa.

Pieridæ.

Terias. Three distinct forms occur in Japan: *mariesi*, sp. n., figs. 1–7, *anemone*, Feld., figs. 9–12, and *mandarina*, De l'Orza, figs. 13–18. Intermediate forms are rare, and may therefore be regarded as hybrids, instead of the insects being all considered to be forms of one variable species. Butler, Tr. E. Soc. 1880, pp. 197–200, pl. vii.

Pieris rapæ. Mimicry in pupa; J. E. Fletcher, Ent. M. M. xvi. p. 185. Fowls will not touch the larvæ; on the best mode of destroying the insect; Am. Ent. iii. pp. 55 & 178.

Belenois mesentina, Cram., and *Synchloe iranica*, Bien. (= *ripasa*, Moore). Transformations described and pupæ figured; Roberts & Butler, P. Z. S. 1880, pp. 409 & 410, pl. xxxix. figs. 6 & 7.

Mylothris sabina, Feld., noticed; Kirby, P. R. Dubl. Soc. (2) ii. p. 337.

Callidryas eubule migrating in Georgia; Willett & Gibbes, Canad. Ent. xii. pp. 40 & 60.

Colias. Elwes discusses this genus, giving a list of the relationship of the various forms, according to his own views, and adding notes on several; Tr. E. Soc. 1880, pp. 133–146. *C. edusa*, var *helice*: unusual abundance in Switzerland in 1879; other vars. are also noted, some intermediate between *edusa* and *hyale*; A. Leonard, Feuill. Nat. x. p. 38. Oberthür notices var. *helicina*, intermediate between *edusa* and *helice*; Bull. Soc. Ent. Fr. (5) x. pp. cxlv. & cxlvi.

Rhodocera cleopatra. Odour, range, &c., discussed; Vallantin, Le Nat. ii. p. 238.

Idmais eris, Klug (♂ = *abyssinicus*, Butl., redescribed, and differentiated from an allied form; Kirby, *l. c.* p. 337. *I. tripuncta*, Butler, ♀ described and figured by him as *Teracolus tripunctatus*; P. Z. S. 1880, p. 149, pl. xv. fig. 4.

Teracolus dirus, Butler, noticed by him; Ann. N. H. (5) v. pp. 222 & 223.

Anthocharis ausonia and allies discussed; Le Nat. ii. pp. 180, 181, 225, 226, 284, 285, 337 & 338. Transformations, *l. c.* p. 155.

New species :—

Euterpe lycurgus, Godman & Salvin, Tr. E. Soc. 1880, p. 132, pl. iv. fig. 15, Santa Marta.

Leptalis perrensi (= *amphione*, Swains., *nec* Cram.), Gosse, Ent. xiii. p. 195, Corrientes.

Terias hobsoni and *unduligera*, Butler, P. Z. S. 1880, p. 668, Formosa. *T. mariesi*, id. Tr. E. Soc. 1880, p. 198, pl. vi. figs. 1–7, Japan. *T. aliena*, id. Ann. N. H. (5) v. p. 337, Fianarantsoa. *T. flavia*, Burmeister, Atlas, p. 54, Tucuman.

Pieris rembina (? = *chloris*, var.), and *adultera* (= *capricornus*, ♂, Ward; his *capricornus*, ♀ = his *cebron*, ♀), Plötz, S. E. Z. xli. p. 205, West Africa. *P. hecyra*, Mabille, C. R. Ent. Belg. xxxiii. p. cv., Madagascar. *P. ornytion*, Godman & Salvin, P. Z. S. 1880, p. 613, pl. lvi. fig. 5, New Guinea. *P. albertisi* and *enniana*, Oberthür, Ann. Mus. Genov. xv. pp. 480 & 481, pl. iv. figs. 4 & 3, Andai.

Hebomoia rœpstorffi, Wood-Mason, J. A. S. B. xlix. pt. ii. pp. 134, 150, & 235, South Andamans.

Ixias dharmsalæ, Dharmsala, figs. 8 & 9, p. 150, *frequens*, figs. 6 & 7, and *watti*, fig. 1, p. 151, Bengal, Butler, P. Z. S. 1880.

Catopsilia decipiens and *rufo-sparsa*, id. Ann. N. H. (5) v. pp. 358 & 395, Madagascar.

Idmais maimuna, Kirby, P. R. Dubl. Soc. (2) ii. p. 338, Angola; *I. philumene*, Mabille, *l. c.* p. cvi., Madagascar.

Euchloe venosa, Butler, P. Z. S. 1880, p. 151, pl. xv. fig. 5, W. Thibet.

Danaidæ.

F. Moore (Lep. Ceyl. p. 1) substitutes *Euplœina* for *Danainæ*, because the name *Danaus* properly belongs to species of *Pierinæ*. The following known species (exclusive of those placed in new genera) are redescribed and generally figured: *Nectaria jasonia*, Westw., p. 3, pl. i. fig. 1, *Macroplœa elisa*, Butl., p. 9, pl. v. figs. 2 & 2 *a*, *Euplœa asela*, Moore, p. 11, pl. vi. figs. 2 & 2 *a*, *frauenfeldi* and *scherzeri*, Feld., p. 12.

Godman & Salvin (Biol. Centr. Am. *Rhop.*) have completed their account of the Central America *Danainæ*. *Hymenitis lyra*, Salv. (figs. 11 & 12), *H. sosunga*, Reak. (figs. 15–18), *zygia*, G. & S. (figs. 19 & 20), pl. v., and *Heterosais cadra*, G. & S. (pl. ii. fig. 5), are figured; *Ithomia telesto*, Hew., = *Hymenitis anetta*, Guér.

Danais archippus swarming; Canad. Ent. xii. pp. 37–39, 119 & 120. *D. chrysippus*, var. *alcippus*, recorded from a small island near Sumatra; Snellen, Tijdschr. Ent. xxiii. pp. xiii. & xiv. *D. dorippus* and *chrysippus* discussed; Oberthür, Ann. Mus. Genov. xv. pp. 153 & 154.

Euplœa usipetes, Hew., discussed; Oberthür, Ann. Mus. Genov. xv. pp. 490 & 491.

Hamadryas zoilus, Fabr., var. from Andai noticed and figured; *id. l. c.* pp. 196 & 197, pl. iv. fig. 1.

Melinæa lilis, Doubl. & Hew., var. from Manaure described; Godman & Salvin, Tr. E. Soc. 1880, p. 127.

New genera and species:—

Radena, Moore, Lep. Ceyl. p. 3. Type, *Danais exprompta*, Butl. (redescribed and figured, p. 4, pl. ii. fig. 1).

Tirumala, id. *l. c.* p. 4. Type, *Pap. limniacæ*, Cram.; add *Danais septentrionis*, Butl. (both redescribed and figured, pp. 4 & 5, pl. i. figs. 3 & 2).

Salatura, id. *l. c.* p. 5. Type, *Pap. genutia*, Cram.; add *P. chrysippus*, Linn. (both redescribed and figured, pp. 6 & 7, pl. iv. figs. 2 & 2 *a*, & pl. iii. figs. 1 *a* & *b*).

Parantica, id. *l. c.* p. 7. Type, *Pap. aglea*, Cram.; add *Dan. ceylonica*, Feld. (redescribed and figured, p. 8, pl. ii. figs. 2 & 2 *a*).

Chittira, id. *l. c.* p. 8. Type, *Dan. fumata*, Butl. (*taprobana*, Feld.) (redescribed and figured, p. 9, pl. iv. figs. 1 & 1 *a*).

Isamia, id. *l. c.* p. 10. Type, *Euplœa sinhala*, Moore (redescribed and figured, *l. c.* p. 10, pl. v. fig. 1).

Narmada, id. *l. c.* p. 13. Type, *Eupl. coreoides*, Moore; add *E. montana*, Feld. (redescribed and figured, *l. c.* pl. vi. fig. 1).

Heterosais, Godman & Salvin, Biol. Centr. Am. *Rhop.* p. 60. Placed after *Hymenitis*; neuration of ♂ hind-wing extremely simple; ♀ tarsi 5-jointed. Type, *Ithomia nephele*, Bates; add *I. cadra*, G. & S.

Hestia cadelli, Port Blair, and *hadeni*, Burma, Wood-Mason, J. A. S. B. xlix. pt. ii. pp. 225 & 242, pl. xiii. figs. 1 & 2.

Danais formosa, Godman, P. Z. S. 1880, p. 183, pl. xix. fig. 1, E. Africa.

Amauris psyttalea (Feld. MS.; ? = *damocles*, var.), Plötz, S. E. Z. xli. p. 189, Aburi, W. Africa.

Euplœa (*Salpinx*) *adamsoni*, Marshall, J. A. S. B. xlix. pt. ii. p. 245, Moulmein.

Ceratinia philidas, Godman & Salvin, Tr. E. Soc. 1880, p. 127, pl. iii. fig. 1, Santa Marta.

Hymenitis furina, iid. Biol. Centr. Am. *Rhop.* p. 59, pl. iv. figs. 15 & 16, Panama.

Acræidæ.

Acræa thalia, L., *pellenea*, Hübn., *anteas*, D. & H., and *mamita*, Burm., appear to be all forms of one species; Gosse, Ent. xiii. p. 197. *A. serena*, var. (?) from Abyssinia, noticed; Oberthür, Ann. Mus. Genov. xv. p. 184. *A. zitja*, var. *fumida*, from Madagascar, described; Mabille, CR. Ent. Belg. xxiii. p. cvi.

Acræa chilo, Godman, figs. 4 & 5, Abyssinia, *insignis*, Distant, fig. 6, Magila, East Africa, P. Z. S. 1880, p. 184, pl. xix.; *A. antinorii*, Oberthür, Ann. Mus. Genov. xv. p. 157, pl. i. fig. 3, Shoa; *A. orestina*, Plötz, S. E. Z. xli. p. 190, Cameroons; *A. boseæ*, Saalmüller, Ber. senck. Ges. 1879–1880, p. 259, Nossi-Bé: spp. nn.

Heliconiidæ.

Evides kuenowii, Dew., = *edias*, Hew.; Godman & Salvin, Tr. E. Soc. 1880, p. 130.

Blanchardia, g. n., Buchecker, Syst. Ent. *Lep.* ii. pl. li. Allied to *Heliconius*, eyes hairy; type, *H. choarina*, Hew.

Heliconius ocania, sp. n., *id. l. c.* pl. lii. upper fig., Colombia.

Nymphalidæ.

The following known *Nymphalinæ* are redescribed, and generally figured, by F. Moore (Lep. Ceyl.): *Charaxes fabius*, Fabr. (= *solon*, Fabr.), p. 29, pl. xv. fig. 1, *Eulepis samatha*, Moore, p. 29, pl. xiv. figs. 2 *a* & *b*, *Euthalia lubentina*, Cram., p. 31, figs. 1 *a* & *b*, *garuda*, Moore, p. 32, figs. 2 & 2 *a*, pl. xvi., *vasanta*, Moore, p. 33, pl. xvii. figs. 2 *a* & *b*, *Symphœdra nais*, Forst., p. 35, *Discophora lepida*, p. 36, pl. xviii. figs. 1 *a* & *b*, *Callima philarchus*, Westw., and *mackwoodi*, Moore, p. 37, pl. xx. figs. 1, 2 & 2 *a*, *Doleschallia bisaltide*, Cram., p. 38, pl. xix. figs. 1 *a* & *b*, *Precis iphita*, Cram. (= *intermedia*, Feld.), and *laomedia*, Linn., pp. 39 & 40, pl. xxi. figs. 1 *a* & *b* & 2.

W. H. Edwards describes the transformations of *Grapta progne*, *Argynnis alcestis* and *cybele*, *Agraulis vanillæ*, and *Euptoieta claudia*; Canad. Ent. xii. pp. 9–14, 69–74, 141–145, 122–126, & 231–234.

Vanessa charonia, Dru., = *canace*, Linn. & V., *glauconia*, Motsch., = *no-japonicum*, Sieb., *Catagramma sinamara*, Hew., = *codomannus*, Fabr., ♀, *Symphœdra thyelia*, Fabr., = *nais*, Forst., *Anæa pyrrhothea*, Feld., = *chrysophana*, Bates; Kirby, P. R. Dubl. Soc. (2) ii. pp. 305–311.

Cirrochroa aoris, Doubl. & Hew. Gynandromorphous specimens described and figured; Westwood, Tr. E. Soc. 1880, pp. 113–117, pl. ii.

Argynnis adippe, var. *cleodoxa*, taken in Herefordshire; Law, Ent. xiii. p. 217. *A. cytheris*, Dru. (= *siga*, Hübn., = *anna*, Reed), is distinct from *cytheris*, Reed (Gay?), and the latter must be called *montana*, Reed; Kirby, P. R. Dubl. Soc. (2) ii. p. 336. *A. selene*: the Swedish varieties *hela*, Heyd., *rinaldus* and *marphisa*, Herbst, and *intermedia*, Spångb., are redescribed, and the 3 last figured; Spångberg, Sv. Ak. Handl. Bihang, v. No. 12, pp. 10, col. pl. Aberration from Düsseldorf; Kirby, P. E. Soc. 1880, p. xxx. figs.

Melitæa maturna, var. *wolfensbergeri*, and *M. aurelia*, var. *rhætica*, from Switzerland, described; Frey, Lep. Schweiz. pp. 27 & 30.

Hypanartia hippomene, Boisd., *nec* Hübn., renamed *commixta*; Butler, Ann. N. H. (5) v. p. 336. Also renamed *borbonica* by Oberthür; Ann. Mus. Genov. xv. p. 164.

Vanessa antiopa. Hybernation; C. M. Siewers, Rep. E. Soc. Ont. 1878, p. 18.

Pyrameis cardui double-brooded, W. Wilkinson, Ent. M. M. xvii. pp. 43–44; aberration, Clark & Phipson, Ent. xiii. pp. 73 & 74, woodcut; Phipson, P. E. Soc. 1880, p. xx. fig.; its occurrence in the deserts of Arabia, E. C. Rye (quoting W. S. Blunt), Ent. M. M. xvi. p. 185; its abundance and migrations in 1879 in all parts of Europe, and its comparative rarity in 1880, are noticed in all journals on Natural History, but the references would be too numerous to quote; larva described, Jordan, Ent. M. M. xvi. pp. 196 & 197.

Salamis anacardii, ♂ in coitu with *Aphelia apollinaris*, ♀, Bowker & Trimen, P. E. Soc. 1880, pp. xxiii. & xxiv.

Catagramma zerynthia, Burm., = *sorana*, Godt.; Gosse, Ent. xiii. p. 200.

Limenitis sibylla, black variety; Rose, Ent. xiii. p. 186.

Harma hypatha, Hew., = *fumana*, ♀, Westw.; Kirby, P. R. Dubl. Soc. (2) ii. p. 336.

Apatura iris and *ilia*. Melanism; Bertkau, CB. Ver. Rheinl. xxxvii. pp. 161 & 162. *A. flora*, *clyton*, *celtis*, and *alicia* are all distinct species; W. H. Edwards, Psyche, iii. p. 114. *A. alicia*: early stages described and compared with *A. celtis*; id. *l. c.* pp. 123–127.

Castalia chandra, Moore, ♀ figured by Waterhouse, Aid, i. pl. viii.

Pseudacræa drusilla, Saalm., = *Panopea apaturoides*, Feld.; Butler, Ann. N. H. (5) v. p. 336.

Charaxes cowani, Butl., ♀ noticed; *id.* ibid. *C. brutus*, Cram., var. *junius*, and *phœbus*, Butler, ♀ described from Abyssinia; Oberthür, Ann. Mus. Genov. xv. pp. 166 & 167.

Anæa ops, Druce, probably = *andria*, Scudd., which is quite distinct from *troglodyta*, Fabr.; Kirby, *l. c.* p. 336.

Rohana, g. n., Moore, Lep. Ceyl. p. 27 (*Apatura*, sect. ii. Feld.). Type, *A. parysatis*, Westw., add *R. camiba*, sp. n., *l. c.* p. 27, pl. xiv. figs. 1 *a–c*, Ceylon.

Haridra, g. n., *id. l. c.* p. 30. Types, *Charaxes psaphon*, Westw. (redescribed and figured, *l. c.* pl. xv. fig. 2), and *H. serendiba*, sp. n., *l. c.* fig. 3, Ceylon.

Dophia, g. n., *id. l. c.* p. 33 (*Adolias*, sect. v., Feld.). Type, *Pap. evelina*, Stoll (p. 34, pl. xvii. figs. 1 & 1 *a*).

New species:—

Terinos alurgis, Godman & Salvin, P. Z. S. 1880, p. 612, New Guinea.

Melitæa robertsi, Butler, P. Z. S. 1880, p. 406, pl. xxxix. fig. 2, Candahar.

Phyciodes catenarius and *castianira*, Godman & Salvin, Tr. E. Soc. 1880, p. 131, pl. iv. figs. 11 & 10, Santa Marta.

Doleschallia dascon and *dascylus*, iid. P. Z. S. 1880, p. 612, pl. lvi. figs. 3 & 4, New Guinea.

Anartia corona, Gosse, Ent. xiii. p. 129, pl. ii. fig. 1, Asuncion [evidently an aberration of *A. jatrophæ*].

Precis actia, Distant, P. Z. S. 1880, p. 185, pl. xix. fig. 7, Masassi, East Africa. *P. sinuata*, Plötz, S. E. Z. xli. p. 477, W. Africa.

Perisama gisco, Godman & Salvin, Tr. E. Soc. 1880, p. 131, pl. iv. fig. 12, Santa Marta.

Crenis amazoula, Mabille, CR. Ent. Belg. xxiii. p. xvi., Madagascar.

Pyrrhogyra argo, Gosse, Ent. xiii. p. 199, pl. ii. fig. 6, Paraguay.

Limenitis eros, W. H. Edwards, Canad. Ent. xii. pp. 246–251, S. Florida (described in all stages).

Neptis gratilla, Mabille, *l. c.* p. cvi., Madagascar.

Panopea diffusa, Butler, Ann. N. H. (5) v. p. 336, Fianarantsoa.

Euryphene lætitia, Plötz, S. E. Z. xli. p. 192, W. Africa.

Aterica (?) *buchholzi*, id. *ibid.*, W. Africa.

Harma ogova and *reinholdi*, id. *l. c.* pp. 193 & 194, W. Africa.

Charaxes relatus, Butler, *l. c.* p. 394, Madagascar; *C. watti*, id. P. Z. S. 1880, p. 148, pl. xv. fig. 2, Upper Assam.

Morphidæ.

Drusilla macrops, Feld., ♂ described; Oberthür, Ann. Mus. Genov. xv. p. 510.

Æmona, Hew., monographed, and the genus and species described. Three species are admitted:—*Æ. amathusia*, Hew. (p. 176, pl. vi. figs. 3 & 4), *Æ. lena*, Atk. (p. 177) and one new one; Wood-Mason, J. A. S. B. xlix. pt. ii.

Morphopsis, g. n., Oberthür, Ann. Mus. Genov. xv. p. 513. Differs from *Morpho* by its longer abdomen, and closed hind wing cells. Type, *M. albertisi*, sp. n., *l. c.* pl. ii. fig. 3, Andai.

Tenaris chionides, sp. n., Godman & Salvin, P. Z. S. 1880, p. 611, New Guinea.

Drusilla butleri, sp. n., Oberthür, Ann. Mus. Genov. xv. p. 512, New Guinea.

Æmona peali, sp. n., Wood-Mason, P.A.S.B. 1880, p. 123, and J.A.S.B. xlix. pt. 2, p. 177, pl. vi. figs. 5 & 6, Assam.

Morpho rhodopteron, sp. n., Godman & Salvin, Tr. E. Soc. 1880, p. 130, pl. iv. fig. 9, Santa Marta.

Satyridæ (including *Elymnias*).

Edwards, W. H. On certain species of *Satyrus*. Canad. Ent. xii. pp. 21–32, 51–55, 90–94, 109–115, & 147.

Satyrus nephele and *alope* are apparently dimorphous forms; var. *olympus* from the Eastern States described; *S. pegala*, *boopis*, and *paulus* are noticed; *S. œtus*, Boisd., = *silvestris*, Edw. (worn); *ariane*, *gabbi*, *wheeleri*, *sthenele*, *charon*, *phocus* (= *charon*, var.), and *meadii* noticed. In the concluding paper, the writer discusses the distribution of the N. American species of *Satyrus*, and adds a list (*cf.* also French, *op. cit.* p. 140).

Moore, F. On the Asiatic *Lepidoptera* referred to the genus *Mycalesis*, with descriptions of new genera and species. Tr. E. Soc. 1880, pp. 155–177.

A list of the Indian species is added under each genus. The three following genera are recharacterized:—*Orsotriæna*, Wallengr. (type, *Pap. medus*, Fabr.), p. 157, *Culapa*, Moore (type, *Myc. mnasicles*, Hew.), p. 165, and *Mycalesis*, Hübn. (type, *Pap. evadne*, Cram.), p. 176.

Godman & Salvin (Biol. Centr. Am. *Rhop.*) have commenced their monograph of Central American *Satyrinæ*, from *Cithærias* to *Euptychia*. The following known species are figured, or their synonymy noted:—*Callitæra menander*, Dru. (= *andromeda*, Fabr.), figs. 1 & 2, *Hetæra macleannania*, Bates, figs. 3 & 4, *Pierella luna*, Fabr. (= *pallida*, Salv. & Godm.), *rubecula*, S. & G., figs. 10 & 11, *incanescens*, G. &. S., figs. 5 & 6, and *ocreata*, S. & G., figs. 7–9, pl. vi. *Antirrhæa miltiades* (= *lindigi*, Feld., = *casta*, Bates), figs. 1 & 2, *tomasia*, Butl., fig. 3, and *pterocopha*, S. & G., figs. 4–6, pl. vii.; *Euptychia metaleuca*, Boisd. (=

butleri, Dist., figs. 1 & 2, *mollina*, Hübn. (= *westwoodi*, Butl., = *mollis*, Staud.), figs. 13 & 14, *fetna*, Butl., figs. 15 & 16, *insolata*, Butl. & Druce (= *macrophthalma*, Staud.), *salvini*, Butl., fig. 17, *labe*, Butl., fig. 3, *pieria*, Butl. (= *usitata*, Butl. & Druce, *gulnare*, Butl. fig. 11, *squamistriga*, Feld. (= *zabdi*, Butl.), fig. 24, *similis*, Butl. (? = *undina*, Butl.) fig. 4, *renata*, Cram. (= *disaffecta*, Butl. & Druce), fig. 5, *libye*, Linn. (= *libyoidea*, Butl.), *satyrina*, Bates (= *gigas*, Butl., = *incerta*, Butl. & Druce), fig. 23, *polyphemus*, Butl. (= *umbracea*, Butl. & Druce, = *cyclops*, Butl.), fig. 22, *nebulosa*, Butl., fig. 10, *cœmerta*, Cram. (= *hermes*, Fabr., = *sosybius*, Fabr., = *fullax*, Feld., = *maimoune*, Butl.), figs. 6 & 7, *phares*, Godt., figs. 8 & 9, *nebulosa*, Butl., fig. 10, *gemma*, Hübn., fig. 12, *glaucina*, Bates, figs. 18 & 19, *sericeella*, Bates, fig. 20, *ithamna*, Butl., fig. 25, *argentella*, Butl. & Bruce, fig. 26, and *pyracmon*, Butl., fig. 27, pl. viii.

The following known species of *Satyrinæ* are redescribed, and in most cases figured by F. Moore (Lep. Ceyl.):—*Melanitis ismene*, Cram., p. 14, figs. 2 *a* & *b*, *leda*, Linn., p. 15, figs. 1 *a* & *b*, pl. x.; *Lethe neelgherriensis*, Guér., p. 16, pl. vii. figs. 1 & 1 *a*, *drypetes*, Hew. (= *embolima*, Butl., p. 17, pl. viii. figs. 1 *a* & *b*, and *daretis*, Hew., p. 18, pl. vii. figs. 2 *a* & *b*; *Orsotriæna mandata*, Moore (= *gamaliba*, Butl.), p. 22, pl. xi. figs. 1 & 1 *a*, *Iphthima singala*, Feld., p. 24, figs. 3 & 3 *a*, and *ceylonica*, Hew., p. 25, figs. 5 & 5 *a*, pl. xii.

Argyrophorus argenteus, Blanch., = *leucothea*, Molina, *Tetraphlebia* (?) *plumbeola*, Butl., = *Cosmosatyrus leptoneuroides*, Feld., and *Mycalesis saga*, Butl., = *nebulosa*, Feld.: Kirby, P. R. Dubl. Soc. (2) ii. pp. 297 & 298.

Elymnias fraterna, Butl., and *singhala*, Moore, figured and redescribed; Moore. Lep. Ceyl. pp. 25 & 26, pl. xiii. figs. 1 *a*, *b*, & 2, 2 *a*. (The genus is included with the *Satyrinæ*).

Gnophodes betsimena, Boisd., is distinct from *pythia*, the S. African *G. parmeno*, Trim., is distinct from the W. African form, and may be called *G. diversa*; Butler, Ann. N. H. (5) v. p. 333.

Melanitis amabidis, Boisd., ♂ described; Salvin & Godman, P. Z. S. 1880, p. 610.

Erebia cassiope: habits; J. Fraser, Ent. M. M. xvii. pp. 148 & 149. *E. pyrrha*, var. *pyrrhula* from the Grisons described; Frey, Lep. Schweiz. p. 37.

Erebiola butleri, Fereday, redescribed and figured by him; Tr. N. Z. Inst. xii. pp. 264–266, pl. ix. figs. 1–4.

Melanargia galathea, yellow variety from Lüneburg, described; Rüst, Ent. Nachr. vi. pp. 282 & 283.

Œneis jutta, Hübn., near Stockholm, Thesenius, Ent. Tidskr. i. pp. 196, 197, & 215.

Epinephile interposita, Ersch., figured; Butler, P. Z. S. 1880, pl. xxxix. fig. 1. *E. pasiphae*, ab. *tessalensis*, from Algeria, described; Austaut, Le Nat. ii. p. 156.

Satyrus circe, var., R. Rubattel, Feuill. Nat. x. p. 48. *S. janira*, observed on May 3rd; Hay, Ent. xiii. p. 61. With white patches on wings; Parish, Ent. xiii. p. 186.

Aulocera brahminus, Blanch. Blanchard has figured *A. werang*, Lang and the ♀ of another species, as the sexes of his *Sat. brahminus*; Moore & Butler, P. Z. S. 1880, p. 147.

Mycalesis asochis, Hew., ♀ described; Kirby, *l. c.* p. 335.

Iphthima ceylonica, Hew., recorded from Madras; *I. corynetes*, Boisd., from Natal, is only a MS. species; *id. l. c.*

Cœnonympha arcania, L., var. *darwiniana*, Staud., more fully described; Frey, Lep. Schweiz. p. 48. *C. inornata*, Edw., recorded from Newfoundland; W. H. Edwards, Psyche, iii. p. 114.

New genera and species:—

Parantirrhœa, Wood-Mason, J. A. S. B. xlix. pt. ii. p. 248. Allied to *Antirrhœa*; type, *P. marshalli*, sp. n., *l. c.* p. 250, Travancore.

Hanipha, Moore, Lep. Ceyl. p. 18. Type, *Lethe sinhala*, Moore; add *Debis dynsate*, Hew. (both redescribed and figured, pp. 19 & 20, pl. viii. figs. 2 *a* & *b*, pl. ix. figs. 1 *a* & *b*).

Calysisme, id. *l. c.* p. 20, and Tr. E. Soc. 1880, p. 161. To contain *Pap. drusia*, Cram. (p. 20, pl. xi. figs. 3 & 3 *a*), *P. blasius*, Fabr. (p. 21, pl. xi. figs. 2 & 2 *a*), *P. perseus*, Fabr. (p. 21, pl. xii. figs. 1 & 1 *a*), and *P. mineus*, Linn. (p. 22, pl. xi. figs. 4 *a* & *b*).

Nissanga, id. *ll. c.* p. 23 & 169. Type, *Mycalesis patnia*, Moore (p. 23, pl. xii. figs. 2 & 2 *a*.

Virapa, id. Tr. E. Soc. 1880, p. 155. Type, *Mycalesis anaxias*, Hew.

Gareris, id. *l. c.* p. 156. Type, *M. sanatana*, Moore.

Satoa, id. *l. c.* p. 157. Type, *M. maianeas*, Hew.

Sadarga, id. *l. c.* Type, *M. gotama*, Moore.

Dalapa, id. *l. c.* p. 158. Type, *M. sudra*, Feld.

Suralaya, id. *l. c.* p. 159. Type, *M. orseis*, Hew.

Jatana, id. *l. c.* p. 164. Type, *M. mynois*, Hew.

Pachama, id. *l. c.* p. 165. Type, *M. mestra*, Hew.

Indalasa, id. *l. c.* p. 166. Type, *M. moorii*, Feld.

Samanta, id. *l. c.* Type, *M. malsara*, Moore.

Telinga, id. *l. c.* p. 167. Type, *Satyrus adolphii*, Guér.

Kabanda, id. *l. c.* p. 168. Type, *M. malsarida*, Butl.

Martanda, id. *l. c.* p. 169. Type, *M. janardana*, Moore.

Mydosama, id. *l. c.* p. 170 (= *Dasyomma*, Feld., preocc.). Type, *D. fuscum*, Feld.

Nebdara, id. *l. c.* p. 173. Type, *M. tagala*, Feld.

Sevanda, id. *l. c.* p. 174. Type, *Sat. duponcheli*, Guér.

Lohora, id. *l. c.* p. 175. Type, *M. dexamenus*, Hew.

Nasapa, id. *l. c.* p. 176. Type, *M. aramis*, Hew.

Loesa, id. *l. c.* p. 177. Type, *M. oroatis*, Hew.

Lamprolenis, Godman & Salvin, P. Z. S. 1880, p. 610. Allied to *Mycalesis*; type, *L. nitida*, sp. n., *l. c.* p. 611, pl. lvi. fig. 2, New Guinea.

Callyphthima, Butler, Ann. N. H. (5) v. p. 335. Allied to *Pseudonympha* and *Iphthima*; type, *P. wardi*, Butl. (♂ described, *l. c.*).

Zophoessa julaurida, De Nicéville, J. A. S. B. xlix. pt. ii. p. 245, N.W. Himalayas.

Lethe maitrya, N.W. Himalayas, p. 245, and *satyavati*, Assam, *id. l. c.* p. 246. *L. siderea*, Sikkim, Marshall, *op. cit.* p. 246.

Neope bhima, id. *ibid.*, Burma.

Melanitis tambra, Moore, Lep. Ceyl, p. 15, pl. ix. figs. 2 *a–c*, Ceylon.

Tisiphone lyssa, Burmeister, Atlas, p. 55, Tucuman.

Idiomorphus una, *massalia*, p. 195, and *vala*, p. 196, Plötz, S. E. Z. xli., W. Africa.

Euptychia peribœa and *lineata*, Godman & Salvin, Tr. E. Soc. 1880, p. 128, pl. iii. figs. 2 & 3, Santa Marta. *E. summandosa*, Gosse, Ent. xiii. p. 202, Paraguay.

Pseudonympha cowani and *turbata*, Butler, Ann. N. H. (5) v. p. 334, Fianarantsoa.

Erebia shallada, Kunawur, Lang, and *mani*, Ladak, De Nicéville, *l. c.* p. 247.

Callerebia hybrida, Butler, P. Z. S. 1880, p. 147, N.W. Himalayas.

Hipparchia diffusa, id. *l. c.*, Ravee Basin, India.

Satyrus sylvicola, Austaut, Le Nat. ii. p. 284, Algeria.

Mycalesis oculus, Marshall, *l. c.* p. 247, Travancore. *M. melanopis*, Godman & Salvin, P. Z. S. 1880, p. 610, pl. lvi. fig. 1, New Guinea. *M. sophrosyne*, *nuwa*, p. 196, *istaris*, *tolosa*, *peitho*, p. 197, *decira* and *gerda*, p. 198, Plötz, *l. c.*, W. Africa. *M. difficilis* and *cingulina*, Mabille, CR. Ent. Belg. xxiii. p. cv., Madagascar.

Strabena dyscola, id. *l. c.*, Madagascar.

Sadarga oculata, Moore, Tr. E. Soc. 1880, p. 158, Silhet.

Calysisme indistans, id. *l. c.* p. 164, Calcutta.

Samanta rudis, N. India, and *lepcha*, Nepal, *id. l. c.* pp. 166 & 167.

Physcœneura pione, Godman, P. Z. S. 1880, p. 183, pl. xix. figs. 2 & 3, E. Africa.

Iphthima doleta, Kirby, P. R. Dubl. Soc. (2) ii. p. 336, Sierra Leone. *I. ordinata*, Butler, *l. c.* p. 148, pl. xv. fig. 3, Bengal. *I. thora*, Moore, Lep. Ceyl. p. 24, pl. xii. figs. 4 & 4 *a*, Ceylon.

Lymanopoda cæruleata, Godman & Salvin, Tr. E. Soc. 1880, p. 129, pl. iii. fig. 4, Santa Marta.

Pedaliodes polyxo, figs. 8 & 8 *a*, *leucocheilus*, fig. 5, p. 129, *symmachus*, fig. 7, pl. iii., *tyrrheus*, pl. iv. fig. 6, p. 130, *iid. l. c.*, Santa Marta.

Libytheidæ.

Libythea rohini, Marshall, J. A. S. B. xlix. pt. ii. p. 248, Khasi Hills.

Erycinidæ.

Esthemopsis linearis, sp. n., Godman & Salvin, Tr. E. Soc. 1880, p. 132, pl. iv. fig. 13, Santa Marta.

Siseme pomona, sp. n., *iid. l. c.* fig. 14, Santa Marta, Venezuela.

Charis zabua, sp. n., Gosse, Ent. xiii. p. 202, pl. ii. fig. 5, Corrientes.

Lycænidæ.

Lampides pactolus, Feld. ?, or sp. n. ?, from Port Blair and North

India, described, p. 230 ; *Hypolycæna andamana*, Moore, = *erylus*, Godt. ; *Sithon sugriva*, Hew., var. *areca*, Feld., ♀ described, p. 232; *S. kamorta*, Feld., is distinct; *S. westermanni*, Feld., var. noticed ; *tarpina*, Hew., redescribed, p. 233 ; *Deudorix orseis*, Hew., ♀ noticed, *Arrhopala centaurus*, Fabr., var. *coruscans*, noticed, p. 234 ; *Surendra latimargo*, Moore, = *quercetorum*, Moore, var., = ? *vivarna*, Horsf., var. p. 235. Wood-Mason, J. A. S. B. xlix. pt. ii.

Pentila acræa, Doubl., varr. *sanguinea* and *bimacula*, from W. Africa, described; Plötz, S. E. Z. xli. pp. 198 & 199.

Liptena libentina, Hew., var. *zerita*, from W. Africa, described ; *id. l. c.* p. 199.

Lycæna negus, Feld., = *parsimon*, Cram.; *L. praxiteles*, Feld., = *hellotia*, Mén., ♂ ; *P. gaika*, Trim., recorded from Ceylon, Kirby, P. R. Dubl. Soc. (2) ii. p. 336. *L. alexis*, hermaphrodite ; Dewey, Ent. xiii. p. 240. *L. argiolus*, var., gen. ii. *parvipuncta*, described ; Fuchs, S. E. Z. xli. pp. 116–118. *L. corydon*, variety noticed ; Hodge, Ent. xiii. p. 240. *L. medon*, aberration ; Lelièvre, Le Nat. ii. p. 242. *L. neglecta*, hermaphrodite; W. H. Edwards, Psyche, iii. p. 114, Canad. Ent. xii. p. 160. *L. persica*, Bien., redescribed ; Butler, P. Z. S. 1880, p. 407.

Cupido arinia, Oberthür. Amended description ; Ann. Mus. Genov. xv. p. 523.

Chrysophanus dispar and *hippothoe* : on their specific claims ; Le Nat. ii. pp. 180 & 181, and Ent. xiii. pp. 137–140. *C. phlæas* : varieties noticed ; Ent. xiii. pp. 277 & 278 ; Le Nat. ii. pp. 164, 169, 178, & 180 ; S. E. Z. xli. p. 115. *C. virgaureæ* recorded as taken at Cromer ; Capel Cure, Ent. xiii. p. 45.

Thecla icana, Moore, ♀ described ; Butler, P. Z. S. 1880, p. 149. *T. pæas*, Hübn., injurious to cotton ; Am. Ent. iii. p. 201. *T. quercus* : pupa squeaking ; Parish, Ent. xiii. p. 186.

Iolaus argentarius, Butler, ♂ described by him ; Ann. N. H. (5) v. p. 395, Madagascar.

New species :—

Zeritis aderna, Plötz, S. E. Z. xli. p. 203, Victoria, W. Africa.

Lampides contracta, Butler, P. Z. S. 1880, p. 406, pl. xxxix. fig. 3, Candahar, Kutch; *L. plumbeo-micans*, Wood-Mason, J. A. S. B. xlix. pt. ii. p. 231, Port Blair.

Lycæna (*Lampides*) *butleri*, Oberthür, Ann. Mus. Genov. xv. p. 170, pl. i. fig. 2, Abyssinia.

Lycæna bracteata, Butler, P. Z. S. 1880, p. 407, pl. xxxix. fig. 4, Candahar ; *L. togara*, p. 202. *mirza* and *locra*, p. 203, Plötz, *l. c.*, W. Africa ; *L. artemenes*, Mabille, CR. Ent. Belg. xxiii. p. xvi., Madagascar.

Castalius auratus, Butler, Ann. N. H. (5) v. p. 336, Fianarantsoa.

Chrysophanus stygianus, id. P. Z. S. 1880, p. 408, pl. xxxix. fig. 5, Candahar.

Thecla cimelium, Paraguay, fig. 2, *cruenta*, Corrientes, fig. 4, and *ivelia*, Paraguay, fig. 3, Gosse, Ent. xiii. pp. 203–205, pl. ii.

Aphnæus lutosus, p. 200, *guttatus* and *asterius*, p. 201, Plötz, *l. c.*, W. Africa.

Hypolycæna bellina, id. *l. c.* p. 200, Aburi, W. Africa.

Lycœnesthes buchholzi and *mœander*, id. *l. c.* p. 202, W. Africa.
Sithon camerona, id. *l. c.* p. 201, Cameroons.
Phytala eurema, id. *l. c.* p. 199, W. Africa.
Deloneura marginata, id. *l. c.* p. 204, W. Africa.

Hesperiidæ.

Pamphila sylvicola, Herr.-Schäff., = *nero*, Fabr., *P. mœsa*, Moore, = *dara*, Koll., and *Pyrgus superna*, Moore, = *Hesperia galba*, Fabr.; Kirby, P. R. Dubl. Soc. (2) ii. p. 328.

Erycides licinus, Möschl.: if this species should be considered to clash with *Pamphila licinus*, Edw., it may be called *E. sigovesus*; Möschler, S. E. Z. xli. pp. 114 & 115. *E. palemon*, Cram. & Fabr., redescribed; Mabille, Bull. Soc. Ent. Fr. (5) x. p. xlvi.

Thymelicus premnas, Burm., *nec* Wallengr., renamed *nitidula*, Berg; Burmeister, Atlas, pp. 55 & 56.

Syrichthus cacaliæ, Ramb., and *andromeda*, Wallengr., redescribed; Frey, Lep. Schweiz. pp. 52 & 53.

Erinnys marrubii, Herr.-Schäff. Transformations described; Roberts, P. Z. S. 1880, p. 411.

Tagiades aleca, Moore, ♀ described; Wood-Mason, J. A. S. B. xlix. pt. ii. p. 241.

New species :—

Erycides spurius and *decolor*, Mabille, Bull. Soc. Ent. Fr. (5) x. p. xlvi., exact localities not stated; *E. phanias*, Burmeister, Atlas, p. 56, Tucuman.

Ismene albertisi, Oberthür, Ann. Mus. Genov. xv. p. 528, pl. ii. fig. 2, Andai.

Entheus marshalli, Kirby, P. R. Dubl. Soc. (2) ii. p. 339, Trinidad.

Hesperia fervida, Butler, Ann. N. H. (5) v. p. 339, Fianarantsoa; *H. boseœ*, Saalmüller, Ber. senck. Ges. 1879–80, p. 259, Nossi-Bé.

Pamphila apostata, Snellen, Midden-Sumatra, iv. (1) 8, p. 27, Sumatra; *P. ursa* and *pottawottomie*, Worthington, Canad. Ent. xii. pp. 49 & 50, Illinois, &c.; *P. byssus*, W. H. Edwards, *op. cit.* p. 224, Florida.

Thymelicus palemonides, Snellen, *l. c.* p. 28, Sumatra.

Pyrgus evanidus, Butler, Ann. N. H. (5) v. p. 223, Beloochistan.

Tagiades maura, Snellen, *l. c.* p. 28, Sumatra. *T. homeyeri*, Plötz, S. E. Z. xli. p. 307, Pungo-N'dongo, W. Africa.

Sphingidæ.

P. Maassen publishes a detailed criticism of Butler's Revision of the *Sphingidæ*; S. E. Z. xli. pp. 49–72.

Thyreus, Swains. (preocc.), renamed *Maredus*, and *Lophura*, Herr.-Schäff. (preocc.), renamed *Gurelca*; Kirby, P. R. Dubl. Soc. (2) ii. p. 330.

The markings on the larvæ of *Smerinthus populi* and other *Sphingidæ*, simulate the fungi, or the galls of *Phytopi*, which infest the trees on which they feed; P. Cameron, Tr. E. Soc. 1880, pp. 69–71.

Chœrocampa cretica, Boisd., and *Eusmerinthus kindermanni*, Ersch. Transformations described, and portions of the larvæ and the pupa of the latter figured ; Roberts & Butler, P. Z. S. 1880, pp. 411–414, pl. xxix. figs. 8, 11, & 12.

Macroglossa bombylans, Boisd., recorded from Madagascar ; Kirby, *l. c.* p. 340.

Chœrocampa elpenor, var. of larva described; Hammond, Ent. xiii. p. 280. *C. nerii*, new to Scotland, recorded from Crieff; Raynor, Ent. xiii. p. 162, and Scot. Nat. v. p. 346.

Philampelus. Larva of an undetermined species said to feed on *Nymphæa* in Louisiana, and to swim from one plant to another; Reizenstein, Psyche, iii. p. 113. *P. achemon* noticed and figured in all states ; Rep. E. Soc. Ont. 1879, pp. 73 & 74, figs. 42–44. *P. eos*, Burm., = *lycidas*, Boisd., var., figured and larva described ; Burmeister, Atlas, p. 58, pl. x. fig. 1.

Deilephila euphorbiæ : pupa hissing when placed in water ; J. J. Weir, Ent. xiii. p. 218. *D. livornica* recorded as new to Sweden ; Kindberg, Ent. Tidskr. i. pp. 153 & 154 : also noticed from Tunis ; Lucas, Bull. Soc. Ent. Fr. (5) x. p. lxviii. *D. porcellus* with the rose-colour replaced by olive-green ; Fallou, *op. cit.* p. lxxvi.

Œnosanda noctuiformis, Walk., recorded from Florida ; W. H. Edwards, N. Am. Ent. i. p. 103.

Smerinthus austauti, Staud., ab. *incarnata* described ; Austaut, Le Nat. ii. p. 237. *S. ocellatus* : varieties of larva; E. Boscher, P. E. Soc. 1880, p. xxviii. *S. populi* with abnormal coloration, and one antenna malformed ; J. J. Weir, P. E. Soc. 1880, p. xxvii. : hermaphrodites ; Kirby & Hudson, *op. cit.* p. xxx., Shuttleworth, Ent. xiii. p. 116 : variety of larva ; Flemyng, Ent. xiii. pp. 243 & 244.

Sphinx ligustri : scent-apparatus described ; Von Reichenau & Fügner, Ent. Nachr. vi. pp. 141 & 166, and Kosmos, vii. pp. 387–390, woodcuts. Pupa with double proboscis noticed and figured ; Kraatz, Deutsche E. Z. xxiv. p. 345, pl. ii. figs. 38 & 39. *S. pinastri*, var. noticed ; Thesenius, Ent. Tidskr. i. pp. 197 & 215. *S. quinque-maculata* : popular account of transformations ; C. J. S. Bethune, Canad. Ent. xii. pp. 101–104, woodcuts.

Phlegethontius distans, Butl., = *roseo-fasciata*, Koch ; Kirby, *l. c.* p. 333.

New species :—

Pholus hesperidum (Westw., MS.) briefly noticed ; Kirby, P. R. Dubl. Soc. (2) ii. p. 340, Jamaica.

Deilephila robertsi, Butler, P. Z. S. 1880, p. 412, Candahar. (Described in all stages, and portions of larva, and pupa figured ; pl. xxxix. figs. 9 & 10).

Sphinx streckeri, Staudinger, Ent. Nachr. vi. p. 252, Wladiwostock. *S. buchholzi*, Plötz, S. E. Z. xli. p. 76, W. Africa. *S. maura*, Burmeister, Atlas, p. 57, Tucuman.

Protoparce blackburni, Butler, Ent. M. M. xvii. p. 6, Honolulu.

Metagastes piepersi, Snellen, Tijdschr. Ent. xxiii. p. xxii., Java.

Basiana hornimani, Druce, Ent. M. M. xvi. p. 268, Mongo-ma-Lobah.

ÆGERIIDÆ.

Sesia apiformis. Habits of larva; D. M'Lellan, P. Glasg. Soc. iv. p. 17.

Trochilium polistiforme mimics *Polistes fuscus*; Packard, Am. Nat. xiv. p. 600. *T. tipuliforme*, noticed and figured; Rep. E. Soc. Ont. 1879, pp. 76 & 77, fig. 50.

Ægeria exitiosa attacking almond; Fuller, Am. Ent. iii. pp. 11 & 12.

Trochilium lustrans, sp. n., Grote, Canad. Ent. xii. p. 213, Ohio.

Melittia (?) *auristrigata*, sp. n., Plötz, S. E. Z. xli. p. 77, Aburï, W. Africa.

URANIIDÆ.

Urania sloanus. Habits; Gosse, Ent. xiii. pp. 133–135.

Nyctalemon patroclus. Pupa and cocoon described; Lucas, Bull. Soc. Ent. Fr. (5) x. pp. liii. & liv.

Sematura lunus and *selene* noticed; Kirby, P. R. Dubl. Soc. (2) ii. p. 340.

CASTNIIDÆ.

Buchecker (Syst. Ent. Lep. viii.) divides the *Castniidæ* into (mostly new) genera according to their neuration. He separates the genus *Athis* as subfamily *Athinæ*, because there is no appendicular cell on the hind wings, and the discoidal cell of the fore wings is very broad and tripartite, with a very broad appendicular cell at its upper portion. The other genera form the subfamily *Castniinæ*.

Chremes, pl. i. Type, *C. jonesi* (= *Castnia chremes*, Fabr.) (*Castnia pelasgus*, Fabr., is figured, pl. ii. fig. 2, without generic name.)

Herrichia, l. c. pls. ii. & xxvi. Types *cronis*, Cram., *dacræoides*, Boisd., and *therapon*, Koll.

Castnia, Fabr. (pls. iii.–xiv.). Types, *fonscolombii*, Latr., *grayi*, Boisd., *walkeri* [= *fonscolombii*, ♀], pl. v., Brazil, *latreillii*, Godt., *zerynthia*, Walk., *icarus*, *pylades*, Cram., *syphax*, Fabr., *ardalus*, Dalm., *orestes*, Walk., *inca*, Walk., *palatinus*, Cram., *satrapes*, Koll., *phalaris*, Fabr., and *amycus*, Cram.

Graya, pls. xv.–xviii. Types, *C. procera*, Boisd., *licus*, *dædalus*, Cram., and *atymnus*, Dalm.

Euphrosyne, pl. xix. Type, *E. pertii* (= *Castnia euphrosyne*, Perty).

Corybanthes, Hübn., pl. xx. Types, *C. evalthe*, Fabr., and *wagneri*, sp. n., *l. c.*, Colombia.

Prometheus, Hübn., pls. xxi. & xxii. Type, *C. cochrus*, Fabr.

Doubledaya, pl. xxiii. Type, *C. zagræus*, Feld.

Cabirus, pl. xxiv. Type, *C. linus*, Cram.

Geyeria, pls. xxv. & xxvi. Types, *decussata*, Latr., *godarti*, Mén., and *castnioides* [= *huebneri*, Boisd.], *l. c.* pl. xxvi. upper fig., Brazil.

Athis, Hübn., pl. xxviii. Type, *C. fabricii*, Godt.

Castnia archon, Catamarca, and *uruguayana*, Paysandu, Burmeister, Atlas, p. 66, spp. nn.

Cocytiidæ.

Cocytia durvillii. Palpi of both sexes described; Lucas, Bull. Soc. Ent. Fr. (5) x. pp. lix. & lx.

Agaristidæ.

Alypia maccullochi, Kirby, ♂ described and figured; W. Couper, Canad. Ent. xii. pp. 41 & 42, figs. 7 & 8.

Edwardsia ‖, g. n., Neumoegen, Canad. Ent. xii. p. 67. Allied to *Pseudalypia*; type, *E. brillians*, sp. n., *l. c.* p. 68, S. W. Texas.

Agarista bruijni, sp. n., Oberthür, Ann. Mus. Genov. xv. pl. iv. fig. 6 [New Guinea ?].

Eusemia grandis, p. 268, *hornimani*, Mongo-ma-Lobah, and *medeba*, Old Calabar, p. 269, Druce, Ent. M. M. xvi. *E. metagrius* and *tranquilla*, Butler, Ann. N. H. (5) v. pp. 339 & 340, Madagascar. *E. buchholzi*, Plötz, S. E. Z. xli. p. 82, Aburi, W. Africa.

Milionia gestroi, Oberthür, *l. c.* pl. iv. fig. 5 [New Guinea ?].

Ægocera tripartita, sp. n., Kirby, P. R. Dubl. Soc. (2) ii. p. 340, Burma.

Chalcosiidæ.

Chalcosia olivescens, sp. n., Snellen, Midden Sumatra, iv. (1) 8, p. 31, Sumatra.

Zygænidæ.

Christ, —. Die Zygænen unserer Südalpen. MT. schw. ent. Ges. vi. pp. 35-46, pl. i.

Zygæna triptolemus, Frey, *charon*, Hübn. (*nec* Boisd.), *stœchadis*, Borkh., *dubia*, Staud., and var. *major*, Frey, *ochsenheimeri*, Zell., and *transalpina*, Zell., are discussed in detail. The plate represents 5 parallel forms of *Z. scabiosæ* and its Southern representative, *triptolemus*, side by side. The Northern representatives of the other species are *meliloti* (*charon*), *lonicerœ* (*stœchadis*, *dubia*, and *major*), *filipendulæ* (*ochsenheimeri*), and *hippocrepidis* (*transalpina*).

Zygæna. Hymenopterous and dipterous parasites; Bignell and others, Ent. xiii. pp. 16–18 & 69. *Z. filipendulæ* assembling round a pupa; Oberlander, S. E. Z. xli. p. 129. Var. *arctica*, from Norway (68° N.) described; Schneider, Tromsö Mus. Aarsh. iii. p. 85. *Z. lonicerœ*, Esp., var. *major* from South Switzerland, described, Frey, Lep. Schweiz. p. 67. *Z. trifolii*, Esp., occasionally double-brooded; Girard, Bull. Soc. Ent. Fr. (5) x. p. cxv. Var. (?) *gracilis* from Borwich described; A. Fuchs, S. E. Z. xli. pp. 118–120.

Syntomis alicia, Butl., and *ceres* and *rufina*, Oberth., discussed; Oberthür, Ann. Mus. Genov. xv. pp. 173 & 174.

Euchromia fraterna, Butl. Amended description; A. G. Butler, P. Z. S. 1880, p. 670.

Dahana atripennis, Grote, recorded from Florida; W. H. Edwards, N. Am. Ent. i. p. 103.

New species:—

Ino orana, Austaut, Le Nat. ii. p. 284, Oran.

Naclia amplificata, Saalmüller, Ber. senck. Ges. 1879–80, p. 261, Nossi-Bé; *N.* (?) *sippia*, Plötz, S. E. Z. xli. p. 78, Cameroons.

Syntomis negritina and *victorina*, (*S.* ?) *ponga*, p. 78, *S.* (?) *setipes*, and *S. cleta*, W. Africa, *S.* (?) *chrysopyga*, and *S.* (?) *idda*, Cameroons, p. 79, *id.* l. c.; *S. acuminata*, p. 31, *guttata*, p. 32, *dilatata*, and *biplagata* (Voll., MS.), p. 33, Snellen, Midden Sumatra, iv. (1) 8, Sumatra.

Psychotoe (?) *pallata*, Plötz, *l. c.* p. 78, Abo, W. Africa.

Glaucopis leucostalacta, Burmeister, Atlas, p. 59, Buenos Aires.

Diospaga (?) *triplex*, Plötz, *l. c.* p. 79, Eningo, W. Africa.

Antichloris (?) *solora*, *flavifrons*, and *rufidorsis*, id. *l. c.* p. 80, W. Africa.

Automolis unicolor, Oberthür, Ann. Mus. Genov. xv. p. 186, Abyssinia.

ARCTIIDÆ.

Daphænura fasciata, Butler. Scent-fans noticed; A. G. Butler, Ann. N. H. (5) v. p. 341.

Ocnogyna deserticola and *Antarctia multifaria*, Berg. Larvæ described; Berg, An. Sci. Arg. x. p. 231.

Spilosoma virginicum. Transformations described and figured; W. Saunders, Canad. Ent. xii. pp. 56 & 57. There is a process on each side of the front of the thorax; J. E. Bates, *op. cit.* p. 20.

Euchætes collaris, Fitch, and *egle*, Harr. Transformations described; H. S. Jewett, Canad. Ent. xii. pp. 228–230.

Arctia alpina, Acerbi, redescribed and figured; Spångberg, Ent. Tidskr. i. p. 91, pl. i. fig. 1. *A. cervini* var. *hnatecki* from the Valais described; Frey, Lep. Schweiz. p. 85. *A. quenseli*, Payk., var. *gelida*, Möschl., discussed and figured; Schφyen, Arch. Math. Naturv. v. p. 175, fig. 3. *A. villica*, aberration; Savage, Ent. M. M. xvii. p. 162, woodcut. *A.* (*Pyrrharctia*) *isabella*, Smith, noticed; Riley, Am. Ent. iii. pp. 133 & 134, fig. 51.

Chelonia villica and *caia*. Variation noticed; Oberthür, Bull. Soc. Ent. Fr. (5) x. pp. clxiv. & cxlv. *Cf.* also on the variation of these and other *Arctiidæ*; Fallou, *op. cit.* pp. cxlix. & cl.

Palustra burmeisteri, Berg, ♀ figured; S. E. Z. xli. pl. i. fig. 1.

New genera and species:—

Mydrodoxa, Butler, Ann. N. H. (5) v. p. 340. Allied to *Eupyra*; type, *M. splendens*, l. c. p. 341, Fianarantsoa.

Epicauses, id. *l. c.* p. 341. Allied to *Acronycta* [*Arctiidæ*, sec. Butl.]; type, *E. lanigera*, sp. n., *l. c.* p. 342, Fianarantsoa.

Charidea pretiosa, Burmeister, Atlas, p. 59, Tucuman.

Caryatis (?) *viridis*, Plötz, S. E. Z. xli. p. 80, W. Africa.

Euhalisidota longa, Grote, Canad. Ent. xii. p. 213, Florida.
Zatrephes (?) *biseriata*, Plötz, *l. c.* p. 84, Abo, W. Africa.
Amerila vitrea, id. *l. c.*, Eningo, W. Africa.
Spilosoma eyralpenus, id. *l. c.*, W. Africa; *S. melanimon*, Mabille, CR. Ent. Belg. xxiii. p. xvi., Madagascar.
Cycnia scioana (*C. shoa* on plate), Oberthür, Ann. Mus. Genov. xv. p. 176, pl. i. fig. 8, Abyssinia.
Ecpantheria kinkelini, Burmeister, *l. c.* p. 59, Buenos Aires.
Arctia (*Areas*) *galactina*, Mabille, *l. c.* p. cvii., Madagascar.
Pseudocallimorpha doriæ, Oberthür, *l. c.* p. 175, pl. i. fig. 7, Abyssinia.

Melameridæ.

Darceta nocturna, sp. n., Burmeister, Atlas, p. 64, Tucuman.

Lithosiidæ.

Scepsis fulvicollis, Hübn. Larva described; Coquillett, Canad. Ent. xii. p. 44.
Deiopeia cribraria: transformations described and figured; Künckel d'Herculais, Ann. Soc. Ent. Fr. (5) x. pp. 159 & 160, pl. iv. figs. 3–3 *a* & *b*. *D. ornatrix*, Linn.: larva described; Berg, An. Sci. Arg. x. p. 230.
Emydia grammica. Varieties from Digne noticed; Bellier de la Chavignerie, Bull. Soc. Ent. Fr. (5) x. p. cxxvii.
Hypoprepia fucosa, Hübn. Larvæ described; Coquillett, Canad. Ent. xii. p. 45.
Calligenia d-miniata, Forst., ab. *crocea*, from Paris, described; Bignault, Bull. Soc. Ent. Fr. (5) x. p. cv.
Eudule weyenberghi and *Hypocrita calochroma*, Snell., redescribed; Snellen, Period. Zool. iii. pp. 19 & 21.
Nola centonalis. Natural history; W. H. Tugwell, Ent. M. M. xvi. pp. 206–208, & Ent. xiii. pp. 42–45.
Isorropus, g. n., Butler, Ann. N. H. (5) v. p. 342. Allied to *Dyphlebia*, but with broader wings; type, *I. tricolor*, sp. n., *l. c.* p. 343, Fianarantsoa.

New species:—

Hypocrita porphyrea, Snellen, Midden Sumatra, iv. (1) 8, p. 35, Sumatra.
Nola arctica, Schφyen, Math. Nat. Vidensk. v. p. 172, figs. 1 & 2, Norway. *N. innocua* and *spreta*, Butler, P. Z. S. 1880, p. 671, Formosa. *N. musculalis*, Saalmüller, Ber. senck. Ges. 1879–1880, p. 261, Nossi-Bé.
Nudaria infantula, id. *l. c.*, Nossi-Bé. *N.* (?) *sexmaculata* and *N.* (?) *tosola*, Plötz, S. E. Z. xli. p. 81, W. Africa.
Paidia (?) *rufo-stria* and *P.* (?) *gibba*, id. *l. c.*, W. Africa.
Setina tabida, *davidata*, p. 37, and *pudibunda*, p. 38, Snellen, *l. c.*, Sumatra. *S. imminuta*, Saalmüller, *l. c.* p. 262, Nossi-Bé.
Gnophria (?) *eningæ*, Plötz, *l. c.* p. 80, Eningo, W. Africa.
Katha immaculata, Butler, *l. c.* p. 671, Formosa.
Lithosia brevipennis and *trifasciata*, Snellen, *l. c.* pp. 36 & 37, Sumatra.

L. agonchæ, Plötz, *l. c.* p. 80, Agoncha, W. Africa. *L. trispilota* and *L.* (*Capissa*?) *notifera*, Saalmüller, *l. c.* p. 262, Nossi-Bé.

Deiopeia (?) *acrisia*, Plötz, *l. c.* p. 83, W. Africa.

Barsine flabelligera, Saalmüller, *l. c.* p. 263, Nossi-Bé.

Pitane fractilinea, Snellen, *l c.* p. 38, Sumatra.

Sommeria extensa, Butler, Ann. N. H. (5) v. p. 343, Fianarantsoa.

Nycteolidæ.

Sarrothripa virgulana, sp. n., Mabille, CR. Ent. Belg. xxiii. p. xvii., Madagascar.

Thyana speculatrix, Darjiling, and *lancina*, Bhotan, Butler, Ann. N. H. (5) vi. pp. 64 & 65, spp. nn.

Nychthemeridæ.

Leptosoma. Vollenhoven's 18 species are analysed; *L. anthracinum*, Voll., = *Secusio mundipicta*, Walk., and *L. novies-punctatum*, Voll., = *maculata*, Walk.; Butler, P. Z. S. 1880, pp. 672 & 673.

Nychthemera antinorii, pl. i. fig. 1, Abyssinia, Zanzibar, Sierra Leone, p. 174, and *doriæ*, pl. iv. fig. 2 [New Guinea?]; Oberthür, Ann. Mus. Genov. xv., spp. nn.

Leptosoma regularis, Snellen, Midden Sumatra, iv. (1) 8, p. 34, Sumatra. *L. mungi*, *xanthura*, *L.* (?) *lipara*, *L.* (?) *doleris*, p. 82, and *L.* (?) *eurem*, p. 83, Plötz, S. E. Z. xli., W. Africa: spp. nn.

Dilemera uniformis, sp. n., *id. l. c.* p. 83, Eningo, W. Africa.

Pitasila inconstans, sp. n., Butler, P. Z. S. 1880, p. 672, Formosa.

Liparidæ.

Liparis detrita, Esp., noticed; Bellier de la Chavignerie, Bull. Soc. Ent. Fr. (5) x. pp. cxxvi. & cxxvii. *L. dispar*: strength of the sexual instinct and indifference to injury in this species; Ent. Nachr. vi. pp. 205 & 206. *L. salicis*: migrating swarm at Montfauçon; A. Michard, Feuill. Nat. x. p. 39.

Orgyia antiqua. Extraordinary abundance in 1880; Douglas, Ent. M. M. xvii. p. 114. Naturalized in the United States; Am. Ent. iii. p. 77. Female mating with seven males in succession; Butler, Ent. M. M. xvii. p. 133.

Parorgyia clintoni, G. & R. Larva described; Coquillett, Canad. Ent. xii. p. 45.

New genera and species :—

Pyramocera, Butler, J. L. S. xv. p. 85, fig. Allied to *Lymantria*; fore wings longer, antennæ longer, broader at the base, and narrowing in a pyramidal form to the tip, with very long pectinations; body and wings woolly beneath. Type, *P. fuliginea*, sp. n., *l. c.*, Fianarantsoa.

Xanthodura, Butler, Ann. N. H. (5) v. p. 384. Allied to *Dura* and *Orgyia*; type, *X. trucidata*, sp. n., *l. c.* p. 385, Madagascar.

Lechriolepis, Butler, *l. c.* p. 385. Resembles *Chœrotriche*; type, *L. anomala*, sp. n., *l. c.* p. 386, Madagascar. (Typical of a new subfamily, *Lechriolepidinæ*, to which the two following genera will also belong.)

Raphipeza, id. *l. c.* p. 386. Allied to last; type, *Gegane turbata*, Butl.

Chrysopsyche, id. *l. c.* p. 387. Allied to *Chœrotriche*; type, *C. mirifica*, Butl.

Brachysoma, Austaut, Le Nat. ii. p. 284. Allied to *Cnethocampa*?; type, *B. codeti*, sp. n., *l. c.*, Algeria.

Liparis binotata, Mabille, CR. Ent. Belg. xxiii. p. cvii., Madagascar.

Dasychira procincta, Saalmüller, Ber. senck. Ges. 1879–80, p. 267, Nossi-Bé.

Orgyia josephina, Austaut, Le Nat. ii. pp. 212 & 220, Oran; *O.* (?) *cæca*, Plötz, S. E. Z. xli. p. 84, W. Africa.

Leucoma translucida, Oberthür, Ann. Mus. Genov. xv. p. 177, pl. i. fig. 6, Abyssinia; *L. parva*, Aburi, and *albina*, Bonjongo, Plötz, *l. c.* p. 84.

Aroa (?) *xanthospila*, and *A. sulphurea*, id. *ibid.*, W. Africa.

Porthesia depauperata, Mabille, *l. c.* p. xvii., Madagascar.

Euproctis (?) *batoides*, Plötz, *l. c.* p. 85, Bonjongo, W. Africa.

Cnethocampa (?) *cadica*, id. *ibid.*, W. Africa.

Jana cosima, id. *ibid.*, Abo, W. Africa.

Psychidæ.

Heylaerts, fils, F. J. M. Observations relatives à des Psychides CR. Ent. Belg. xxiii. pp. xxviii.–xxxii.

Characters of the *Animulina* and *Psychina* described; all *Psychidæ* possess scales, whether the wings are clothed with hairs or not; *Œceticus variegatus*, Snell., = *crameri*, Westw.

Large S. African case, probably belonging to the *Psychidæ*, but resembling a Myriopod in general appearance; Trimen, P. E. Soc. 1880, p. xxxiv.

Heterogynis pennella, Hübn., recorded from Alsatia; Christ, MT. schw. ent. Ges. vii. pp. 15 & 16.

Heliconisa, Walk., referred to the *Psychidæ*; Berg, An. Sci. Arg. x. pp. 42 & 43.

Phalæna. Bombyx atra, L., = *Psyche plumifera*, Ochs., and *atra*, Esp., must take the name of *angustella*, Herr.-Schäff.; Heylaerts, S. E. Z. xli. pp. 186–188.

Œceticus abboti noticed; Grote, N. Am. Ent. i. pp. 52 & 53.

Heckmeyeria, g. n., Heylaerts, CR. Ent. Belg. xxiii. p. xxix. Allied to *Psyche*; fore-wings with an interposed cell, and the dorsal nervure not bifurcated; legs clothed with long yellowish hairs as far as the claws. Type, *Fumea pronubella*, Snell.

Psyche zermattensis, Frey, Lep. Schweiz. p. 91, note, Zermatt; *P. sera*, Wiskott, Ent. Nachr. vi. p. 242, Sicily: spp. nn.

Œceticus (?) *buchholzi*, sp. n., Plötz, S. E. Z. xli. p. 88, Aburi, W. Africa.

Notodontidæ.

Heterocampa pulverea, G. & R. Larva described; G. H. French, Canad. Ent. xii. pp. 83 & 84.

Stauropus fagi. Protective attitude of larva, which resembles a spider from some points of view; Meldola & H. Müller, P. E. Soc. 1880, pp. iii. & iv. Last moult fully described; Buckler, Ent. M. M. xvii. pp. 18–20.

New genera and species :—

Hyperæschra, Butler, Ann. N. H. (5) vi. p. 65. Allied to *Olene*; type, *H. pallida*, sp. n., *l. c.*, Darjiling, Singapore.

Prismosticta, id. *l. c.* p. 67. Allied to *Trilocha* and *Norasuma*; type, *P. fenestrata*, sp. n., *l. c.* p. 68, Darjiling.

Clostera alpina, Bellier de la Chavignerie, Ann. Soc. Ent. Fr. (5) x. p. 367, pls. xi. figs. 10 & 10 *a*, Digne.

Notodonta (?) *circumcincta*, Saalmüller, Ber. senck. Ges. 1879–80, p. 268, Nossi-Bé; *N. marmor*, Mabille, CR. Ent. Belg. xxiii. p. xvii., Madagascar.

Phalera stigmigera, Bhotan, and *arenosa*, Darjiling, Butler, Ann. N. H. (5) vi. p. 66.

Somera lichenina, id. *l. c.* p. 67, Borneo.

Callœnia elongata, id. *l. c.*, Darjiling.

Crinodes vethi, Snellen, Midden Sumatra, iv. (1) 8, p. 40, Sumatra.

Cœlodasys telifer, Grote, N. Am. Ent. i. p. 99, Texas, Georgia.

Cilla distema, id. *ibid.*, Texas.

Limacodidæ.

Limacodes latomia, Harv., ? = *rectilinea*, G. & R.; Grote, N. Am. Ent. i. p. 60.

Crothœma, g. n., Butler, Ann. N. H. (5) v. p. 388. Allied to *Edibessa* and *Alpis*; type, *C. sericea*, sp. n., *l. c.*, Madagascar.

New species :—

Scopelodes sericea, Butler, Ann. N. H. (5) vi. p. 63, Darjiling.

Parasa pastoralis, id. *ibid.*, Bhotan.

Heterogenea exsanguis, *marmorata*, p. 263, and *pinguis*, p. 264, Saalmüller, Ber. senck. Ges. 1879–80, Nossi-Bé.

Limoscodes nubeculosa, Snellen, Midden Sumatra, iv. (1) 8, p. 30, Sumatra. *L. flexuosa*, Florida, and *cæsonia*, New York, Grote, N. Am. Ent. i. p. 60, N. York, Sharon Springs.

Monoleuca sulfurea, Grote, N. Am. Ent. i. p. 60, Florida.

Miresa bracteata, Butler, *l. c.* p. 64, Darjiling.

Aphendala conspersa, id. P. Z. S. 1880, p. 673, Formosa.

Heterolepis (?) *sparsa*, Plötz, S. E. Z. xli. p. 87, W. Africa.

Siculodidæ.

Siculodes sordidula, Plötz, S. E. Z. xli. p. 304, Aburi, W. Africa; *S. terreola*, Mabille, CR. Ent. Belg. xxiii. p. cviii., Madagascar; *S. minutula*, Saalmüller, Ber. senck. Ges. 1879–80, p. 295, Nossi-Bé: spp. nn.

Drepanulidæ.

Drepana sicula. Habits and transformations described; Grigg & Buckler, Ent. M. M. xvii. pp. 121–123.

Rosema (?) *sicularia*, sp. n., Plötz, S. E. Z. xli. p. 304, W. Africa.

Saturniidæ.

Report of the Silk Commission at Lyons for 1879; Ann. Soc. Agric. (5) ii. pp. 475–540.

Catalogue of the Wild Silks of India; Wardle, J. Sci. Arts, xxviii. pp. 217–221.

On rearing various *Saturniidæ*, with remarks on hybrids between *Samia ceanothi* and *gloveri*; Wailly and others, J. Sci. Arts, xxviii. pp. 229–232, 337, & 338, Bull. Soc. Acclim. (3) vii. pp. 529–537, 629, 716–724, Ent. xiii. pp. 61–63, 154–158, Canad. Ent. xii. pp. 227 & 228, Psyche, iii. pp. 112 & 113.

Attacus atlas: transformations; Ann. Soc. Ent. Fr. (5) x. pp. 183–188, pl. viii. *A. pernii* and *cecropia*: on rearing in the open air; Fallou, Bull. Soc. Acclim. (3) vii. pp. 7–10. *A. pernii*; aberrations; Clément, Bull. & Ann. Soc. Ent. Fr. (5) x. pp. cxxii., 181, & 182, fig. *A. prometheus* described in all stages, with notes on rearing; Bureau, Bull. Soc. Acclim. (3) vii. pp. 345–348. *A. yama-mai*: on rearing; Hénon, *op. cit.* pp. 618–620. *A.* (*Samia*) *cynthia* discussed and figured; Riley, Am. Ent. iii. pp. 56–58, fig. 16.

Bombyx (*Actias*) *selene.* Structure of cocoon, &c., described; Clément, Ann. Soc. Ent. Fr. (5) x. pp. 161–164, pl. iv. figs. 4, 4 *a*, 4 *b*.

Hyperchiria io. On rearing; Bureau, *l. c.* pp. 412 & 413. Noticed and figured; Rep. E. Soc. Ont. 1879, pp. 75 & 76, figs. 46–48.

Saturnia carpini: mimicry of larva; Goody, Sci. Goss. xvi. p. 138. *S. pyri*: on rearing; Le Nat. ii. p. 226.

Aphelia apollinaris, ♀ in coitu with *Salamis anacardii*, ♂; Bowker & Trimen, P. E. Soc. 1880, pp. xxiii. & xxiv.

Aglia tau. Repeated copulation, and long-continued attractiveness of a ♀; Wacherzapp, Ent. Nachr. vi. pp. 15–17.

Pseudohazis eglanterina, black var. *shastaensis*, from Mount Shasta, California; J. Behrens, N. Am. Ent. i. pp. 61 & 62.

Dirphia concolor, Walk. (?), from Tucuman described; Burmeister, Atlas, p. 60.

New species:—

Attacus rhombifer, Burmeister, Atlas, p. 44, pl. xxiv. fig. 1, Grand Chaco.

Samia plœtzi (Weym., MS.), Plötz, S. E. Z. xli. p. 86, Abo, W. Africa.

Bunœa buchholzi, Plötz, S. E. Z. xli. p. 87, Aburi, W. Africa.

Copaxa subocellata, Butler, Ann. N. H. (5) v. p. 387, Madagascar.

Antheræa lapoides, id. *l. c.* p. 61, Borneo.

Saturnia antinorii, Oberthür, Ann. Mus. Genov. xv. p. 178, pl. i. fig. 4, Abyssinia.

Phricodia (?) *albida*, Plötz, *l. c.* p. 87, Bonjongo, W. Africa.

Bombycidæ.

Bombyx mori. History, under the title of "The Romance of a Caterpillar"; Wyckoff, Am. Ent. iii. pp. 111–114, & 134–137, woodcuts. On the structure and development of the sexual organs; Tichomirow, Zool. Anz. iii. pp. 235–237. On promoting the hatching of the eggs by friction; Valery-Mayot, Assoc. Fr. viii. pp. 754–756.

Lasiocampidæ.

Brahmæa lunulata Brem., = *certhia*, Fabr.; *certhia*, Walk., is renamed *conchifera*, as it is distinct from *wallichi*, Gray, = *spectabilis*, Hope; Butler, Ann. N. H. (5) v. pp. 188 & 189.

Odonestis potatoria, with abnormal coloration; Weir & Bowyer, P. E. Soc. 1880, p. xxvii., & Ent. xiii. p. 310.

Gastropacha quercus. Variation in times of appearance; Schilde, Ent. Nachr. vi. pp. 35 & 36. Var. *alpina*, described; Frey, Lep. Schweiz. p. 97. Var. *tenuata*, from N. Germany, described; Fuchs, S. E. Z. xli. pp. 120–124.

Bombyx cratægi. Transformations described and figured, including several varieties of larvæ; J. Van Leeuwen, Tijdschr. Ent. xxiii. pp. 195–197. *B. rubi* attracted by the fragments of a ♀; Zeller, S E. Z. xli. pp. 129 & 130.

Eutricha pini. Its ravages in Norway in 1812–16; W. M. Schφyen, Ent. Tidskr. i. pp. 39–42. Var. *montana* noticed; Frey, *l. c.* p. 99.

Tolype, sp. from Brazil; urticating larvæ described and figured; Burmeister, Atlas, p. 50, pl. xxii. fig. 5.

Clisiocampa sylvatica discussed; W. Saunders, Rep. E. Soc. Ont. 1878, pp. 28–30.

New species:—

Brahmæa nigrans, Butler, Ent. M. M. xvii. p. 110, Japan. *B. rufescens*, id. Ann. N. H. (5) vi. p. 62, N.E. Bengal.

Hydrias graphiptera, Saalmüller, Ber. senck. Ges. 1879–80, p. 264, Nossi-Bé.

Odonestis (?) *minima*, Plötz, S. E. Z. xli. p. 85, Eningo, W. Africa.

Clisiocampa fulgurata, Saalmüller, *l. c.* p. 265, Nossi-Bé.

Bombyx echimata, id. *ibid.*, Nossi-Bé.

Lasiocampa bosci, id. *l. c.* p. 266, Nossi-Bé.

Borocera punctifera, Mabille, CR. Ent. Belg. xxiii. p. xvii., Madagascar.

Zeuzeridæ.

Cossus. Supposed new species; A. H. Mundt, Canad. Ent. xii. pp. 39, 59, & 100.

Hypopta breviculus, Mab., ♂ described; Butler, Ann. N. H. (5) v. p. 388.

Zeuzera æsculi destructive to cherry trees; Lucas, Bull. Soc. Ent. Fr. (5) x. p. cxxxviii.

Morpheis smerintha, Hübn. Structure very fully described; Burmeister, Atlas, pp. 61–63.

Duomitus, Butler, g. n., Ann. N. H. (5) vi. p. 68. Affinities not stated; type, *D. ligneus*, sp. n., *l. c.*, Darjiling.

Zeuzera aburæ, sp. n., Plötz, S. E. Z. xli. p. 77, Aburi, W. Africa.

Phragmatœcia sumatrensis, sp. n., Snellen, Midden Sumatra, iv. (1) 8, p. 29, Sumatra.

Hepialidæ.

Hepiolus humuli: the chief peculiarities of its anatomy pointed out; E. Brandt, Zool. Anz. iii. pp. 186 & 187. Var. *hethlandica*, Staud.: variation discussed, and 9 ♂ ♂ and 3 ♀ ♀ figured; J. J. Weir, Ent. xiii. pp. 250 & 251, pl. iii. *H. velleda*, from the Shetlands, noticed and figured; *id. l. c.* p. 289, pl. iv. figs. 16 & 17.

Hepiolus marcidus, sp. n., Butler, Ann. N. H. (5) vi. p. 69, Darjiling.

Noctuidæ.

Grote, A. R. On the synonymy of North American *Noctuidæ*. Canad. Ent. xii. pp. 184–188.

Relates to various species described by Morrison.

Möschler, H. B. Beiträge zur Schmetterlingsfauna von Surinam. iii. Verh. z.-b. Wien, xxx. pp. 379-486, pls. viii. & ix.

Includes *Noctuidæ* and *Deltoidæ*. A considerable number of new genera and species are described. The following known genera, &c., are specially noticed:—*Bœcula*, Walk., recharacterized, pp. 382 & 383; *Fracara*, Walk., recharacterized, and *F. viridata*, Cram., redescribed, pp. 387 & 388; *Ophideres procas*, Cram., redescribed, p. 418; *Brujas malitiosa*, Guén. (= *opigena*, Hübn., *nec* Dru., = ? *circe*, Guén., = *festonata*, Feld. & Rog.), discussed, pp. 420 & 421; *Marmorinia epionoides* and *geometroides*, Guén., are the sexes of *Pangrapta decoralis*, Hübn., p. 451; *Cerocteena*, Guén., recharacterized, p. 469; *Euclystis columbalis*, Guén., discussed, pp. 480 & 481.

Riley, C. V. The Cotton Worm: Summary of its natural history, with an account of its enemies, and the best means of controlling it, being a report of progress of the work of the Commission (Bull. U. S. Ent. Comm. No. 3). Washington: 1880, 8vo, pp. 144, col. plate and woodcuts.

A comprehensive work on the subject. Much of it is reprinted in Am. Ent. iii., where some additional notices will be found. *Cf.* also Grote, N. Am. Ent. i. pp. 68–70.

Snellen, P. C. T. *Lepidoptera* van Celebes verzameld door M. C. Piepers, mit aanteckeningen en beschrijving der nieuwe soorten. Tweede Afdeeling: *Heterocera*. ii. *Noctuina*. Tijdschr. Ent. xxiii. pp. 41–138, pls. iv.–viii.

Includes *Deltoidæ*.

On the North American *Noctuidæ* figured in Hübner's Zuträge; A. R. Grote, Canad. Ent. xii. pp. 84–88, 116–118.

Meinert notices his discovery of an organ rising from the medial segment of the females of *Noctuæ*, which he supposes to be homologous with the halteres of *Diptera*; Tidskr. Ent. i. pp. 168 & 169.

Agrotis, *Hadena*, and *Celæna*. 12 species of these genera described under the name of "cutworms," and several figured as moths or larvæ; Bowles, Rep. E. Soc. Ont. 1879, pp. 37–46, figs. 2–6.

Telesilla cinereola, Guén., *Crambodes talidiformis*, Guén., and *Adipsophanes miscellus*, Grote. Larvæ described; D. W. Coquillett, N. Am. Ent. i. p. 52.

Thyatira batis. The larva has a deceptive resemblance to bird-droppings; P. G., Le Nat. ii. pp. 155 & 156.

Bryophila par, from Cambridge, recorded as new to Britain; Warren, Ent. xiii. pp. 225 & 226, and Ent. M. M. xvii. pp. 115 & 116.

Acronycta leporina: on breeding; Dobson, Ent. xiii. pp. 93 & 94. *A. megacephala* with only two wings; Wood & Fitch, P. E. Soc. 1880, p. xxx. *A. tridens* and *psi*: differences; Smallwood, Ent. xiii. pp. 231–233.

Simyra albo-venosa, Goeze (= *venosa*, Borkh., = *degener*, Hübn.), described in all stages, with remarks on its variation; Aurivillius, Ent. Tidskr. i. pp. 32–39. Var. *murina*, Aur., figured; Spångberg, *op. cit.* pl. i. fig. 2.

Leucania unipuncta (Army-worm). Natural history; Am. Ent. iii. pp. 170 & 171, 184, 185, 203, 214, & 215, figs. 72–75.

Nonagria fulva: larva and pupa described; Buckler, Ent. M. M. xvii. pp. 114 & 115. *N. sparganii*, Esp., noticed and figured; Carrington, Ent. xiii. pp. 49–51, figs.

Gortyna flavago and var. *cinerea* discussed; *xanthenes*, Germ., and *mœsiaca*, Herr.-Schäff., are probably only varieties: Goossens, Ann. Soc. Ent. Fr. (5) x. pp. 155–158. *G. nitida*, Guén., noticed and figured; Am. Ent. iii. p. 201, fig. 107.

Hydrœcia micacea. Larva feeding on bread; Kay, Ent. xiii. p. 14.

Spodoptera capicola, Herr.-Schäff., ? = *cilium*, Guén.; Snellen, Tijdschr. Ent. xxiii. p. 45.

Pachetra leucophœa. On rearing; Elisha, Ent. xiii. pp. 233–235.

Mamestra leineri var. (?) *pomerana*: transformations described; Dohrn, S. E. Z. xli. pp. 46 & 47. *M. nigro-cuprea*, Moore, noticed and figured; Snellen, *l. c.* p. 48, pl. iv. figs. 5 *a* & *b*. *M. splendens* and *oleracea*: larvæ compared; A. Streckfuss, Ent. Nachr. vi. pp. 279–281.

Perigea dolorosa and *illecta*, Walk., are probably sexes; Butler, P. Z. S. 1880, p. 676.

Caradrina jurassica, Herr.-Schäff., redescribed; Frey, Lep. Schweiz.

p. 152. *C. 4-punctata* var. *leucoptera*, Thunb., redescribed and figured; Spångberg, Ent. Tidskr. i. p. 62, pl. i. fig. 3.

Agrotis admirationis, Guén., noticed; Butler, Cist. Ent. ii. p. 544. *A. innotabilis*, Grote, var. from Washington Territory noticed by him; Canad. Ent. xii. p. 154. *A. lubricans*, Guén.: larva described; G. H. French, *op. cit.* p. 14. *A. speciosa*, Hübn., var. *obscura* from the Upper Engadine noticed; Frey, *l. c.* p. 117.

Agrotis saucia and *Noctua c-nigrum*. Unusual times of appearance; Barrett & Douglas, Ent. M. M. xvii. pp. 70 & 139.

Anytus sculptus, Grote, is not generically distinct from *Agrotis*; Grote, N. Am. Ent. i. p. 93.

Triphæna fimbria, monstrosity; L. Camerano, Bull. Ent. Ital. Resoconti, 1880, pp. 9 & 10. *T. pronuba*: notes on young larva; Stainton & Buckler, Ent. M. M. xvii. pp. 135 & 136.

Pachnobia hyperborea, var. from Shetland noticed and figured; J. J. Weir, Ent. xiii. p. 290, pl. iv. figs. 14 & 15.

Xanthia flavago, Fabr. (1787) = *lutea*, Ström (1783); Schφyen, S.E. Z. xli. p. 134.

Dianthœcia conspersa, var. from Shetland noticed and figured; J. J. Weir, Ent. xiii. p. 290, pl. iv. figs. 12 & 13.

Onconemis and *Homohadena*. List of N. American species; Grote, Canad. Ent. xii. pp. 255–258.

Arsilonche henrici, Grote. Larva described; Coquillett, Canad. Ent. xii. pp. 45 & 46.

Hadena (*Pseudanarta*) *crocea*, H. Edw., is hardly distinct from *flava*; Grote, *l. c.* p. 215.

Cleophana antipoda, Streck., redescribed; Grote, Canad. Ent. xii. p. 217, Colorado.

Heliothis armigera feeding on hard corn; Claypole, Am. Ent. iii. p. 278: eating pupæ of *Aletia argillacea*; Jones, Am. Ent. iii. p. 253.

Anarta. 11 Scandinavian species described, none new; J. Spångberg, Ent. Tidskr. i. pp. 3–15. *A. melanopa*, Thunb., = *alpicola*, Acerbi; *id. l. c.* p. 93. Habits; J. Fraser, Ent. M. M. xvii. p. 57.

Chasmina, Walk., probably belongs to the *Acontiinæ* rather than to the *Glottulinæ*; Butler, P. Z. S. 1880, p. 675, note.

Leocyma vestæ, Guén., var. (?) *celebensis* described; Snellen, *l. c.* p. 54.

Mesotrosta stigmatula, Snellen, noticed by him, *l. c.* pp. 55 & 56.

Xanthoptera, Guén., discussed; *id. l. c.* pp. 60 & 61.

Thalpochares. Grote gives a list of the North American species, and points out the differences between *T. patruelis*, Grote, and *Tarache patula*, Morr., *l. c.* pp. 57–59.

Eustrotia secta, Grote, neuration described by him, *l. c.* p. 50.

Homodes regularis (? = *vivida*, Guén., var.), Snellen, *l. c.* p. 67, Macassar. *H.* (?) *thermesioides*, Snell., = *Thermesia reticulata*, Walk.; Butler, P. Z. S. 1880, p. 680.

Drapetodes mitaria, Guén., noticed, and details figured; Snellen, *l. c.* p. 67, pl. v. figs. 11 & 11 *a*.

Plusia kalitura, Feld. & Rog., ? = *albo-striata*, Brem. & Grey; Snellen,

l. c. p. 73. *P. precationis*, when captured by the flowers of *Physianthus*, said to be killed and eaten by *Apis mellifica*; Packard, Am. Nat. xiv. pp. 48–50.

Calpe canadensis, Beth. Larva described; Coquillett, Canad. Ent. xii. p. 44.

Hyblæa puera, Cram., and *tortricoides*, Guén. Structure of the former noticed, and the latter redescribed; Snellen, *l. c.* pp. 74 & 75.

Anomis, sp. destructive to cotton at Bahia; Am. Ent. iii. pp. 128 & 129.

Spiloloma, Grote, considered too near *Spilosoma*, renamed by him *Strenoloma*, N. Am. Ent. i. p. 99.

Apopestes phantasma, Eversm. Transformation described; Roberts, 1880, pp. 414 & 415.

Stilbia anomala. Larva described; G. T. Porritt, Ent. M. M. xvi. pp. 210 & 211.

Alamis, Guén., and *Pericyma*, Herr.-Schaff., are distinct; Snellen, *l. c.* pp. 80 & 81. *A. umbrina*, Guén., is redescribed; *l. c.* pp. 81 & 82.

Cocytodes cærulea, Guén. *C. granulata*, Guén., is probably a variety of the female, and *Arcte polygrapha*, Koll., may also be identical; *id. l. c.* p. 85.

Stictoptera cucullioides, Guén., 9 varieties mentioned; *id. l. c.* p. 86.

Catocala. Dates of appearance of various species in Pennsylvania; Johnson, Canad. Ent. xii. pp. 137 & 138. Captures in Illinois; French, *op. cit.* pp. 241 & 242. *C. ultronia* redescribed and figured; W. Saunders, *op. cit.* pp. 4 & 5, fig. 1, & Rep. E. Soc. Ont. 1879, pp. 74 & 75, fig. 45.

Ercheia. The following species of Walker's belong to this genus: *Achæa cyllata*, *cyllaria*, *fusifera*, *signivitta*, *polychroma*, and *Catephia dubia*; Butler, P. Z. S. 1880, p. 678.

Crino sommeri, Hübn., proved to be a Javan insect; Snellen, *l. c.* p. 99, and note.

Ophiodes tirrhæa noticed from Tunis; Lucas, Bull. Soc. Ent. Fr. (5) x. p. lxviii.

Ophisma lætabilis, Guén., = *peropaca*, Geyer, which was erroneously stated to come from Montevideo; Snellen, *l. c.* p. 99.

Ophiusa joviana, Guén., *nec* Cram., renamed *guenei*; id. *l. c.* p. 103.

Remigia gregalis, Guén., = *archesia*, Cram., and is distinct from *virbia*, Cram; *R. optativa*, Walk., is probably a *Polydesma*; Butler, P. Z. S. 1880, p. 680. *R. lycopodia*, Hübn., = *alipes*, Feld. & Rog., = ? *frugalis*, Fabr., var.; Snellen, *l. c.* p. 106.

Lacera capella, Guén., = *alope*, Cram., ♀; *id. l. c.* p. 108.

Amphigonia hepatizans, Guén. Palpi described and figured; *id. l. c.* p. 108, pl. viii. fig. 46.

Thermesia rubricans, Boisd. Structure described; *id. l. c.* p. 109.

Anticarsia gemmatilis, varies on the upper surface only; Grote, *l. c.* p. 103.

New genera and species :—

Erioscele, Möschler, Verh. z.-b. Wien, xxx. p. 384. Allied to *Eriopus*; type, *E. rureoides*, sp. n., *l. c.* p. 385, Surinam.

Dædalina, Möschler, *l. c.* p. 385. Placed next to *Erioscele*; type, *D. cleria*, sp. n., *l. c.* p. 386, pl. ix. fig. 44, Surinam.

Amphodia, id. *l. c.* p. 386. Placed next to *Dædalina*; type, *A. prolata*, sp. n., *l. c.* p. 387, pl. ix. fig. 45, Surinam.

Thelidora, id. *l. c.* p. 391. Placed next to *Plasia*; type, *T. splendens*, sp. n., *l. c.* p. 392, pl. ix. fig. 46, Surinam.

Gonuris, id. *l. c.* p. 397. Affinities not stated; placed next to *Anomis*; type, *G. flaminia*, sp. n., *l. c.* p. 398, pl. ix. fig. 43, Surinam.

Hesperimorpha, Saalmüller, Ber. senck. Ges. 1879–80, p. 283. Allied to *Spintherops*; type, *H. paradoxa*, sp. n., *ibid.*, Nossi-Bé.

Smyra, Möschler, *l. c.* p. 408. Affinities uncertain; placed after *Yrias*; types, *S. recurvicornis* and *chlorolimbis*, spp. nn., *l. c.* p. 409, pl. ix. figs. 50 & 51, Surinam.

Placonia, id. *l. c.* p. 410. Placed next to *Smyra*; type, *P. selene*, sp. n., *l. c.* p. 410, pl. viii. fig. 1, Surinam; add *Noctua japeta*, Cram.

Stenopis, Mabille, CR. Ent. Belg. xxiii. p. cvii. Allied to *Sphingomorpha*; type, *S. reducta*, sp. n., *l. c.* p. cviii., Madagascar.

Arctinia, Möschler, *l. c.* p. 432. Placed after *Athyrma*; types, *A. suffumata* and *diffumata*, spp. nn., *l. c.* p. 433, pl. ix. figs. 24 & 25, Surinam.

Amabela, id. *l. c.* p. 435. Placed after *Poaphila*; type, *A. delicata*, sp. n., *l. c.* pl. ix. fig. 34, Surinam.

Gabyna, id. *l. c.* p. 445. Placed after *Thermesia*; types, *G. cærulina*, pl. ix. fig. 47, and *erratrix*, spp. nn., *l. c.* pp. 445 & 446, Surinam.

Adyroma, id. *l. c.* p. 455. Placed after *Capnodes*; type, *A. reposita*, sp. n., *l. c.* p. 456, Surinam.

Clapra, id. *l. c.* p. 457. Placed after *Adyroma*; types, *C. asthenoides*, *ero*, and *quadrata*, spp. nn., *l. c.* pp. 457–459, pl. ix. figs. 37, 36, & 38, Surinam.

Megacephalon, Saalmüller, *l. c.* p. 286. Allied to *Hypenaria*; type, *M. rivulosum*, sp. n., *l. c.* p. 287, Nossi-Bé.

Buphana, Möschler, *l. c.* p. 462. Affinities not stated; placed next to *Plaxia*; type, *B. zapissa*, sp. n., *l. c.* pl. ix. fig. 35, Surinam.

Charadra palata, Grote, Canad. Ent. xii. p. 258, Colorado.

Apatela thoracica, id. N. Am. Ent. i. p. 94, Colorado.

Chlenias manxifera [!], Fereday, Tr. N. Z. Inst. xii. p. 268, pl. ix. fig. 1′, New Zealand (= *Detunda atro-nivea*, Walk.).

Leucania circulus, Saalmüller, Ber. senck. Ges. 1879–80, p. 268, Nossi-Bé; *L. pulchra*, Snellen, Midden-Sumatra, iv. (1) 8, p. 41, Sumatra; *L. aspersa* and *incana*, id. Tijdschr. Ent. xxiii. pp. 42 & 43, pl. iv. figs. 1 & 2, Celebes; *L. percussa* and *insularis*, Butler, P. Z. S. 1880, p. 674, Formosa; *L. dentigera*, id. Cist. Ent. ii. p. 542; *L. sulcana*, Fereday, Tr. N. Z. Inst. xii. p. 267, pl. ix .fig. 3′ (apparently = *L. semivittata*, Walk.), New Zealand; *L. rosea* and *punctifera*, Möschler, Verh. z.-b. Wien, xxx. p. 389, Surinam.

Sesamia albiciliata, Snellen, Tijdschr. Ent. xxiii. p. 44, pl. iv. fig. 3, Celebes; *S. tranquillaris*, Butler, P. Z. S. 1880, p. 674, Formosa.

Nonagria gracilis, id. *l. c.* p. 675, Formosa.

Bœcula myrina, Möschler, *l. c.* p. 383, Surinam.

Gortyna serrata, Grote, N. Am. Ent. i. p. 94, Colorado.

Lithophane contenta, id. Canad. Ent. xii. p. 116, California.

Xylophasia morosa, Butler, Cist. Ent. ii. p. 543, New Zealand.

Xylomyges dolosa, Grote, *l. c.* p. 88, locality not stated.

Spodoptera erica, Butler, P. Z. S. 1880, p. 675, Formosa.

Mamestra defessa, California, and *acutipennis*, Nevada, Grote, *l. c.* pp. 88 & 214.

Apamea macrostigma, Snellen, *l. c.* p. 46, pl. iv. fig. 4, Celebes.

Perigea falsa, California, and *albo-labes*, Arizona, Grote, *l. c.* pp. 215 & 216.

Caradrina sebghana, Austaut, Le Nat. ii. p. 212, Oran; *C. venosa*, Butler, Ent. M. M. xvii. p. 7, Honolulu; *C. albipilosa*, Saalmüller, *l. c.* p. 269, Nossi-Bé.

Agrotis consentanea, Mabille, CR. Ent. Belg. xxiii. p. cvii., Madagascar; *A. hilaris*, Texas, *stellaris*, Washington Territory, Nevada, p. 153, and *citricolor*, Colorado, p. 154, Grote, l. c.; *A. dolis*, *sublatis*, Colorado, *worthingtoni*, Indiana, p. 91, *baileyana*, St. Laurence, &c., p. 92, *infimatis*, California, p. 93, *id.* N. Am. Ent. i.

Spœlotis lucicolens, Honolulu, and *cremata*, Oahu, Butler, *l. c.* pp. 7 & 8; *S. inconstans*, id. Cist. Ent. ii. p. 545, New Zealand.

Chersotis inconspicua, id. *ibid.*, New Zealand.

Orthosia erubescens, id. Ann. N. H. (5) v. p. 224, Neilgherries.

Orrhodia sebdouensis, Austaut, Le Nat. ii. p. 221, Algeria.

Cosmia bipuncta[*ta*], Snellen, Midden Sumatra, iv. (1) 8, p. 43, Sumatra.

Euperia pallescens, Saalmüller, *l. c.* p. 269, Nossi-Bé.

Dianthœcia viridis, Butler, Cist. Ent. ii. p. 547, New Zealand.

Hecatera impura, Snellen, *l. c.* p. 43, Sumatra.

Packardia goodelli, Grote, Canad. Ent. xii. p. 242, Massachusetts.

Oncocnemis cibalis and *levis*, id. *l. c.* pp. 244 & 254, Colorado.

Homohadena chorda, Colorado, p. 256, *fortis*, Nevada, and *picina*, California, p. 257, *id. l. c.*

Polia ædon, Nevada, and *epichysis*, California, *id. l. c.* pp. 154 & 219.

Hadena skelloni, Butler, Cist. Ent. ii. p. 547, New Zealand; *H. cylindrica*, *tonsa*, Nevada, p. 214, and *H.* (*Pseudanorta*) *singula*, Texas, p. 215, *H. adnixa*, *characta*, Nevada, p. 243, *chryselectra*, Colorado, p. 244, Grote, l. c.; *H. hulsti*, id. N. Am. Ent. i. p. 93, Colorado; *H. statiuncula* and *regressa*, Möschler, *l. c.* p. 381, Surinam.

Heterochroma oxygrapha, Snellen, Tijdschr. Ent. xxiii. p. 49, pl. iv. figs. 6 & 6 *a*, Celebes.

Lepidomys ærifrons, id. *l. c.* p. 51, pl. iv. figs. 7, 7 *a–d*, Celebes.

Agrophila flavo-niten[*s*], Austaut, *l. c.* p. 156, Algeria.

Aedis simulatilis, Grote, N. Am. i. p. 94, Colorado.

Xanthodes diffusa, Snellen, *l. c.* p. 53, pl. iv. fig. 8, Celebes.

Leocyma apicalis, id. *l. c.* p. 54, pl. iv. fig. 9, Celebes.

Tarache sutrix, Grote, Canad. Ent. xii. p. 154, Colorado.

Mesotrosta abyssa, Snellen, *l. c.* p. 56, pl. v. figs. 1 & 1 *a*, Celebes.

Erastria ritsemæ, fig. 2, p. 57, *vermiculata*, fig. 3, p. 58, *anthracina*, figs. 7 & 7 *a*, p. 59, *id. l. c.* pl. iv., Celebes. *E. undulata*, id. Midden Sumatra, iv. (1) 8, p. 45, Sumatra. *E. apicimacula* and *leucoglene*, Mabille, *l. c.* p. xviii., Madagascar. *E. sororcula*, p. 271, *pullula*, and *matercula*,

p. 272, Saalmüller, *l. c.*, Nossi-Bé. *E. deltoides*, Möschler, *l. c.* p. 399, Surinam, Jamaica.

Xanthoptera dimorpha, Snellen, *l. c.* p. 45, Sumatra. *X. semifusca* and *selenicula*, pp. 61 & 62, pl. v. figs. 8 & 4, Celebes, *semirufa* and *constellata*, p. 62, note, Java, *id.* Tijdschr. Ent. xxiii.

Micra lacteola, Mabille, *l. c.* p. xix., Madagascar.

Thalpochares partita, id. *l. c.* p. xviii., Madagascar. *T. costimacula*, Saalmüller, *l. c.* p. 271, Nossi-Bé. *T. pudica*, fig. 5, p. 63, *wallengreni*, fig. 6, *rubricosa*, fig. 9, p. 64, and *subcinerea*, fig. 10, p. 65, Snellen, *l. c.* pl. x., Celebes. *T. deliciosa*, Möschler, *l. c.* p. 399, Surinam.

Eustrotia parvimacula, (? = *concinnimacula*, Guén.), Grote, N. Am. Ent. i. p. 67, Texas.

Phlegetonia corvina, Snellen, *l. c.* p. 68, pl. vi. fig. 1, Celebes.

Palindia diana, Möschler, *l. c.* p. 394, pl. xi. fig. 41, Surinam.

Diomyx antigone, id. *l. c.* p. 396, Surinam.

Eriopus miranda, Saalmüller, *l. c.* p. 273, Nossi-Bé.

Penicillaria (?) *histrio*, id. *l. c.* p. 270, Nossi-Bé.

Odontina pierronii, Mabille, *l. c.* p. xviii., Madagascar. *O.* (?) *tri-obliqua*, Saalmüller, *l. c.* p. 274, Nossi-Bé.

Plusia bipartita and *cornucopiæ*, Snellen, *l. c.* pp. 71 & 72, pl. vi. figs. 2 & 3, Celebes. *P. buchholzi*, Plötz, S. E. Z. xli. p. 298, Eningo, W. Africa. *P. pertusa*, Möschler, *l. c.* p. 390, Surinam.

Gonodonta superba, id. *l. c.* p. 393, pl. ix. fig. 48, Surinam.

Nolaphana labecula, Grote, Canad. Ent. xii. p. 217, Wisconsin, New York.

Anomis albipuncta and *subtilis*, Snellen, *l. c.* p. 76, pl. vi. figs. 4, 4 *a*, 5, 5 *a* & *b*, Macassar. *A. illitoides*, Möschler, *l. c.* p. 397, Surinam.

Aletia formosana, Butler, P. Z. S. 1880, p. 675, Formosa.

Orthogonia malayica, Snellen, Midden Sumatra, iv. (1) 8, p. 46, Sumatra.

Toxocampa noctivolans, Butler, Ent. M. M. xvii. p. 8, Maui. *T.* (?) *fortis*, id. Cist. Ent. ii. p. 549, New Zealand.

Amphipyra agrotoides, Snellen, Tijdschr. Ent. xxiii. p. 77, pl. vi. figs. 6 & 6 *a*, Celebes.

Herminodes bimaculata, id. *l. c.* p. 78, pl. vi. figs. 7 & 7 *a*, Celebes.

Alamis subcinerea and *brunnescens*, id. *l. c.* pp. 82 & 83, pl. vii. figs. 3, 3 *a*, & 4, Celebes. *A. albangula* and *lituraria*, Saalmüller, *l. c.* pp. 284 & 285, Nossi-Bé.

Homoptera lydia, pl. ix. fig. 49, and *focillatrix*, Möschler, *l. c.* pp. 400 & 402, Surinam, Colombia.

Safia praecusta, pl. viii. fig. 2, p. 402, *lucilia*, p. 404, *placida*, p. 405, and *inconspicua*, p. 406, *id. l. c.*, Surinam.

Yrias crespula and *mollis*, pl. viii. fig. 3, *id. l. c.* pp. 406 & 407, Surinam.

Cœnipeta thetis, id. *l. c.* p. 412, Surinam.

Hypogramma ines and *amphitrite*, pl. viii. fig. 7, *id. l. c.* pp. 413 & 415, Surinam. *H.* (?) *oba*, Plötz, S. E. Z. xl. p. 301, Abo, W. Africa.

Plecoptera dolosa, Butler, P. Z. S. 1880, p. 678, Formosa.

Anophia trispilosa and *nigro-picta*, Saalmüller, *l. c.* p. 275, Nossi-Bé.

Stictoptera pœcilosoma, p. 276, and the 4 abb. *flavo-basalis*, *lætifica*, *semipartita*, p. 277, and *ante-marginata*, p. 278; *id. l. c.*, Nossi-Bé. *S. macromma* and *anisoptera*, Snellen, *l. c.* pp. 87 & 88, pl. vi. figs. 8, 8 *a*, & 9, 9 *a*, Celebes.

Lophoptera squamulosa, Saalmüller, *l. c.* p. 278, Nossi-Bé.

Ariola corticea, Snellen, *l. c.* p. 89, pl. vi. figs. 10 & 10 *a*, Celebes.

Cremnodes macrocera, id. *l. c.* p. 90, pl. vii. figs. 5 & 5 *a*, Java, Sumatra, Celebes.

Leucanitis philippina, Austaut, *l. c.* p. 237, Algeria.

Ercheia charon, Butler, *l. c.* p. 678, Formosa.

Bolina surinamensis and *sphærita*, pl. viii. fig. 4, Möschler, *l. c.* pp. 416 & 417, Surinam.

Ophideres banakus, Plötz, *l. c.* p. 298, Upper Guinea. *O. boseœ*, Saalmüller, *l. c.* p. 278, Nossi-Bé.

Brujas defleta, Möschler, *l. c.* p. 422, Surinam.

Sypna complicata, Butler, Ann. N. H. (5) v. p. 389, Madagascar.

Letis aluco (? = *scops*, Guén.), *falco*, *suava*, *sophia*, and *cytheris*, Möschler, *l. c.* pp. 423–427, Surinam.

Nyctipao nyctaculis, Snellen, *l. c.* p. 95, pl. vii. fig. 1, Celebes.

Cyligramma buchholzi, Plötz, *l. c.* p. 301, Aburi, W. Africa.

Hypopyra bosei, Saalmüller, *l. c.* p. 279, Nossi-Bé.

Hamodes hebraica, Snellen, *l. c.* p. 96, pl. vii. figs. 6 & 6 *a*, Celebes.

Entomogramma pardalis, id. *l. c.* p. 280, Nossi-Bé.

Bendis duplicans, Möschler, *l. c.* p. 429, Surinam.

Ophiodes cameronis, Victoria, p. 299, *ibona*, Abo, and *O.* (?) *ningi*, Eningo, p. 300, Plötz, *l. c.*

Pseudophia pygospila, Snellen, *l. c.* p. 98, pl. viii. fig. 1, Macassar.

Ophisma ebenaui and *externe-signata*, Saalmüller, *l. c.* pp. 281 & 282. *O. perfinita*, Möschler, *l. c.* p. 430, Surinam.

Achœa hilaris, *locra*, Victoria, *mariaca*, Akkra, and *durfa*, Bonjongo, Plötz, *l. c.* p. 299. *A. sinistra*, Mabille, *l. c.* p. xix., Madagascar. *A. stumpfi*, Saalmüller, *l. c.* p. 282, Nossi-Bé.

Calesia simplex, Snellen, *l. c.* p. 101, pl. viii. figs. 2 & 2 *a*, Celebes.

Hypœtra griseo-maculata, id. *l. c.* p. 102, note, Java.

Athyrma nodosa and *orbana*, Möschler, *l. c.* p. 431, pl. ix. figs. 26 & 27, Surinam.

Ophiusa diatonica, id. *l. c.* p. 438, pl. ix. fig. 28, Surinam.

Acantholipes inconspicua, Butler, P. Z. S. 1880, p. 677, Formosa.

Agnomonia (?) *orontes*, Plötz, *l. c.* p. 298, Cameroons.

Grammodes oculata and *bisinuata*, Snellen, *l. c.* pp. 103 & 104, pl. viii. figs. 6 & 3, Celebes.

Poaphila davidua, Möschler, *l. c.* p. 434, Surinam.

Epidromia cinnaberrina, Snellen, Midden Sumatra, iv. (1) 8, p. 48, Sumatra.

Remigia xylomiges, id. Tijdschr. Ent. xxiii. p. 106, pl. 8, fig. 7, Celebes. *R. sobria*, pl. ix. fig. 42, and *guenei*, pl. viii. fig. 12, Möschler, *l. c.* pp. 436 & 437, Surinam.

Focilla laceroides, pl. viii. fig. 13, and *homopteroides*, id. *l. c.* pp. 438 & 439, Surinam.

Sylectra fictilina, Möschler, *l. c.* p. 440, pl. viii. fig. 14, Surinam.

Orthogramma venefica, *recessa*, fig. 8, *flaccida*, p. 441, *decorosa*, fig. 9, p. 442, *id. l. c.* pl. viii., Surinam.

Thermesia prona and *cœnosa*, id. *l. c.* pp. 443 & 444, Surinam. *T. laciniæ*, Saalmüller, *l. c.* p. 284, Nossi-Bé. *T.* (?) *lumma*, Akkra, and *T.* (?) *apistis*, Aburi, Plötz, S. E. Z. xli. pp. 300 & 301.

Hypospila infima and *infimoides*, Möschler, *l. c.* pp. 446 & 447, Surinam.

Selenes crinipes, Snellen, *l. c.* p. 109, pl. viii. figs. 4 & 4 *a*, Celebes. *S. macarioides* and *specifica*, Möschler, *l. c.* pp. 447 & 448, pl. viii. figs. 10 & 17, Surinam.

Ephyrodes mensurata, id. *l. c.* p. 449, Surinam.

Renodes humilis, id. *l. c.* p. 450, pl. viii. fig. 11, Surinam.

Marmorinia conjuncta, id. *l. c.* p. 452, Surinam.

Capnodes albo-oculata and *C.* (?) *porrecta*, Saalmüller, *l. c.* p. 286, Nossi-Bé. *C. macrocera* and *arabescalis*, Snellen, *l. c.* pp. 110 & 111, pl. viii. figs. 8, 8*a*, & 5, 5 *a*. *C. spectanda*, pl. ix. fig. 29, p. 452, *steropioides* (= *sterope*, Cram., fig. 312 *c*), p. 453, *melanoides* (= *melanea*, Guén., *nec* Cram.), *stulta*, p. 454, and *contenta*, pl. viii. fig. 16, p. 455; Möschler, *l. c.*, Surinam.

Hypenaria superba, id. *l. c.* p. 460, Surinam.

Plaxia drusilla, id. *l. c.* p. 461, Surinam.

Palyna amabilis, id. *l. c.* p. 462, Surinam.

Deltoidæ.

Hypena scabra, Fabr. Larva described; Coquillett, Canad. Ent. xii. p. 43. *H. calabralis*, Feld. & Rog., described; Snellen, Tijdschr. Ent. xxiii. p. 116.

Echana plicalis, Moore, and *Hydrillodes lentalis*, Guén. (?), or sp. n. (?), *achillealis*, from Celebes. Structure described; *id. l. c.* pp. 127 & 128, & note.

Pseudaglossa lubricalis, Gey., and *Chytolita morbidalis*, Guén. Larvæ described; Coquillett, Canad. Ent. xii. p. 44.

New genera and species:—

Cryptomeria, Saalmüller, Ber. senck. Ges. 1879–80, p. 290. Allied to *Hypena* (?); type, *C. mabillii*, sp. n., *l. c.* p. 291, Nossi-Bé.

Arbinia, Möschler, Verh. z.-b. Wien, xxx. p. 466. Allied to *Pangrapta*, type, *A. todilla*, sp. n., *l. c.* p. 467, pl. ix. fig. 20, Surinam.

Bavilia, id. *l. c.* p. 471. Allied to *Platydia*; type, *B. flavo-costata*, sp. n., *l. c.* p. 472, pl. ix. fig. 30, Surinam.

Cladenia, id. *l. c.* p. 474. Placed next to *Chadaca*; type, *C. mocha*, sp. n., *l. c.* pl. ix. fig. 32, Surinam.

Synalissa, id. *l. c.* p. 475. Placed next to *Cladenia*; type, *S. tempaca*, sp. n., *l. c.* p. 475, Surinam.

Mindora, id. *l. c.* p. 482. Affinities uncertain; somewhat resembles a *Tortrix*; type, *M. tortriciformis*, sp. n., *l. c.* p. 483, pl. ix. fig. 33, Surinam.

Pangrapta gilvagalis, Snellen, Tijdschr. Ent. xxiii. p. 112, pl. viii.

figs. 9, 9 *a* & *b*, Celebes, Java. *P. tænaria*, pl. ix. fig. 39, p. 463, *privigna*, pl. viii. fig. 18, and *sphragis*, pl. ix. fig. 40, p. 465, Möschler, *l. c.*, Surinam.

Ramphidium surinamense, id. *l. c.* p. 468, pl. ix. fig. 19, Surinam.

Ceroctena agatha, id. *l. c.* p. 470, pl. ix. fig. 21, Surinam.

Megatomis terricola, id. *l. c.* p. 472, Surinam.

Chadaca (?) *orthogonia*, id. *l. c.* p. 474, pl. viii. fig. 15, Surinam.

Euclystis declinata, id. *l. c.* p. 481, pl. viii. fig. 5, Surinam.

Dichromia (?) *banaka*, Plötz, S. E. Z. xli. p. 300, Victoria, W. Africa.

Madopa parallelalis, Mabille, CR. Ent. Belg. xxiii. p. xxi., Madagascar.

Hypena subcyanea and *subviolacea*, Butler, P. Z. S. 1880, p. 681, Formosa. *M. leucotænia*, *semifuscalis*, p. 114, *sublividalis*, p. 115, *rhynchalis*, *semifascialis*, p. 117, *argialis*, *inconspicua*, p. 118, *fontinalis*, p. 119, and *robustalis*, p. 120, Snellen, *l. c.*, Celebes. *H. lyperalis*, *glyptalis*, p. xix., *angulalis*, *contortalis*, and *hemigrammalis*, p. xx., Mabille, *l. c.* Madagascar. *H. fuscalis*, *obscuro-basalis*, p. 288, *bigrammica*, *fusco-maculalis*, p. 289, and *strigatalis*, p. 290, Saalmüller, Ber. senck. Ges. 1879–80, Nossi-Bé. *H. affinialis*, Colombia, Surinam, *amethystalis*, p. 478, *suavalis*, and *uniformalis*, Surinam, p. 479, Möschler, *l. c.*

Docela affinis, Butler, Ann. N. H. (5) v. p. 225, Kurrachee.

Agamana insignis, id. *l. c.* p. 393, Madagascar.

Hypenodes jucundalis, Snellen, *l. c.* p. 121, Celebes.

Schrankia calligrapha, id. *l. c.* p. 122, Celebes.

Rivula scapularis, id. *l. c.* p. 123, Celebes.

Simplicia spurialis, id. *l. c.* p. 124, Celebes.

Zanclognatha vanica, *bicolor*, fig. 22, p. 476, and *histrio*, fig. 23, p. 477, Möschler, *l. c.* pl. ix., Surinam.

Herminia periplocalis and *campanalis*, Mabille, *l. c.* pp. xxi. & cviii., Madagascar.

Nodaria fracturalis, Snellen, *l. c.* p. 125, Celebes.

Hydrillodes indistincta, Butler, P. Z. S. 1880, p. 681, Formosa.

Sitophora fenisecalis, Snellen, *l. c.* p. 131, Celebes, Java.

Pseudaglossa scobialis, Grote, N. Am. Ent. i. p. 95, Buffalo, California.

Chytolita petrealis, id. Canad. Ent. xii. p. 219, Ohio, Illinois.

Epizeuxis pupillalis, p. 128, *inductalis*, and *tenuipalpis*, p. 130, Snellen, *l. c.*, Celebes.

Helia serralis, Mabille, *l. c.* p. xxi., Madagascar.

Heterogramma pseudopsodos, p. 133, *didyma*, p. 134, *fuscicollis*, p. 135, *nigricans*, *clavalis*, p. 136, *œripalpis*, p. 137, Snellen, *l. c.*, Celebes.

Acropteris albaria, Plötz, *l. c.* p. 302, Aburi, W. Africa.

Palthis auca, Möschler, *l. c.* p. 476, Surinam.

Pinacia albolineata, Snellen, Midden Sumatra, iv. (1) 8, p. 49, Sumatra.

Sitophora depressalis, id. *l. c.* p. 50, Sumatra.

Homogramma cyanographa, id. *ibid.*, Sumatra.

GEOMETRIDÆ.

L. W. Goodell describes the transformations of *Ochyria designata*, *Eucrostis chloroleucaria*, *Eutrapela transversata*, Pack., and *Acidalia enucleata*, Guén., Canad. Ent. xii. pp. 235 & 236.

Drepanodes fernaldi, Grote, = *Lozogramma atro-punctata*, Pack.; Grote, Canad. Ent. xii. p. 219.

Emmomos angularia, hermaphrodite; Hudson & Kirby, P. E. Soc. 1880, p. xxx.

Eugonia fuscantaria, Hübn. Transformations described; Torgo, S. E. Z. xli. pp. 213–217.

Auxima restitutaria, Walk., var. *ægrota*, Butler, Ann. N. H. (5) vi. p. 125, Darjiling.

Hemerophila abruptaria, black var.; Olliff, Ent. xiii. p. 283.

Boarmia repandata and *rhomboidaria*: strange habit of larvæ brooding over cocoons of ichneumons; Mathew & Bignell, Ent. xiii. pp. 244 & 245, fig. *Cleora glabraria* has a similar habit; J. J. Weir, *op. cit.* p. 282.

Pseudocoremia productata, Walk., ♀ described; Butler, Cist. Ent. ii. p. 551.

Gnophos obscurata, larva described; Porritt, Ent. xiii. pp. 12 & 13.

Thalassodes glaucaria, Walk., ♀ described; Butler, Ann. N. H. (5) vi. p. 215.

Anisodes hadassa, *imitaria* and var. (?) *obrimaria*, *A. pustularia*, and *eumeleata* belong to *Synegia*, *A.* (?) *platycerata*, Walk., is a *Drapetodes*; id. *l. c.* p. 221.

Acidalia eulomata, Snell., = *perlineata*, Walk.; *id.* P. Z. S. 1880, p. 687. *A. ochrata*: larva described; Tugwell, Ent. xiii. pp. 396–398.

Micronia fasciaria, Mabille, *nec* Cram., renamed *lobularia*; Mabille, CR. Ent. Belg. xxiii. p. civ.

Athroolopha cabylaria, Oberth., probably = *chrysitaria*, Gey., var.; N. R., Le Nat. ii. p. 156.

Abraxas grossulariata double-brooded; Gregson, Ent. xiii. p. 311. Parasites; Bignell, *op. cit.* pp. 245 & 246. *A. ulmata*, slate-coloured var.; Bentley, *op. cit.* pp. 186 & 187.

Lomaspilis marginaria. 3 light varieties noticed and figured; Bond, *op. cit.* p. 169.

Anisopteryx vernata and *pometaria* discussed; Rep. Fruit-Growers' Soc. Ont. 1878, pp. 16 & 17.

J. J. Weir (Ent. xiii. pp. 290 & 291, pl. iv.) describes and figures varieties of the following *Larentiidæ* from the Shetland Islands:—*Eupithecia venosata*, fig. 7, *Emmelesia albulata* var. *thulea*, figs. 4 & 5, *Camptogramma bilineata*, fig. 8, *Melanippe montanata* var. *shetlandica*, figs. 10 & 11, *M. fluctuata*, fig. 6, and *Coremia munitata*, fig. 9.

Emmelesia unifasciata two years in pupa; Thornewill, Ent. xiii. p. 220.

Eupithecia pusillata ab. *laricis*, Spey., and *E. indigata*, Hübn., discussed; Fuchs, S. E. Z. xli. pp. 174–178. *E. succenturiata*: habits of larva; Gregson, *l. c.* p. 16.

Camptogramma bilineata supposed to be attacked by a fungus; Meldola & English, P. E. Soc. 1880, pp. xxviii. & xxix.

Cidaria alaudaria, Freyer: larva described; H. Gross, Ent. Nachr. vi. p. 95. *C. fulvata*: larva described; Porritt, Ent. M. M. xvi. p. 276, and Ent. xiii. p. 116. *C. polata*, Hübn., var. *cineraria* from N. Norway described and figured; Schφyen, Arch. Math. Naturvid. v. p. 196. *C. tri-*

fasciata, Borkh. (*impluviata*, W. V.), = *autumnalis*, Ström; *id.* S. E. Z. xli. pp. 135 & 136.

Lygris reticulata var. *ovulata* from Germany described; H. Borgmann, Ent. Nachr. vi. pp. 278 & 279.

New genera and species:—

Phœnix, Butler, Ann. N. H. (5) vi. p. 122. Allied to *Pyrinia*, but all the branches of the median vein well separated; type, *P. iris*, sp. n., *l. c.*, Darjiling.

Psilocerea, Saalmüller, Ber. senck. Ges. 1879–80, p. 292. Placed after *Comibœna*; type, *P. tigrinata*, sp. n., *l. c.* p. 293, Nossi-Bé.

Dissophthalmus, Butler, *l. c.* p. 219. Allied to *Ophthalmophora*; type, *D. iridis*, sp. n., *l. c.*, Borneo.

Callabraxas, id. *l. c.* p. 226. Differs from *Abraxas* by the shorter cells, and much shorter costal nervure of hind-wings; the subcostal being forked near the cell. To contain *A. whitelyi*, Butl., and *C. amanda*, sp. n., *l. c.*, Darjiling.

Rhodophthitus, id. *l. c.* p. 392. Allied to *Icterodes* and *Vindasura*; fore-wings and palpi longer, and hind-wings shorter. Type, *R. formosus*, sp. n., *l. c.*, Madagascar.

Urapteryx clara, Butler, Ann. N. H. (5) vi. p. 120, N.E. Himalayas.

Oxydia calamina, id. *l. c.* p. 121, Darjiling.

Crocinis piperata, Saalmüller, Ber. senck. Ges. 1879–80, p. 294, Nossi-Bé.

Decetia arenosa, N.E. Himalayas, and *rufescens*, Sarawak, Butler, *l. c.* p. 121.

Epione gynopteridia, id. *l. c.* p. 123, N.E. Himalayas; *E. malefidaria*, Mabille, CR. Ent. Belg. xxiii. p. xxii., Madagascar.

Hyperythra swinhoii, Butler, *l. c.* v. p. 223, Kurrachee.

Rumia sulphurea, id. *l. c.* vi. p. 123, Darjiling.

Endropia lugens, id. *ibid.*, Darjiling.

Garœus cruentatus, id. *l. c.* p. 124, N.E. Himalayas.

Ellopia pulchra, id. *ibid.*, N.E. Himalayas.

Caberodes insularia, Mabille, *l. c.* p. xxii., Madagascar.

Evarzia indica, Butler, *l. c.* p. 222, Darjiling.

Plegapteryx (?) *syntomia*, Eningo, and *P.* (?) *silacea*, Abo, Plötz, S. E. Z. xli. pp. 85 & 86.

Orsonoba pallida, Butler, *l. c.* p. 125, N.E. Himalayas.

Biston virginarius, Grote, Canad. Ent. xii. p. 220, California.

Hemerophila virescens, Butler, *l. c.* p. 126, Darjiling; *H. tetragraphicata*, Saalmüller, *l. c.* p. 294, Nossi-Bé.

Boarmia plumalis, Butler, *l. c.* p. 126, Darjiling; *B. luteolata*, Snellen, Midden Sumatra, iv. (1) 8, p. 52, Sumatra.

Hypochroma crocisa and *vigens*, Butler, *l. c.* pp. 126 & 127, Darjiling; *H. batiaria*, Plötz, *l. c.* p. 302, Victoria, W. Africa.

Gnophos biafaria, id. *l. c.* p. 303, Mungo, W. Africa; *G. œreus*, Butler, *l. c.* p. 128, Darjiling.

Argidava punctata, id. *ibid.*, Darjiling.

Achlora circumflexaria, Snellen, *l. c.* p. 53, Sumatra.

Tanaorhinus smaragdus, Butler, *l. c.* p. 128, N.E. Himalayas.

Geometra grata, Butler, *l. c.* p. 129, Darjiling.

Nemoria pruinosa, id. *l. c.* v. p. 224, Kurrachee; *N. ruficinctaria*, Snellen, *l. c.* p. 53, Sumatra.

Iodis alliata, Höfner, JB. nat. Kärnten, xiv., Carinthia.

Thalassodes apalina, Butler, *l. c.* vi. p. 214, Darjiling; *T. glacialis*, id. *l. c.* v. p. 391; *T. pallidulata*, Mabille, *l. c.* p. xxi., Madagascar.

Phorodesma leucochloraria, id. *l. c.* p. xxii., Madagascar; *P. malachitica*, Saalmüller, *l. c.* p. 291, Nossi-Bé.

Comibœna pictipennis, Butler, *l. c.* vi. p. 215, Darjiling; *C. albo-viridata*, Saalmüller, *l. c.* p. 292, Nossi-Bé.

Rhacheospila cupedinaria, Grote, *l. c.* p. 218, Florida.

Chlorodes pastor, Butler, *l. c.* p. 216, Darjiling.

Phyle (?) *banakaria*, Plötz, *l. c.* p. 302, Victoria, W. Africa.

Agathia scuteligera, Darjiling, p. 216, *gigantea*, Java, p. 217, *visenda* and *beata*, Darjiling, p. 218, Butler, *l. c.*

Thalera textilis, id. *l. c.* p. 219, Darjiling; *T. cowani*, id. *l. c.* v. p. 390; *T. atro-viridaria*, Mabille, *l. c.* p. xxii., Madagascar.

Anisodes punctifera and *lidderdali*, Butler, *l. c.* vi. p. 220, Darjiling.

Acidalia fœculentaria and *punctistriata*, Mabille, *l. c.* p. xxiii., Madagascar.

Timandra atroviridata, Saalmüller, *l. c.* p. 293, Nossi-Bé.

Zanclopteryx puella, Butler, *l. c.* v. p. 391, Madagascar; *Z. fragilis*, id. P. Z. S. 1880, p. 687, Formosa.

Nedusia luctiferata, Snellen, *l. c.* p. 55, Sumatra.

Erosia himala, Butler, Ann. N. H. (5) vi. p. 221, Darjiling. (This genus should be removed to the *Pseudodeltoidæ*; Butler, *l. c.*)

Cabera vulgaria, Plötz, *l. c.* p. 302, Cameroons.

Corycia vestigiata, Butler, *l. c.* p. 222, Darjiling.

Macaria crassilimbaria, Mabille, *l. c.* p. xxiii., Madagascar.

Tephrina malesignaria and *univirgaria*, id. *l. c.* pp. xxiii. & xxiv., Madagascar.

Psamatodes arenularia, id. *l. c.* p. xxiv., Madagascar.

Plutodes discigera, India, *flavescens*, N.E. Himalayas, *exquisita*, p. 223, and *subcaudata*, Darjiling, p. 224, Butler, l. c.; *P. glaucaria*, *centraria*, and *strigularia*, Snellen, *l. c.* p. 57, Sumatra.

Marcala (?) *modesta*, Butler, *l. c.* v. p. 390, Madagascar.

Panagra rachicera, id. *l. c.* p. 391, Madagascar.

Fidonia (?) *cristataria*, Plötz, *l. c.* p. 303, Victoria, W. Africa.

Pagrasa rufescens, Butler, *l. c.* vi. p. 224, Darjiling.

Noreia sericea, id. *l. c.* p. 225, N.E. Himalayas.

Euschema regalis, Malacca, and *proba*, Borneo, Darjiling, *id. l. c.* pp. 119 & 120.

Panœthia iridicolor, id. *l. c.* p. 227, Darjiling.

Abraxas pusilla, Darjiling, Nepal, *conspersa*, Darjiling, p. 225, and *consocia*, N.E. Himalayas, p. 226, *id. l. c.*

Emmelesia sublutea, id. *l. c.* v. p. 392, Madagascar.

Eupithecia tristrigosa, id. P. Z. S. 1880, p. 688, Formosa; *E. hemileucaria*, Mabille, *l. c.* p. xxiv., Madagascar.

Sauris ignobilis, Butler, Ann. N. H. (5) vi. p. 227, Darjiling.

Lygranea cinerea, id. *l. c.* p. 228, Darjiling.

Coremia casta, id. Cist. Ent. ii. p. 553, New Zealand.

Scotosia syngrammata, Mabille, *l. c.* p. xxiv., Madagascar.

Cidaria fissisignis, Darjiling, p. 228, *delecta*, *relata*, p. 229, *aurigena*, N.E. Himalayas, and *aliena*, Bhotan, p. 230, Butler, Ann. N. H. (5) vi.; *C. raphaelaria*, Oberthür, Ann. Mus. Genov. xv. p. 180, pl. i. fig. 5, Abyssinia.

Pyralidæ.

Snellen, P. C. T. Nieuwe Pyraliden op het Eiland Celebes gevonden door M. C. Piepers. Tijdschr. Ent. xxiii. pp. 198–250.

62 new species described.

Lepidopterous galls on *Eucalyptus*, from Australia, perhaps produced by one of the *Pyralidæ*; McLachlan, P. E. Soc. 1880, p. xxxii.

Cymoriza loricatalis, Led., does not belong to Guénée's genus, but will form a new one; Snellen, Tijdschr. Ent. xxiii. p. 243.

Conchylodes and *Phalangiodes*, Guén., discussed, and 5 species of the former tabulated; *id. l. c.* pp. 236–238. *C. æriferalis*, Moore, probably = *Zebronia abdicalis*, Walk.; Butler, P. Z. S. 1880, p. 684.

Pionea (*Orobena*) *rimosalis*, Guén. Larva destructive to cabbages in America; Thomas, Am. Ent. iii. p. 22.

Cirrochrista ætherialis, Led., = *Margaronia brizoalis*, Walk.; Butler, P. Z. S. 1880, p. 690.

Scopula lutealis a general feeder; G. T. Porritt, Ent. M. M. xvii. p. 91. *S. olivalis*: larva described; Buckler & Porritt, *op. cit.* xvi. pp. 227 & 228. *S. prunalis*: transformations described; Buckler, *op. cit.* xvi. pp. 209 & 210.

Botys ferrugalis, Hübn.: transformations described; Lafaury, Ann. Soc. Ent. Fr. (5) x. pp. 73–76. *B. pandalis*: natural history; Buckler, *l. c.* xvii. pp. 28–31, 156–158. *B. penitalis*, Grote: larva described; Coquillett, Canad. Ent. xii. p. 45.

Eurycreon rantalis, Guén. Larva described; Snow, Psyche, iii. p. 127.

New genera and species:—

Clydonopteron, Riley, Am. Ent. iii. p. 287. Allied to *Œctoperia*, Zell.; type, *C. tecomæ*, sp. n., *l. c.* p. 288, figs. 132 & 133, South-western States of N. America.

Paredra, Snellen, Midden Sumatra, iv. (1) 8, p. 60. Allied to *Cledeobia*; palpi rather more than twice as long as the head; body stout; abdomen a little longer than the hind-wings. Type, *P. eogenalis*, sp. n., *l. c.*, Sumatra.

Pseudochoreutes, id. Tijdschr. Ent. xxiii. p. 202. Allied to *Dicymalomia* and *Cordylopeza*, but with a superficial resemblance to the *Choreutidæ*; type, *P. choreutalis*, sp. n., *l. c.*, Celebes.

Clupeosoma, id. *l. c.* p. 203. Falls under No. 86 of Lederer; type, *C. pellucidalis*, sp. n., *l. c.* p. 204, Macassar.

Eurrhyparodes, id. *l. c.* p. 215. Allied to *Gonocausta*; type, *E. stibialis*, sp. n., *l. c.* p. 216, Celebes, Java, Japan.

Eretria, id. *l. c.* p. 206. Allied to *Botys*; type, *E. obsistalis*, sp. n., *l. c.*, Celebes.

Sameodes, id. *l. c.* p. 217. Allied to *Samea*; type, *S. trithyralis*, sp. n., *l. c.* p. 218, Celebes, Java.

Tabidia, id. *l. c.* p. 219. Allied to *Botys* and *Conchylodes*; type, *T. insanalis*, sp. n., *l. c.* p. 220, Celebes.

Lampridia, id. *l. c.* p. 234. Allied to *Agrotera*, &c.; type, *L. fuliginalis*, sp. n., *l. c.* p. 234, Celebes.

Enyocera, id. Midden Sumatra, iv. (1) 8, p. 67. Allied to *Salbia*; type, *E. latilimbalis*, sp. n., *l. c.*, Sumatra.

Tegulifera, Saalmüller, Ber. senck. Ges. 1879–80, p. 305. Resembles *Endotricha*; types, *T. rubicundalis*, p. 305, *tristiculalis*, and *albo-strigalis*, p. 306, spp. nn., Nossi-Bé.

Phycidicera, Snellen, *l. c.* p. 71. Allied to *Ætholix*; type, *Æ. manicalis*, sp. n., *l. c.* p. 72, Sumatra.

Nymphicula, id. *l. c.* p. 78. Allied to *Cataclysta*; type, *N. stipalis*, sp. n., *l. c.*, Sumatra; add *N. infuscalis* and *acuminatalis*, spp. nn., *id.* Tijdschr. Ent. xxiii. p. 246, Celebes.

Nymphœella, Grote, N. Am. Ent. i. p. 97. Allied to *Cymoriza* and *Oligostigma*; type, *N. dispar*, sp. n. *l. c.*, New York.

Nicaria, Snellen, *l. c.* p. 229. Allied to *Stenia*; type, *N. latisquamalis*, sp. n., *l. c.* p. 230, Celebes.

Decticogaster, id. *l. c.* p. 230. Allied to *Hymenoptychia*; type, *D. zonulalis*, sp. n., *l. c.* p. 231, Celebes.

Decelia, id. *l. c.* p. 231. Allied to *Botys*; type, *D. terrosalis*, sp. n., *l. c.* p. 232, Celebes.

Tatobotys, Butler, P. Z. S. 1880, p. 686. Allied to *Botys*; type, *T. argillacea*, sp. n., *l. c.*, Formosa.

Pyralis tenuis, Butler, P. Z. S. 1880, p. 681, Formosa.

Cledeobia (?) *malgassalis*, Saalmüller, Ber. senck. Ges. 1879–80, p. 298, Nossi-Bé.

Actenia (?) *signata*, Butler, Ann. N. H. (5) v. p. 393, Madagascar.

Ædiodes trimaculalis and *orientalis*, Snellen, *l. c.* pp. 232 & 233, Celebes.

Samea dives, Butler, P. Z. S. 1880, p. 682, Formosa; *S. vespertinalis*, Saalmüller, *l. c.* p. 300, Nossi-Bé.

Heliothela prægalliensis, Frey, Lep. Schweiz. p. 253, Bergell.

Agrotera retinalis, Saalmüller, *l. c.* p. 304, Nossi-Bé.

Asopia hæmatinalis, id. *l. c.* p. 295, Nossi-Bé; *A. rufipicta*, Butler, *l. c.* p. 682, Formosa; *A. fuscicostalis*, Snellen, *l. c.* p. 199, Celebes; *A. planalis*, Grote, N. Am. Ent. i. p. 95, Colorado.

Stericta fuscibasalis, Snellen, *l. c.* p. 199, Celebes.

Endotricha sondaicalis and *ustalis*, id. *l. c.* pp. 200 & 201, Celebes.

Spoladea spilotalis and *avunculalis*, Saalmüller, *l. c.* pp. 299 & 300, Nossi-Bé.

Diasemia spilonotalis, Snellen, Midden Sumatra, iv. (1) 8, p. 73, Sumatra.

Stenia modestalis, Saalmüller, *l. c.* p. 299, Nossi-Bé.

Cnaphalocrocis bifurcalis, Snellen, Tijdschr. Ent. xxiii. p. 219, Celebes, India.

Polythlipta albicundalis, id. *l. c.* p. 221, Celebes, Java.

Auxomitia minoralis, id. *l. c.* p. 222, Celebes.

Heterocnephes strangulalis, id. *l. c.* p. 224, Celebes, Java.

Cœnostola palliventralis, p. 225, *pallicostalis* and *ercmenalis*, p. 226, *id. l. c.*, Celebes.

Phycidicera salebrialis, Snellen, Tijdschr. Ent. xxiii. p. 228, Celebes.

Rhimphalea fastidialis, id. *ibid.*, Celebes.

Metasia lilliputalis, id. *l. c.* p. 229, Celebes.

Cataclysta nympha, Butler, P. Z. S. 1880, p. 683, Formosa, Borneo, Sumatra; *C. vestigialis*, Snellen, Midden Sumatra, iv. (1) 8, p. 78, Sumatra; *C. pusillalis*, Saalmüller, *l. c.* p. 295, Nossi-Bé.

Paraponyx nitens, Butler, Cist. Ent. ii. p. 556, New Zealand; *P. unguicalis*, Snellen, *l. c.* p. 77, Sumatra; *P. hebraicalis*, *fregonalis*, *diminutalis*, and *cuneolalis*, id. Tijdschr. Ent. xxiii. pp. 240–243, Celebes, &c.

Spanista pretiosalis, id. *l. c.* p. 239, Celebes.

Physematia pollutalis, id. *l. c.* p. 240, Celebes, Java.

Cymoriza monetalis and *fulvobasalis*, id. *l. c.* p. 244, Celebes; *C. minima*, Butler, P. Z. S. 1880, p. 684, Formosa.

Margarosticha bimaculalis, Snellen, *l. c.* p. 245, Celebes.

Hydrocampa difflualis and *exsolvalis*, id. Midden Sumatra, iv. (1) 8, pp. 75 & 76, Sumatra; *H. minimalis*, Saalmüller, *l. c.* p. 298, Nossi-Bé.

Phalangiodes columalis, Snellen, Tijdschr. Ent. xxiii. p. 239, Celebes.

Spilomela trivirgalis, Mabille, CR. Ent. Belg. xxiii. p. cviii., Madagascar; *S. ommatilis*, Snellen, *l. c.* p. 235, Celebes.

Conchylodes corycialis and *baptalis*, id. *l. c.* pp. 237 & 238, Celebes.

Glyphodes serenalis and *lomaspilalis*, id. *l. c.* p. 223, Celebes; *G. piepersialis*, *nyctealis*, p. 68, *crameralis* and *botydalis*, p. 69, *id.* Midden Sumatra, iv. (1) 8, pp. 68 & 69, Sumatra; *G. malayana*, Formosa, p. 684, and *lacteata*, Borneo, p. 685, note, Butler, P. Z. S. 1880; *G. boseæ* and *G.* (?) *testudinalis*, Saalmüller, *l. c.* pp. 296 & 297, Nossi-Bé.

Antigastra (?) *cinnamomalis*, id. *l. c.* p. 297, Nossi-Bé.

Eudioptis beninalis, Aburi, and *bonjongalis*, Cameroons, Plötz, S. E. Z. xli. p. 305.

Margarodes septem-punctalis, Mabille, CR. Ent. Belg. xxiii. p. xxv., Madagascar; *M. aquosalis*, Snellen, *l. c.* p. 66, Sumatra.

Botys snellemanni, p. 61, *korndœrfferi*, *nigro-fimbrialis*, p. 62, *velatalis*, *omicronalis*, p. 63, *niveicilialis*, *infundibulalis*, p. 64, *id. l. c.*, Sumatra; *B. salentialis*, p. 207, *subcrocealis*, p. 208, *tœnialis*, *rubricetalis*, p. 209, *tardalis*, p. 210, *orobenalis*, p. 211, *paucilinealis*, p. 212, *ruricolalis*, p. 213, *defloralis*, *semifascialis*, p. 214, and *incisalis*, p. 215, *id.* Tijdschr. Ent. xxiii., Celebes; *B. aburalis*, Aburi, and *mungalis*, Mungo, Plötz, *l. c.* p. 304; *B. bifenestralis*, *stenopalis*, and *venilialis*, p. xxv., and *chrysotalis*, p. cviii., Mabille, CR. Ent. Belg. xxiii., Madagascar; *B. prasinalis*, p. 301, *distinctalis*, *ferruginalis*, *B.* (?) *carnosalis*, p. 302, *B. gravitalis*, *ochracealis*, p. 303, and *posticalis*, p. 304, Saalmüller, *l. c.*, Nossi-Bé; *B. oppilalis*, *oscitalis*, Maine, &c., and *dissectalis*, Ontario, Grote, Canad. Ent. xii. p. 36 (*B. dissectalis* = *submedialis*; id. *l. c.* p. 80).

Cnaphalocrocis sanitalis, Snellen, Midden Sumatra, iv. (1) 8, p. 65, Sumatra.

Heterocnephes vicinalis, Snellen, *l. c.* p. 70, Sumatra.
Hedylepta pyraustalis, id. *l. c.* p. 71, Sumatra.
Siriocauta simialalis, id. *l. c.* p. 73, Sumatra.
Hymenoptychis dentilinealis, id. *l. c.* p. 74, Sumatra.
Omiodes analis, id. Tijdschr. Ent. xxiii. p. 227, Celebes.
Scopula exigua, Butler, Ent. M. M. xvii. p. 9, Maui.
Phryganodes (?) *abnormalis*, Plötz, *l. c.* p. 305, Bonjongo and Aburi.
Nymphula luteivittalis, Mabille, *l. c.* p. xxvi., Madagascar.
Tetralopha diluculella, Grote, N. Am. Ent. i. p. 60, New York.

Crambidæ.

Grote, A. R. *Crambidæ*. Canad. Ent. xii. pp. 15–19.

Crambus interruptus, Grote, = *myellus*, according to Zeller; the remarks on other known species are unimportant.

Scoparia alpina from Shetland, noticed and figured; Vaughan, Ent. xiii. p. 293, pl. iv. figs. 1 & 2.

Plodia interpunctella and *Ephestia ficulella*. Larvæ described; Porritt, Ent. M. M. xvi. p. 261, xvii. p. 44.

Nephopteryx zimmermanni discussed; Kellicott, Rep. E. Soc. Ont. 1879, pp. 33 & 34.

Cecidipta excæcariæ, Berg. Transformations figured; S. E. Z. xli. pl. i. figs. 2, 2 *a*–2 *i*.

Pempelia subornatella, Dup., and *Eucarphia ilignella*, Zell. Transformations described; Lafaury, Ann. Soc. Ent. Fr. (5) x. pp. 76–78.

Pempelia carnella: natural history; Buckler, Ent. M. M. xvi. pp. 167–172. *P. zinckenella*, Treitschke (= *Assara albicostalis*, *Modiana scitivittalis* and *Alata anticalis*, Walk., and *Crambus sabulinus*, Butl.), recorded from Formosa; Butler, P. Z. S. 1880, p. 689.

Dakruma turbatella, Grote, = *Pempelia grossulariæ*, Packard & Riley; Grote, N. Am. Ent. i. p. 68.

Crambus. Preliminary list of North American species; *id.* Canad. Ent. xii. pp. 77–80. *C. culmellus*: natural history; Buckler, *l. c.* xvii. pp. 91–93.

Argyria, Hübn. Fernald gives a table of the 5 N. American species as follows:—*pulchella*, Walk., *auratella*, Clem., *nivalis*, Dru. (= *Geometra argentata*, Emmons, = *Catharylla nummulalis*, Zell., = *Urola michrochysella*, Walk.), *nummulalis*, Hübn. (= *Cath. fuscipes*, Zell., = *Ur. subœnescens*, Walk.) and *rufisignella*, Zell.; N. Am. Ent. i. pp. 100–102.

New genera and species:—

Ambesa, Grote, N. Am. Ent. i. p. 98. Allied to *Myelois*; type, *A. lætella*, sp. n., *l. c.*, Colorado.

Ceratamma, Butler, P. Z. S. 1880, p. 689. Allied to *Pempelia*, basal joint of antennæ thicker, the second large, and covered both above and below with a flattened tuft of hair-like scales, frons terminating in a conical process projecting downwards. Type, *C. hobsoni*, sp. n., *l. c.*, Formosa.

Scoparia altivolans, Butler, Ent. M. M. xvii. p. 9, Hawaii. *S. fulvosignalis* and *nugalis*, Snellen, Tijdschr. Ent. xxiii. pp. 204 & 205, Celebes.

Galleria macroptera, id. *l. c.* p. 249, Macassar.

Melissoblaptes rufo-venalis, id. *l. c.* p. 248, Celebes, Java. *M. obscurellus*, Saalmüller, Ber. senck. Ges. 1879–80, p. 308, Nossi-Bé.

Achræa filiella, id. *ibid.*, Nossi-Bé.

Anerastia vicina, id. *l. c.* p. 307, Nossi-Bé.

Euzophera subterebrella, Snellen, *l. c.* p. 250, Macassar.

Acrobasis angusella, Grote, N. Am. Ent. i. p. 51, New York.

Phycis (*Myelois* ?) *saturatella*, Mabille, CR. Ent. Belg. xxiii., p. xxvi., Madagascar.

Myelois falsella, Snellen, Midden Sumatra, iv. (1) 8, p. 82, Sumatra; *M.* (?) *morosalis*, Saalmüller, *l. c.* p. 307, Nossi-Bé.

Trachonitis punctigera, Butler, P. Z. S. 1880, p. 688, Formosa.

Nephopteryx hyemalis, id. *l. c.* p. 689, Formosa; *N. dissolutella* and *anerastica*, Snellen, *l. c.* p. 81, Sumatra; *N. scobiella*, Grote, *l. c.* p. 51, Texas.

Pinipestis reniculella, id. *l. c.* p. 67, New York, &c.

Etiella madagascariensis, Saalmüller, *l. c.* p. 307, Nossi-Bé.

Pempelia contatella, and var. *quinque-punctella*, Grote, *l. c.* pp. 49 & 50, New York, &c.

Diptychophoro amœnella, Snellen, Tijdschr. Ent. xxiii. p. 247, Macassar.

Crambus dissectus, *exesus*, New York, *occidentalis*, California, p. 16, *goodellianus*, Massachusetts, &c., *oregonicus*, Oregon, p. 17, *anceps*, California, *laciniellus*, United States, *attenuatus*, Vancouver's Island, p. 18, *C.* (*Propexus*) *edonis*, Kansas, p. 19, *C. duplicatus*, New York, and *repandus*, Colorado, p. 79, Grote, Canad. Ent. xii.; *C. punctistrigellus*, Mabille, *l. c.* p. xxvii., Madagascar.

Jartheza simplex, Butler, P. Z. S. 1880, p. 690, Formosa.

Apurima gratiosella (Walk., MS.), *id. ibid.*, Formosa, Sarawak.

Chilo crambidoides, Grote, *l. c.* p. 15, Kansas.

Scirpophaga sericea, Snellen, Midden Sumatra, iv. (1) 8, p. 79, Sumatra.

Schœnobius ochraceellus, id. *ibid.*, Sumatra.

Calamotropha fuscicostella, id. Tijdschr. Ent. xxiii. p. 247, Celebes.

Tortricidæ.

Barrett, C. G. Notes on British Tortrices. Ent. M. M. xvi. pp. 189–195, 238–244; xvii. pp. 35–48, 82–84.

The following species are noticed, chiefly with reference to their transformations:—*Antithesia postremana*, Zell., *A. marginana*, Haw. (= *oblongana*, Haw.), *A. fuligana*, Hübn. (= *ustulana*, Haw., = *carbonana*, Doubl.), *Sericoris euphorbiana*, Zell., *S. littoralis*, Curt., *S. rivulana*, Scop. (= *conchana*, Hübn.), *S. urticana*, Hübn., *S. lacunana*, W. V., *Dichrorrhampha politana*, W. V., *alpinana*, Tr. (?), *plumbagana*, Tr., *acuminatana*, Zell., *simpliciana*, Haw., *tanaceti*, Staint., *consortana*, Steph., *Catoptria hypericana*, Hübn., *cana*, Haw., *fulvana*, Steph., *scopoliana*, Haw., *œmulana*, Schl., *pupillana*, L., *Asthenia scopariana*, Herr.-Schäff.

(new to Britain; redescribed, xvii. p. 35; *cf.* also Hodgkinson, p. 38), *Eupœcilia udana*, Guén., *notulana*, Zell., *ciliella*, Hübn., *Argyrolepia zephyrana*, Tr., *Lozopera francillana*, Fabr. (*flagellana*, Dup., is distinct).

Jabranozy, J. Der Springwurmwickler (*Lozotœnia pilleriana*), ein Feind unserer Weingärten. Wien: 1881 (Dec., 1880), 8vo, pp. 23, woodcuts.

Walsingham [Lord]. Illustrations of Typical Specimens of *Lepidoptera Heterocera* in the Collection of the British Museum. Part iv. North American *Tortricidæ*, by Lord Walsingham. London: 1879, 4to, pp. xi. & 84, pls. lxi.–lxxvii. (*Cf.* Fernald, Ent. M. M. xvii. pp. 95 & 96.)

The author has followed the arrangement of Von Heinemann, as on the whole the best yet proposed. The work consists of descriptions and figures of such species as appear to be new, and of those described by Walker which have not been anticipated by other authors. At the end of each genus is a full list of the N. American species described under that name by Walker. A list of European *Tortricidæ* which are likewise found in North America is appended to the work. The following known species (Walker's unless otherwise stated) are redescribed and figured:— *Teras subnivana* (= *deflectana*, Rob.), fig. 2, p. 1, *pulverosana* (= *implexana*), fig. 7, p. 3, pl. lxi., *Platynota rostrana* (= *Teras restitutana* and *connexana*), p. 5, pl. lxii. fig. 1, *Cacœcia patulana*, p. 6, pl. lxi. fig. 1, *C. semiferana* (= *Tortrix flaccidana*, Rob.), figs. 2 & 3, p. 7, *C. transiturana* (= *sanbornana*, Rob.), fig. 4, *C. argyrospila* (= *Tortr. furvana*, Rob.), figs. 5 & 6, p. 8, *C. georgiana*, fig. 7, p. 9, *Ptycholoma melaleucana* (= *Conchylis invexana*, Walk., = *Ptycholoma* (?) *semifuscana*, Clem.), fig. 8, *Heterognomon conflictana*, fig. 9, p. 10, *Pandemis albaniana* (? = *Tortr. lamprosana*, Rob.), fig. 10, pl. lxii., *Lozotœnia obsoletana* (= *L. vesperana*, Clem.), fig. 1, p. 11, *Lophoderus afflictanus* (= *Lozotœnia fusco-lineana*, Clem.), fig. 8, p. 14, *L. triferanus* (= *Cacœcia velutinana*, Walk., = *Tortr. lutosana* and *incertana*, Clem.), fig. 9, p. 15, pl. lxiii., *Cenopis directana* (? = *ustulana*, Zell.), fig. 4, p. 17, *C.* (?) *xanthoides* (= *Leptoris brevi-ornatana*, Clem.), pl. lxiv. fig. 10, p. 20, *Capua furcatana*, p. 21, pl. lxv. fig. 4, *Idiographis floccosana* (= *Tortr. confusana*, Rob.), fig. 5, p. 27, *Cochylis scissana*, fig. 8, pl. lxvi. p. 28, *Penthina hebesana* (= *Carpocapsa inexpectana*, Walk., = *Penthina fullerea*, Riley, = *Sericoris fœdana*, Clem.), p. 31, pl. lxvii. fig. 8, *Sericoris puncticostana*, fig. 1, p. 33, *dealbana*, fig. 3, p. 34, *inquietana*, fig. 5, p. 35, *Phœcasiophora confixana* (= *Sciophila* ? *perductana*, Walk., = *Sericoris mutabilana*, Clem., = *S. permundana*, Grote & Rob.), fig. 6, pl. lxviii. p. 36, *Exartema ferriferanum*, Walk. (= *Sericoris gratiosana*, Clem., = *Grapholitha* (*Pœcilochroma* ?) *usticana*, Zell.), p. 37, pl. lxxv. fig. 4, *Pœdisca resumptana*, fig. 5, p. 44, *P. cataclystiana* (= *Steganoptycha* (?) *ochreana*, Clem.), fig. 10, pl. lxx. p. 46, *P. bipunctella* (= *Pœdisca worthingtoniana*, Fernald), pl. lxxi. fig. 1, p. 47, *P. improbana* (= *diffinana*), fig. 2, p. 51, *transmissana*, fig. 3, *strenuana* (= *Grapholita exvagana*), fig. 4, p. 52, *solicitana* (*Halonota* (?) *packardiana*, Clem.), fig. 10, pl. lxxii. p. 55, *Semasia refusana*, pl. lxxiv. fig. 10, p. 63, *S. perstructana*, pl. lxxv. fig. 1, p. 64, *Phoxopteryx disci-*

gerana (= *Grapholita metamelana*, Walk., = *Anchylopera spiræ-foliana*, Clem.), fig. 3, p. 72, *P. apicana*, fig. 5, p. 73, and *divisana*, fig. 7, pl. lxxvii. p. 74.

WESTON, W. P. The Tortrices of Surrey, Kent, and Sussex (concluded). Ent. xiii. pp. 7–9, 35–37, 58–61, 83–87, 109–112, 130–133, 158–161, 235–238, 268–272, 294–296.

Extends from *Ptycholoma* to *Tortricodes*.

Amphysa prodromana, Hübn. (*walkeri*, Curt.). Life-history; Gregson & White, Ent. xiii. pp. 90, 114–116.

Penthina postremana. Larva described; Gregson, Ent. xiii. p. 283.

Tortrix dumetana feeds on dewberry; Daltry, Ent. xiii. p. 187. *T. forsterana*: food of larva; Fitch & Hodgkinson, Ent. xiii. pp. 15, 16, & 46. *T. pinicolana*: ravages of its larva in the larch woods of the Engadine; Coaz, MT. ges. Bern, 1879, pp. 76–90. *T. rigana*, Sod., var. *monticolana*, from the Southern Alps, described; Frey, Lep. Schweiz. p. 289.

Pœdisca sordidana noticed; Prest, Ent. xiii. pp. 311 & 312.

Idiographis, Led., recharacterized; Walsingham, Ill. Lep. Het. iv. p. 25.

Bactra lanceolana and *Coptoloma janthinana*. Transformations described; Lafaury, Ann. Soc. Ent. Fr. (5) x. p. 79.

Peronea permutana. Life-history; Gregson, *l. c.* pp. 45 & 46.

Teras contaminana = *reticulata*, Ström; Schöyen, S. E. Z. xli. pp. 135 & 136. *T. cyaneana*, P. I., redescribed; Frey, Lep. Schweiz. p. 283.

Stigmonota scopariana, Herr.-Schäff., recorded as new to Britain; Hodgkinson, Ent. xiii. p. 162, and Ent. M. M. xvii. p. 70.

Retinia frustrana. Habits; Scudder, Psyche, iii. p. 77.

Carpocapsa grossana: larva remaining unchanged in cocoon for two winters; Pratt, Ent. xiii. pp. 46 & 47. *C. pomonella* in Tasmania; Rep. R. Soc. Tasm. 1879, pp. 10–13, 54–58, 77–80. Remedies; Rep. Fruit-Growers' Ass. Ont. 1878, p. 18.

Cochylis ambiguella, Hübn., noticed; Malfatti, Atti Soc. Ital. xxii. pp. 306–808.

Phoxopteris angulifasciana. Oviposition and young larvæ noticed; Fernald, Am. Ent. iii. p. 276, and Psyche, iii. p. 88.

Grapholitha nigricana. Life-history; J. H. Wood, Ent. M. M. xvii. pp. 155 & 156.

New genera and species :—

Hendecastema, Walsingham, Ill. Lep. Het. iv. p. 4. Differs from *Lozotænia*, Herr.-Schäff., &c., by the pectinated antennæ, and the male having 11 veins in the fore-wings. Type, *H. cuneanum*, sp. n., *l. c.* pl. lxi. figs. 8–10, and var. *adumbranum*, l. c. p. 5, California.

Synnoma, id. *l. c.* p. 24. Allied to *Exapate*; type, *S. lynosyrana*, sp. n., *l. c.* pl. lxv. figs. 9 & 10, California.

Hystrichophora, id. *l. c.* p. 64. Allied to *Phoxopteryx*, but with longer and more conspicuous palpi; type, *H. leonana* and var. *aurantiana*, sp. n., *l. c.* p. 65, pl. lxxv. figs. 2 & 3, Califo ia.

Teras simpliciana, Oregon, fig. 4, *nivisellana*, fig. 3, p. 2, and *foliana*,

figs. 5 & 6, California, p. 3, *id. l. c.* pl. lxi.; *T. cuneigera*, Butler, Cist. Ent. ii. p. 559, New Zealand.

Lozotœnia fucana, Oregon, fig. 2, *retiniana*, California, fig. 3, p. 12, *retana*, Texas, fig. 4, *franciscana*, San Francisco, fig. 5, and *glaucana*, Oregon, fig. 6, p. 13; Walsingham, *l. c.* pl. lxiii.

Lophoderus gloveranus, id. *l. c.* p. 14, pl. lxiii. fig. 7, California.

Œnectra inconditana, pl. lxiii. fig. 10, *rudana*, figs. 1 & 2, p. 16, and *senecionana*, fig. 3, p. 17, pl. lxiv., *id. l. c.*, California and Oregon.

Cenopis gracilana, New York, fig. 5, *diluticostana*, Eastern States, fig. 6, p. 18, *niveana*, Canada, fig. 7, *pulcherrimana*, fig. 8, and *demissana*, Texas, fig. 9, p. 19, *id. l. c.* pl. lxiv.

Dichelia tunicana, fig. 1, and *californiana*, figs. 2 & 3, *id. l. c.* pp. 20 & 21, pl. lxv., California.

Capua lentiginosana, id. *l. c.* p. 22, pl. lxv. fig. 5, Texas.

Sciaphila horariana, Oregon, fig. 6, *trigonana*, California, fig. 7, p. 22, and *basiplagana*, Texas, fig. 8, p. 23, *id. l. c.* pl. lxv.

Æmene nigro-punctana, Saalmüller, Ber. senck. Ges. 1879–80, p. 309, Nossi-Bé.

Retinia malgassana, id. *l. c.*, Nossi-Bé; *R. subcervinana*, Walsingham, *l. c.* p. 25, pl. lxvi. fig. 1, Rouge River.

Idiographis fulviplicana, California, figs. 2 & 3, and *ægrana*, Oregon, fig. 4, *id. l. c.* pp. 25 & 26, pl. lxiv.

Cochylis fernaldana, California and Oregon, fig. 7, *intactana*, fig. 6, p. 27, *parallelana*, fig. 9, *transversus*, California, fig. 10, p. 28, pl. lxvi., *saxicolana*, fig. 1, and *dilutana*, fig. 3, Oregon, *latipunctana*, fig. 2, and *campicolana*, fig. 4, Mendocino County, p. 29, and *parvimaculana*, Shasta County, fig. 5, p. 30, pl. lxvii., *id. l. c.*

Penthina consanguinana and *conditana*, id. *l. c.* pp. 30 & 31, pl. lxvii. figs. 6 & 7, California; *P. cyanana*, Murtfeldt, Am. Ent. iii. p. 14, United States.

Sericoris vetulana, California, Texas, fig. 9, p. 32, *auricapitana*, fig. 10, pl. lxvii., *dilutifuscana*, Oregon, fig. 2, p. 33, and *chalybeana*, Siskiyou Mountains, fig. 4, pl. lxviii. p. 34, Walsingham, *l. c.*

Exartema sericoranum, N. America, fig. 7, p. 36, *punctanum*, Shasta County, fig. 8, p. 37, and *griseo-albanum*, Eastern States, fig. 9, p. 38, *id. l. c.* pl. lxviii.

Pœdisca culminana, California, pl. lxviii. fig. 10, p. 38, *illotana*, Oregon, fig. 1, *terracoctana*, fig. 2, p. 39, *rectiplicana*, fig. 3, *albangulana*, fig. 4, *P.* (?) *basipunctana*, fig. 5, p. 40, *P.* (?) *subplicana*, fig. 6, *P. nigralbana*, California, fig. 7, p. 41, *agricolana*, California and Oregon, fig. 8, *atomosana*, fig. 9, *bolanderana*, fig. 10, pl. lxix. p. 42, *crambitana*, fig. 1, *larana*, fig. 2, p. 43, *luridana*, California, fig. 3, *argenti-albana*, Texas, fig. 4, p. 44, *pulveratana*, San Francisco, Texas, fig. 6, *primulana*, fig. 7, *biquadrana*, fig. 8, p. 45, *shastana*, fig. 9, pl. lxx. p. 46, *grandiflavana*, California, fig. 2, p. 47, *subflavana*, Oregon, fig. 3, *maculatana*, fig. 4, *irroratana*, fig. 5, p. 48, *perdricana*, fig. 6, *passerana*, California, fig. 7, *glomerana*, fig. 8, p. 49, *fulminana*, Texas, fig. 9, *canana*, California, fig. 10, pl. lxxxi., *hirsutana*, California and Oregon, fig. 1, p. 50, *radicana*, Oregon, fig. 5, *abruptana*, fig. 6, p. 53, *graduatana*, Texas, fig. 7, *palpana*, California, fig. 8, *abbrevia-*

tana, Washington, fig. 9, pl. lxxii. p. 54, *id.* l. c. ; *P. fernaldana*, Grote, N. Am. Ent. i. p. 98, Colorado.

Semasia radiatana, Eastern States, fig. 1, p. 55, *S.* (?) *elongana*, Oregon, fig. 2, *S. artemisiana*, California, fig. 3, p. 56, *scalana*, California and Oregon, fig. 4, *columbiana*, Oregon, fig. 5, p. 57, *decem-punctana*, Oregon, fig. 6, *perangustana*, California, fig. 7, *lapidana*, fig. 8, p. 58, *sublapidana*, Oregon, fig. 9, *tenuiana*, California, fig. 10, pl. lxxiii. p. 59, *parvana*, Oregon, fig. 1, *stramineana*, Denver, fig. 2, *minimana*, California, fig. 3, p. 60, *argenticostana*, Oregon, fig. 4, *griseo-capitana*, fig. 5, p. 61, *pallidicostana*, California, fig. 6, *infuscana*, San Francisco, fig. 7, *S.* (?) *oregonana*, fig. 8, p. 62, *amphorana*, Oregon, fig. 9, pl. lxxiv. p. 63, Walsingham, *l. c.*

Grapholitha mirificana, Frey, Lep. Schweiz. p. 319, Simplon; *G. vitrana*, fig. 5, p. 65, *cæruleana*, fig. 6, *conversana*, fig. 7, *lunatana*, Oregon, fig. 8, p. 66, *americana*, figs. 9 & 10, pl. lxxv., and *trossulana*, California, pl. lxxvi. fig. 1, p. 67, Walsingham, *l. c.*

Catoptria (*Grapholitha*) *tripoliana*, Barrett, Ent. M. M. xvii. p. 84, Essex.

Pthoroblastis texanana, Walsingham, *l. c.* p. 70, pl. lxxvi. fig. 7, Texas.

Carpocapsa latiferreana, id. *l. c.* p. 70, pl. lxxvi. fig. 8, California and Oregon ; *C. semilunana*, Saalmüller, *l. c.* p. 310, Nossi-Bé.

Steganoptycha caflischiana, Frey, *l. c.* p. 326, Albula; *S. liturana*, Rouge River, fig. 9, *lagopana*, California, fig. 10, pl. lxxvi., *biangulana*, Oregon, fig. 1, p. 71, and *purpuriciliana*, California, fig. 2, pl. lxxvii. p. 72, Walsingham, *l. c.*

Phoxopteryx pacificana, California and Oregon, fig. 4, p. 73, *muricana*, Washington, fig. 6, *cometana*, Mendocino County, fig. 8, pl. lxxvii. p. 74, *id.* l. c. ; *P. loricana*, Grote, Canad. Ent. xii. p. 218, Ohio.

Rhyacionia juncticiliana, Walsingham, *l. c.* p. 75, pl. lxxvii. fig. 9, Shasta County, California.

Dichrorrhampha rhæticana, Frey, *l. c.* p. 331, Bernina, Valais ; *D. radicicolana*, Walsingham, *l. c.* p. 75, pl. lxxvii. fig. 10, Oregon.

Eupœcilia thuleana, Vaughan, Ent. xiii. p. 293, pl. iv. fig. 3, Shetland Islands.

Tineidæ.

Berg, C. Observaciones acerca de la familia *Hyponomeutidæ*. An. Soc. Arg. x. pp. 85–91 & 99–109.

Contains notices of *Hyponomeuta* (1 sp.), *Crameria* (1 sp.), and *Atteva* (17 spp.). Full synonymy is given, but no new species are described.

Chambers, V. T. Descriptions of some new *Tineina*, with notes on a few old Species. J. Cincinn. Soc. ii. pp. 179–194.

Relates to the genera *Anesychia*, *Hyponomeuta*, *Harpalyce*, *Plutelloptera*, *Gelechia*, *Anarsia*, *Nothris*, *Coriscium*, *Coleophora*, *Laverna*, *Œnoe*, *Æœa*, *Ætia*, *Elachista*, *Eulyonetia*, *Dryope*, *Lithocolletis*, *Phyllocnistis*, *Nepticula*, and *Tinea*.

——. Illustrations of the neuration of the wings of the American *Tineina*. L. c. pp. 180–204.

The neuration of 55 species, belonging to 7 families is figured.

[Chambers, V. T.] On the changes that take place in the mouth-parts and legs of some leaf-mining Lepidopterous larvæ. Am. Ent. iii. pp. 235–264, figs. 124–144.

An important paper on the comparative physiology of the *Tineina*, but scarcely admitting of abridgment.

——. Notes upon some Tineid larvæ. Psyche, iii. pp. 63–68, 135–137, 147–149, woodcut.

Relates to different species of *Antispila*, *Aspidisca*, *Æœa* (*Chrysopelia*) *Coleophora*, *Gelechia*, *Gracilaria*, *Laverna*, *Nepticula*, *Ornix*, *Phyllocnistis*, and *Tischeria*.

Dimmock, G. The Trophi and their Chitinous Supports in *Gracilaria*. Psyche, iii. pp. 99–103, woodcuts.

The structure and changes of the mouth-parts in different stages of the larva are described. The mandibles change more than the labrum, the maxillæ more than the mandibles, and the labium most of all; and contemporaneously with the appearance of the later form of larval trophi (the labium becoming capable of turning under, and the maxillæ better developed), the larva acquires the power of eating vertically to the surface of the leaf, and of spinning threads in all directions, its feet becoming developed at the same time.

Meyrick, E. Descriptions of Australian *Micro-Lepidoptera*. iv. *Tineina* (continued). P. Linn. Soc. N. S. W. v. pp. 204–271.

Includes *Glyphipterygidæ* and *Erechthiadæ* (n.); the *Choreutidæ* are included in the former family.

Riley, C. V. The True and the Bogus Yucca Moth, with remarks on the fertilization of Yucca. Am. Ent. iii. pp. 141–145.

Relates to *Pronuba* and *Prodoxus* (cf. also Riley & Hagen, *l. c.* p. 293, Canad. Ent. xii. pp. 128, 129, 263, & 264).

Staudinger, O. Lepidopteren-Fauna Kleinasiens. Hor. Ent. Ross. xv. pp. 369–435.

Extends from *Coleophora* to *Alucita*. The following synonyms, &c., occur:—*Coleophora albifuscella*, Zell., = *leucapennella*, Hübn., *Stagmatophora sumptuosella*, Led., is scarcely a var. of *serratella*, Tr., *Butalis flaviventrella*, var. *asiatica*, described (p. 392), *Oxyptilus marginellus*, Zell., = *parvidactylus*, Haw., var., *Mimæseoptilus lœwi*, Zell., = *zophodactylus*, Dup., and *M. aridus*, Zell., is hardly distinct, *M. manni*, Zell., is probably a southern form of *pterodactylus*, Linn., *Aciptilia confusa*, Herr.-Schäff., = *spilodactyla*, Curt., var., but *phlomidis*, Staud., and *subalternans*, Led., are distinct, *A. malacodactyla*, Zell., = *tetradactyla*, L., var., *A. pentadactyla*, var. *sulphurea* from Amasia described (p. 433).

Wallengren, H. D. J. Skandinaviens Arter af Tineidgruppen *Plutellidæ* (Staint.). Ent. Tidskr. i. pp. 53–63.

20 species are described, belonging to 8 genera, 4 of which are new.

Walsingham [Lord]. On some new and little-known species of *Tineidæ*, by Thomas, Lord Walsingham. P. Z. S. 1880, pp. 77–93, pls. xcii. & xciii.

Relates chiefly to North American species.

Tinea fuscipunctella, *argentimaculella*, *Dasycera oliviella*, and *Laverna schrankella*. Transformations described; Lafaury, Ann. Soc. Ent. Fr. (5) x. pp. 80–84.

Acureuta pireuniæ, Zell. Neuration figured; Burmeister, Atlas, p. 61, pl. i. fig. 15.

Simaethis pronubana, Snell., = *Badera prodigella*, Walk. (*Adelidæ*), Butler, P. Z. S. 1880, p. 687.

Tinea tapetzella, Linn., var. *occidentella* from Virginia described; Chambers, J. Cincinn. Soc. iii. pp. 15 & 16.

Adela. Walsingham discusses the known N. American species, and gives their synonymy as follows: — *A. ridingsella*, Clem. (= *Dicte coruscifasciella*, Chamb., and *A. schlægeri*, Zell.), *purpurea*, Walk. (= *biviella*, Zell.), *chalybeis*, Zell., *bella*, Chamb., *flamensella*, Chamb., *bellella*, Walk., *trigrapha*, Zell., pl. xi., figs. 2 & 3 (♂ = *Adela* [*Nematois*], *trifasciella*, Chamb., ♀ = *A. fasciella*, Chamb.), and *dichroa*, Zell.; P. Z. S. 1880, pp. 77–79.

Nemophora pilella noticed; Hodgkinson, Ent. xiii. p. 164.

Hyponomeuta evonymella, Scop. Transformations noticed; Sandahl, Ent. Tidskr. i. pp. 158 & 159. *H. ordinatellus*, Walk. (? = *multipunctellus*, Clem.), discussed; Walsingham, P. Z. S. 1880, p. 84. *H. circumdatellus* and *assamensis*, Walk., belong to *Azinis*; Butler, P. Z. S. 1880, p. 691.

Argyresthia trifasciata, Staud., redescribed; Frey, Lep. Schweiz. p. 385, Valais.

Cedestis sp. (?) mining the leaves of *Abies nigra* in the United States; Hagen, Canad. Ent. xii. p. 121.

Psecadia xanthorrhoa, Zell., = *P. notatella*, Walk.; Walsingham, *l. c.* p. 85.

Anesychia sparsiciliella, Clem., = *Cryptolechia atro-picta*, Zell., = *C. contrariella*, Walk., *A. multipunctella*, Chamb. (nec *Hyponomeuta m.*, Clem.), = *Psecadia semilugens*, Zell.; *id. l. c.*

Depressaria alpigena, Frey, var. *salevensis* described; Frey, *l. c.* p. 353.

Gelechia ocellatella. Larva described; Barrett, Ent. M. M. xvi. pp. 261 & 262.

Zelleria insignipennella noticed; Warren, Ent. M. M. xvii. p. 116.

Coleophora vibicella, Wocke. Case and larva described; P. G., Le Nat. ii. p. 211.

Cosmopteryx scribaella, Zell. Larva described; Heylaerts, S. E. Z. xli. p. 188.

Batrachedra præangusta. Larva in a goldfinch's nest; Walsingham & Stainton, Ent. M. M. xvii. pp. 45 & 93.

Butalis acanthella, Wocke. Transformations noticed; P. G. Le Nat. ii. p. 251.

Elachista cerussella. Egg and larva noticed; Machin, Ent. xiii. p. 244.

Tischeria gaunacella, Dup., recorded as new to Britain ; W. D. Cansdale, Ent. M. M. xvi. p. 186.

Lithocolletis. Life-history, with an account of the gradual development of the larva and the silk-producing apparatus, &c. ; Chambers. J. Cincinn. Soc. ii. pp. 79–92. *L. guttifinitella* : mandibles of larva figured ; Am. Ent. ii. p. 294, fig. 138.

Phyllocnistis ampelopsella and *vitifoliella*, discussed ; Chambers, J. Cincinn. Soc. ii. pp. 191 & 192.

Bucculatrix pomifoliella, Clem., noticed and figured ; Riley, Am. Ent. iii. p. 23, fig. 6. *B. pomifoliella* : larva wandering to a distance from its food-plant to spin its cocoon ; Chambers, Am. Ent. iii. p. 50.

Trifurcula pallidella, Zell., recorded as new to Britain ; Hodgkinson, Ent. M. M. xvi. pp. 186 & 187, Ent. xiii. pp. 9 & 10. Bred from hawthorn ; Threlfall, Ent. M. M. xvi. p. 230, Ent. xiii. p, 66.

New genera and species, &c. :—

Erechthiadæ [*-thiidæ* vel *-thiadidæ*], fam. n., related to the *Glyphipterygidæ* and *Tineidæ*. Meyrick, P. Linn. Soc. N. S. W. v. p. 206. The five genera, all new, are tabulated as follows :

A. Face smooth. *Hippiochætes*, p. 253. Type, *H. chrysaspis*, sp. n., Sydney, *l. c.*

B. Face rough-haired.

I. Fore wings with 12 veins. *Eschatotypa*, p. 256 ; type, *E. melichrysa*, sp. n., p. 257, New Zealand.

II. Fore wings with 11 veins.

a. Veins 6 and 7 of fore wings stalked. *Eretmetis*, p. 258 ; types, *E. selenophanes*, Brisbane, *brontoctypa*, p. 259, and *iuloptera*, Sydney, p. 260, spp. nn.

b. Veins 6 & 7 of fore wings separate.

1. Veins 5 and 6 of hind wings stalked. *Erechthias*, p. 261. To contain *Tinea mystacinella*, *Argyresthia stilbella*, and *Elachista subpavonella*, Walk., and *E. chasmatias*, Wellington, New Zealand, p. 264, *acontistes*, Blue Mountains, p. 266, *elæorrhoa*, Paramatta, p. 267, *charadrota* and *chionodira*, New Zealand, p. 268, *niphadopla*, Sydney, and *aellophora*, Paramatta, p. 270, spp. nn.

2. Veins 5 and 6 of hind wings separate. *Comodica*, p. 254 ; type, *C. tetracercella*, sp. n., *l. c.* p. 255, Sydney, Brisbane.

Hypertropha, id. *l. c.* p. 208. Allied to *Simaethis* ; wings very broad, veins 7 and 8 of fore wings stalked ; thorax crested. Type, *H. thesaurella*, sp. n., *l. c.* p. 209, New South Wales and Queensland.

Brusadella, Snellen, Midden Sumatra, iv. (1) 8, p. 83. Allied to *Euplocamus* ; type, *B. dichroalis*, sp. n., *l. c.*, Sumatra.

Boocara, Butler, Cist. Ent. ii. p. 562. Allied to *Gracilaria*, but with broader and shorter wings ; type, *B. skelloni*, sp. n., *l. c.*, New Zealand.

Eupselia, Meyrick, *l. c.* p. 216. Allied to *Glyphipteryx* ; 2nd joint of palpi beneath smooth, with appressed scales ; antennæ simple in both sexes ; fore wings with only 11 veins. To contain *Orsana* (?) *percussana*,

carpocapsella, and *beatella*, Walk., and *E. aristonica*, p. 218, *satrapella*, p. 220, *theorella*, Paramatta, &c., p. 222, and *melanostrepta*, Melbourne and Tasmania, p. 223, spp. nn.

Æolocosma, id. *l. c.* p. 224. Allied to last; antennæ in ♂ strongly ciliated, fore wings with 12 veins, 7 and 8 stalked. Types, *Æ. iridozona*, Paramatta, and *marmaraspis*, Blue Mountains, spp. nn., *l. c.* p. 225.

Apistomorpha, id. *l. c.* p. 247. Allied to *Glyphipteryx*; 2nd joint of palpi with long, loose, projecting, tuft-like hairs; veins 7 and 8 of fore wings stalked. Type, *A. argyrosema*, sp. n., *l. c.*, Sydney, &c.

Phryganostola, id. *l. c.* p. 248. Allied to last; veins 7 and 8 of fore wings separate. Types, *P. drosophaes*, Paramatta, *euthybelemna*, Melbourne, Tasmania, *oxymachæra* and *achlyoessa*, New Zealand, spp. nn., *l. c.* pp. 249–252.

Plutelloptera, Chambers, J. Cincinn. Soc. ii. p. 181. Allied to *Plutella*; type, *P. ochrella*, sp. n., *l. c.*, Texas.

Caunaca, Wallengren, Ent. Tidsk. i. p. 56. Allied to *Plutella*; subradial vein of the hind wings simple; last joint of the palpi rather short. To include *bicingulata*, Zell., *annulatella*, Curt., and *senilella*, Zett.

Credemnon, id. *l. c.* p. 59. Allied to *Cerostoma*; ocelli wanting, last joint of the palpi rather long. To include *Tinea sylvella*, Linn., and *T. alpella* and *lucella*, Fabr.

Periclymenobius, id. *l. c.* p. 61. Allied to last; tip of fore wings falcate; radial and subradial veins of the hind wings springing from a common stem arising from the discoidal cell. To include *Tinea falcella*, W. V., and *T. xylostella* and *nemorella*, Linn.

Trachoma, id. *l. c.* p. 63. Allied to *Theristis*, ocelli present; tip of the fore wings hardly falcate. To include *Tinea asperella* and *scabrella*, Linn., and *T. horridella*, Tr.

Prodoxus, Riley, Am. Ent. iii. p. 155. Allied to *Pronuba*, but basal joint of maxillary palpi in ♀ not produced into a spinous tentacle, but is merely an obtuse tubercle, as in ♂. Type, *P. decipiens*, sp. n., *l. c.*, South Carolina (probably = *Hyponomeuta 5-punctella*, Chamb.).

Ætia, Chambers, *l. c.* p. 186. *Elachistidæ*; affinities not stated. Type, *Æ. bipunctella*, sp. n., *l. c.* p. 9, Texas.

Eulyonetia, id. *l. c.* p. 188. Apparently belonging to the *Elachistidæ*, but with the neuration of *Lyonetia*. Type, *E. inornatella*, sp. n., *l. c.*, Texas.

Simaethis sycopola and *melanopepla*; Meyrick, *l. c.* pp. 211 & 212, Sydney.

Euplocamus fœdellus, Mabille, CR. Ent. Belg. xxiii. p. xxvi., Madagascar.

Tinea mancuniella (? = *granella*, var.), Hodgkinson, Ent. xiii. p. 10, Manchester (not described).

Lampronia oregonella, Oregon, and *tripunctella*, N. America, Walsingham, P. Z. S. 1880, pp. 91 & 92, pl. xii. figs. 11 & 10.

Incurvaria solenobiella, id. *l. c.* p, 82, pl. xi. fig. 10, San Francisco.

Adela septentrionella, fig. 1, p. 79, *singulella*, fig. 4, *lactimaculella*, figs. 5 & 6, Mendocino County, California, p. 80, *simpliciella*, fig. 7, S. Oregon,

gemmella, fig. 8, p. 81, and *griseella*, figs. 9 & 9 *a*, Dharmsala, Punjab, p. 82, *id. l. c.* pl. xi.

Micropteryx amasiella, Staudinger, Hor. Ent. Ross. xv. p. 421, Amasia; *M. pardella* and *auro-sparsella*, Walsingham, *l. c.* p. 83, pl. xi. figs. 11 & 12, S. Oregon.

Swammerdamia caflischiella, Frey, Lep. Schweiz. p. 344, Gamsen?

Hyponomeuta lapidella, Walsingham, *l. c.* p. 86, pl. xii. fig. 1, Dharmsala; *H. texanella*, Chambers, J. Cincinn. Soc. ii. p. 180, Texas.

Anesychia texanella, id. *l. c.* p. 179, Texas.

Plutella polaris, Zeller, Ent. M. M. xvii. p. 109, Spitzbergen.

Cerostoma (?) *luehderella*, Plötz, S. E. Z. xli. p. 306, Mungo, W. Africa.

Epigraphia eruditella, Grote, N. Am. Ent. i. p. 53, Massachusetts.

Psecadia nigro-apicella, Saalmüller, Ber. senck. Ges. 1879-80, p. 310, Nossi-Bé; *P.* (?) *cupreo-nivella*, Rio de Espirito Santo, Brazil, fig. 2, p. 86, *P. monticola*, Siskiyou Mountains, between California and Oregon, fig. 3, p. 87, *arctostaphylella*, fig. 4, p. 88, *subcærulea*, fig. 5, California, *albistrigella*, Siskiyou Mountains, fig. 6, p. 89, *ermineella*, fig. 7, and *hockingella*, figs. 8, 9, & 9 *a*, Dharmsala, Punjab, p. 90, Walsingham, *l. c.* pl. xii.

Cryptolechia (?) *eningiella*, Plötz, S. E. Z. xli. p. 306, Eningo, W. Africa; *C. argillacea*, Butler, Ann. N. H. (5) v. p. 394, Madagascar.

Depressaria absinthivora, Frey, *l. c.* p. 355, Switzerland; *D. lennigiella*, Fuchs, S. E. Z. xli. p. 237, Lennig (? = *umbellana* var.).

Gelechia erschoffi, p. 361, *killiasii*, p. 362, *steudeliella*, Valais, *excelsa*, Gornergrat, p. 363, *submissella*, Valais, p. 367, Frey, Lep. Schweiz.; *G. insularis*, Butler, *l. c.* p. 394, Madagascar; *G. sedata*, id. Cist. Ent. ii. p. 560, New Zealand; *G. pinifoliella*, *obliquifasciella*, and *biminimaculella*, Chambers, *l. c.* pp. 181–183, Texas.

Teleia wachtli, Rogenhofer, SB. z.-b. Wien, xxx. p. 48, Egypt.

Anarsia belfrageella, Chambers, *l. c.* p. 183, Texas.

Hypsolophus obscuripennis, Frey, *l. c.* p. 372, Valais.

Nothris citrifoliella, Chambers, *l. c.* p. 184, injurious to orange in Florida.

Œcophora limbata, Butler, Cist. Ent. ii. p. 560, New Zealand.

Butalis ericivorella, Montlhéry, p. cxx., *binotiferella*, Bouray, and *fasciatella*, p. cxxi., Alicante, Ragonot, Bull. Soc. Ent. Fr. (5) x.; *B. tenuisquamata*, Amasia, p. 388, *tabescentella*, Caraman, p. 390, *pœlopyga*, Amasia, p. 391, *anomaloptera*, Caraman, Balkan, p. 393, *basistrigella*, Magnesia, p. 395, *platypyga*, Caraman, p. 396, *zelleri*, Amasia, p. 397, *caramani*, Caraman, p. 400, *subfasciata*, p. 402, *canescens*, Amasia, p. 403, *satyrella*, p. 404, and *matronella*, N. Persia, p. 404, Staudinger, Hor. Ent. Ross. xv.

Glyphopteryx chrysolithella, Sydney, Tasmania, &c., p. 229, *cometophora*, Melbourne, p. 231, *iometalla*, Brisbane, p. 232, *triselena*, Christchurch, New Zealand, p. 234, *asteriella*, Shoalhaven, p. 235, *evastera*, Christchurch, p. 236, *meteora*, Murrurundi, p. 237, *chrysoplanetis*, Sydney, Melbourne, p. 238, *leucocerastes*, Murrurundi, p. 239, *asteronota*, Auckland, p. 240, *actinobola*, Sydney, p. 241, *palæomorpha*, Brisbane, p. 242, *iochecera*, p. 243, *acrothecta*, p. 244, and *astropœa*, New Zealand, p. 245, Meyrick, *l. c.*

Douglasia columbella and *D.* (?) *minutissima*, Staudinger, *l. c.* pp. 383 & 384, Kerasdere, &c.

Gracilaria rutilans, Butler, *l. c.* p. 561, New Zealand.

Coleophora collina, Upper Engadine, *brigensis*, Valais, *medio-strigata*, p. 398, and *albulæ*, Albula, p. 399, Frey, l. c.; *C. linosyridella*, Fuchs, *l. c.* p. 113, Lower Rheingau; *C. necessaria*, p. 370, *confusa*, Amasia, p. 372, *tauricella*, Taurus, p. 374, *occatella*, Sarepta, Amasia, Castile, p. 376, *breviuscula*, Kerasdere, p. 377, *granulosella*, Amasia, Macedonia, p. 379, *lutealella*, Amasia, and *miserella*, Caraman, p. 380, Staudinger, *l. c.*

Chauliodus wockeellus, id. *l. c.* p. 382, Kerasdere.

Laverna sabalella, Chambers, *l. c.* p. 185, Florida.

Æœa quadricristatella, id. *l. c.* p. 186, Texas.

Elachista atrisquamosa, p. 406, *deceptricula*, Kerasdere, p. 409, and *pollutissima*, Amasia, p. 411, Staudinger, l. c.; *E. bicristatella*, Chambers, *l. c.* p. 187, Texas.

Lithocolletis deleta, Staudinger, *l. c.* p. 413, Maidan; *L. sex-notella*, *quinque-notella*, p. 189, and *solidaginisella*, p. 190, Chambers, *l. c.*, Texas.

Bucculatrix basifascella, *oppositella*, Amasia, and *infans*, Kerasdere, Staudinger, *l. c.* pp. 416–418.

Nepticula bolli, Frey, Lep. Schweiz. p. 421, Bremgarten; *N. grandisella* and *maculosella*, Chambers, *l. c.* p. 193, Texas; *N. nyssæ-foliella*, id. Psyche, iii. p. 66, Kentucky (larva only).

Pterophoridæ.

Walsingham [Lord]. *Pterophoridæ* of California and Oregon. By Thomas, Lord Walsingham. London: 1880, 8vo, pp. xvi. & 66, pls. iii.

42 species enumerated, mostly new, belonging to the genera *Chrysocorys*, *Platyptilus*, *Amblyptilus*, *Oxyptilus*, *Mimeseoptilus*, *Œdematophorus*, *Pterophorus*, *Lioptilus*, *Acyptilus*, *Trichoptilus*, and *Alucita*. The following known species are noticed:—*Chrysocorys festaliella*, Hübn., p. 1, fig. 1, *Platyptilus bertrami*, Rössl. (= *bischoffi*, Zell., = ? *cervinidactylus*, Pack.), p. 3, fig. 3, *P. cardui*, Zell. (= *carduidactylus*, Riley), fig. 6, p. 7, pl. i., *P. petrodactylus*, Walk., p. 20, fig. 11, *Amblyptilus cosmodactylus*, Hübn., p. 23, figs. 2–4, *Oxyptilus periscelidactylus*, Fitch, p. 25, fig. 5, *O. delawaricus*, Zell., p. 29, fig. 7 (redescribed), *O. nigro-ciliatus*, Zell. (? = *tenuidactylus*, Fitch), p. 31, fig. 8, *Œdematophorus cretidactylus*, Fitch (*gypsodactylus* suggested as a more appropriate name), p. 35, pl. ii., *Pterophorus monodactylus*, Linn. (= *pergracilidactylus*, Pack., and *cinereidactylus*, Fitch), p. 39, pl. ii. fig. 16, pl. iii. fig. 1, *Lioptilus paleaceus*, Zell., p. 41, fig. 2, *L. agraphodactylus*, Walk., p. 46, fig. 6, *L. sulphureus* (= *sulphureodactylus*, Pack.), p. 48, fig. 7, *homodactylus*, Walk. (? = *hololeucus*, Zell.), p. 50, figs. 8 & 9, and *Alucita hexadactyla*, Linn., p. 66, fig. 16, pl. iii. The introduction comprises an account of the circumstances under which the author's materials were obtained, notes on the variation and affinities of the species, and a review of the little previously recorded on the *Pterophoridæ* of Western America.

Staudinger publishes notes on the synonymy of several species from Asia Minor (cf. *Tineidæ*, anteà, p. 176).

List of Plume-moths found near St. Louis (only 9 species); Murtfeldt, Am. Ent. iii. p. 235.

Pterophorus. Description of the larva of a supposed new species, on Golden Rod; Kellicott, Canad. Ent. xii. pp. 105 & 106.

Trichoptilus, g. n., Walsingham, *l. c.* p. 62. Resembles *Aciptilus* in its narrow lobes, and in the absence of a defined anal angle; cleft of fore-wings deeper, and tuft of scales on third lobe of hind-wings nearer the base than in any other known genus. Type, *T. pygmæus*, sp. n., *l. c.* p. 64, pl. iii. fig. 15, California (probably the smallest known species of the family).

New species:—

Chrysocorys felicella, id. *l. c.* p. 2, pl. ii. figs. 2, 2 *a*, & 2 *b*, California, Oregon.

Platyptilus adustus, fig. 4, p. 5, *grandis*, fig. 5, p. 6, *percnodactylus*, California, fig. 7, p. 8, *albidus*, Oregon, California, fig. 8, p. 10, *orthocarpi*, Oregon, fig. 9, p. 11, *albidorsellus*, fig. 10, p. 13, *shastæ*, fig. 11, p. 14, *fragilis*, fig. 12, p. 16, *albiciliatus*, fig. 13, p. 17, *modestus*, fig. 14, p. 18, California, *id. l. c.* pl. i.

Amblyptilus pica, id. *l. c.* p. 21, pl. ii. fig. 1, California.

Oxyptilus ningoris, id. *l. c.* p. 26, pl. ii. fig. 6, California.

Mimeseoptilus pneumonanthes, Schleich & Büttner (? = *plagiodactylus* var.), S. E. Z. xli. p. 472, Pomerania; *M. exclamationis*, Walsingham, *l. c.* p. 32, pl. ii. fig. 10, California, Oregon.

Œdematophorus grisescens, Oregon, fig. 11, p. 34, *guttatus*, fig. 12, p. 36, and *occidentalis*, figs. 13 & 14, p. 37, California, *id. l. c.* pl. ii.; *Œ. ambrosiæ*, Murtfeldt, Am. Ent. iii. p. 236, St. Louis.

Lioptilus stramineus, Oregon, fig. 3, p. 41, *angustus*, California, fig. 4, p. 43, *inconditus*, California, Washington, fig. 5, p. 44, *subochraceus*, California, fig. 10, p. 53, *helianthi*, Oregon, fig. 11, p. 54, and *L.* (?) *parvus*, California, fig. 12, p. 55, Walsingham, *l. c.* pl. iii.; *L. sericidactylus*, Murtfeldt, *l. c.* p. 235, St. Louis.

Aciptilus cinerascens, fig. 13, p. 57, *montanus*, fig. 14, p. 59, pl. iii., *A.* (?) *californicus*, pl. ii. fig. 9, p. 60, Walsingham, *l. c.*

DIPTERA.

BY

W. F. Kirby, M.E.S., &c.

The General Subject.

Arribálzaga, F. L. Informe sobre una coleccion de Dipteros reunida en las Conchas por M. O. César. Nat. Arg. i. pp. 185–189.

Bigot, J. M. F. Diptères nouveaux ou peu connus. xviii.–xxii. Ann. Soc. Ent. Fr. (5) x. pp. 84–94, 213–230 & 369–374.

Relates to *Plagiocera*, *Formosia*, and *Rutilia*; *Diopsididæ* (with table of genera); Persian and Caucasian *Diptera* (no distinction is made between these new species); *Syrphidæ*; and *Tabanidæ* (remarks, and table of the genera into which *Pangonia* and *Tabanus* have been subdivided).

Brauer, F. Die Zweiflügler des kaiserlichen Museums zu Wien, i. Denk. Ak. Wien, xlii. pp. 105–216, pls. i.–vi.

Includes a sketch of the four principal collections of *Diptera* in the Vienna Museum, the Imperial, Winthem's, Wiedemann's, and Egger's Collections; remarks on the classification of *Diptera*, with a table of families, and a monograph of the European species of *Tabanus*, including descriptions of many Mediterranean and Siberian species, and preceded by valuable tables of 55 males and 62 females. Remarks on geographical distribution and tables of authorities and synonymy, &c., close the paper. The plates represent details, and chiefly the heads of the species described.

Ciaccio, G. V. Nuove osservazioni intorno all' intima struttura degli occhi de' Ditteri. Rend. Acc. Bol. 1879–80, pp. 134 & 135.

Gobert, —. Diagnoses de Tabaniens nouveaux. Bull. Soc. L. N. Fr. v. pp. 29 *et seq.*

[Not seen by the Recorder.]

Holmgren, A. E., Novas species insectorum cura et labore A. E. Nordenskiöldii e Novaia Semlia coactorum descripsit. Holmiæ: 1880, 4to, pp. 24.

[Not seen by the Recorder. Probably published in advance of Sv. Ak. Handl. (2) xviii.]

Meinert, F. Sur la construction des organes buccaux chez les Diptères. Ent. Tidskr. i. pp. 150–153.

The mouth in *Diptera* consists of the pharynx, which is divided in front into two parts, the epipharynx and the hypopharynx. This is followed by the first metamera, the upper portion of which, combined with the epipharynx, forms the labrum; its lower part is generally separated from the hypopharynx, and forms the labium. Behind this is the second metamera, that of the maxillæ, and the maxillary lobes are simply processes of it, and not jointed organs; the maxillary palpi are generally similar, only being jointed to the metamera, and themselves articulated in *Culex* and *Tipula*. The third and last metamera, that of the mandibles, is generally separated from the preceding, though its hinder part is strongly soldered to the cephalic plate; it is, however, never exposed.

Mik, J. Ueber das Präpariren der Dipteren. Verh. z.-b. Wien, xxx. pp. 359–378, woodcuts.

Important practical directions.

——. Dipterologische Mittheilungen. *L. c.* pp. 587–610, pl. xvii.

Includes notes on various known species, chiefly from Gobert's collection, and descriptions of several new ones.

Osten-Sacken, C. M. Ueber einige merkwürdige Fälle von Verscheeppung und Nichtverschleppung der Dipteren nach anderen Welttheilen. S. E. Z. xli. pp. 326–332.

Relates to *Eristalis tenax*, *Syrphus pyrastri*, *Sarcophaga carnaria*, and *Psilopus pallens*.

Stein, J. P. L. Die Löw'sche Dipteren-Sammlung. S. E. Z. xli. pp. 256–259.

Van der Wulp, F. M. Eenige *Diptera* van Nederlandsche Indie. Tijdschr. Ent. xxiii. pp. 155–194, pls. x. & xi.

53 species noticed, with descriptions of several new genera and species.

Viallanes, H. Sur les terminaisons nerveuses sensitives, dans la peau de quelques Insectes. C. R. xci. pp. 1089–1091.

This paper consists of minute anatomical details relative to the larvæ of *Musca* and *Eristalis*, and does not admit of abridgment.

On the geographical distribution of *Diptera*; Osten-Sacken, Ent. Nachr. vi. pp. 67 & 68.

Scarcity of *Diptera* at Paris; Feuill. Nat. x. pp. 81 & 82.

Notes on Dutch *Diptera*; Van der Wulp, Tijdschr. Ent. xxiii. pp. xix. & xx.

Flies marching in black bands at Delhi; J. H. Smith, Sci. Goss. xvi. p. 236.

Migrating swarms of flies in America; Am. Nat. xiv. p. 805, & Nat. xxii. p. 518.

The following *Diptera* are described and figured as destructive to the Rocky Mountain Locust: *Anthomyia angustifrons*, Meig., fig. 23, *Sarco-*

phaga carnaria, L., fig. 60, and var. *sarraceniæ*, Riley, fig. 62, *Erax bastardi*, fig. 35, *Proctocanthus milberti*, Macq., fig. 54, *Tachina*, sp., fig. 59; 1st Rep. U. S. Ent. Comm. on Rocky Mountain Locust, pp. 285–324.

The different sounds produced by flies depend on the movement of the wings, and the clothing of the body, and not on thoracic stigmata; Brass, Z. ges. Nat. (3) v. p. 683.

Dipterous larva in the left rhachidian bulb of the horse; Sirodet, Le Nat. ii. p. 243.

Taschenberg reviews the symptoms of the complaint known as anthrax, and comes to the conclusion that it is not conveyed by flies, as popularly supposed; Z. ges. Naturw. (3) v. pp. 197–199.

Flies riding on a beetle; Moulton, Am. Ent. iii. p. 126.

Cecidomyiidæ.

Fitch, E. A. British Gall-flies. Ent. xiii. pp. 146–154.

Table of British *Cecidomyiidæ*, with notice of food-plants, and mode of attack.

Löw, F. Ueber neue Gallmücken und neue Mückengallen. Verh. z.-b. Wien, xxx. pp. 31–40.

Includes a criticism on Karsch's "Revision der Gallmücken"; descriptions of 4 new species; and preliminary notices of galls on *Verbascum lychnitis*, *Hieracium pilosella*, *Ononis columnæ*, and *Rhus cotinus*.

Packard, A. S. The Hessian Fly: its Ravages, Habits, Enemies, and the means of preventing its increase. Bull. U. S. Ent. Comm. No. 4, pp. 43, pl.; *cf.* Am. Nat. xiv. pp. 586 & 587, also Am. Ent. iii. pp. 118–121.

Its principal parasite is *Semiotellus destructor*.

Cecidomyia. Galls on *Tanacetum*, supposed to belong to this genus; E. A. Ormerod, P. E. Soc. 1880, pp. xxvii. & xxviii. *C. destructor*: Hagen argues that the Hessian Fly was not imported from Europe, but is indigenous in North America; and suggests that the American insect may be distinct from the European *C. secalina*; Canad. Ent. xii. pp. 197–207. Supposed parthenogenesis, and present rarity of this insect; *id.* N. Am. Ent. i. pp. 65 & 66, *cf.* also Am. Ent. iii. pp. 21, 140, & 141. *C. leguminicola*, Lintner, redescribed by him; Rep. E. Soc. Ont. 1879, pp. 128–130. *C. ranunculi*, Bremi (?), noticed, and gall figured; Fitch, Ent. xiii. pp. 145 & 146, fig.

Asphondylia. Pupæ, galls, &c., described, with list of the European species, and descriptions of 2 new ones. Wachtl, Verh. z.-b. Wien, xxx. pp. 531–538.

Cecidomyia gollmeri, Karsch, Z. ges. Naturw. (3) v. p. 297, Caracas; *C. galiicola* and *violæ*, Löw, Verh. z.-b. Wien, xxx. pp. 33 & 34, Austria: spp. nn.

Diplosis anthophthora, sp. n., *id. l. c.* p. 36, Austria.

Asphondylia doryenii, id. *l. c.* p. 37, Austria (earlier stages probably described by Müller); *A. hornigi*, figs. 1–1*f*, and *miki*, fig. 2, Wachtl, *l. c.* pp. 531 & 535, pl. xviii., Vienna: spp. nn.

Mycetophilidæ.

Sciara, sp. n. Its occasional appearance in swarms in the Southern States of America, formerly led to its being called "the yellow fever fly;" Hagen, Psyche, iii. p. 111.

Trichonta obesa, Winn., ♂ described; Mik, Verh. z.-b. Wien, xxx. pp. 607–609, pl. xvii. figs. 13–15.

Trichonta hamata, sp. n., *id. l. c.* p. 604, pl. xvii. figs. 9–12, Austria.

Bibionidæ.

Bibio albipennis and *basalis*. Transformations and habits noticed; Provancher, Nat. Canad. xii. pp. 57–59.

Dilophus vulgaris (*spinatus*, Walk.). Extraordinary abundance on shipboard between Grimsby and London (all ♀ ♀); Douglas, Ent. M. M. xvii. p. 142.

Simuliidæ.

Simulium, sp. from Ithaca, N.Y., described and eggs figured; Barnard, Am. Ent. iii. pp. 191–193, fig. 103. *S. golumbacensis*, Fabr.: habits; Lethò, Nature, xxi. p. 202.

Chironomidæ.

Chironomus, vide Jawarowsky, A. (*Insecta*, General Subject, *anteà*, p. 4).

Chironomus. Marriage-flight at Leipzig, Sept. 28, 1880; Taschenberg, Z. ges. Naturw. (3) v. p. 766.

Blepharoceridæ.

Curupira torrentium. Under this name, F. Müller is about to publish the transformations of one of the *Blepharoceridæ* apparently belonging to the genus *Paltostoma*, Schin., = *Hapalothrix*, Löw. The transformations of the group were previously quite unknown. and its systematic position was uncertain in consequence; Brauer, Zool. Anz. iii. pp. 134 & 135.

Osten-Sacken discusses various points relative to the *Blepharoceridæ*, in connection with F. Müller's observations; Ent. M. M. xvii. pp. 130–132.

Culicidæ.

Specifics against the attacks of mosquitoes; Nature, xxii. pp. 11, 338, 460, 461, & 511.

Tipulidæ.

Ctenophora. Structure of the dorsal vessel in some Dipterous larvæ supposed to belong to this genus, described at great detail; Viallanes, C. R. xc. pp. 1180–1182. *C. compedita*, Wied., noticed and wing figured,

C. javanica, Dol., redescribed ; Van der Wulp, Tijdschr. Ent. xxiii. pp. 156 & 157, pl. x. fig. 1.

Conosia, g. n., *id. l. c.* p. 159. Type, *Limnobia irrorata*, Wied. (= *Limnophila crux*, Dol.), redescribed, p. 161, pl. x. figs. 5–7.

Eriocera albipunctata, sp. n., *id. l. c.* p. 158, Java.

Stratiomyiidæ.

Stratiomys. Habits of larva ; Laxer, Ent. xiii. pp. 167 & 168.

Pachygaster pini, Perris, = *P. minutissimus*, Zett. ; Mik, Verh. z.-b. Wien, xxx. p. 590.

Hermetia batjanensis, sp. n., Van der Wulp, Tijdschr. Ent. xxiii. p. 161, Batchian.

Xylophagidæ.

Cœnomyia ferruginea, Scop. Transformations described ; Beling, Verh. z.-b. Wien, xxx. pp. 343–346, woodcuts.

Subula trinotata, sp. n., Bigot, Ann. Soc. Ent. Fr. (5) x. p. 148, N. Persia or Caucasus.

Tabanidæ.

Chatin, J. Sur la constitution de l'armature buccale chez les Tabanides. Bull. Soc. Philom. (7) iv. pp. 104 & 105.

The writer briefly describes the structure of the mouth, and shows that the part which has hitherto been regarded as the lingua, is really a prolongation of the mentum.

Megalomyia, g. n., Bigot, Bull. Soc. Ent. Fr. (5) x. p. v. Allied to *Acanthomera*, 3rd joint of antennæ short, with a long setiform chætum. Type, *M. argyropasta*, sp. n., *ibid.*, Panama.

Tabanus (*Therioplectes*) *muehlfeldi* (= *græcus*, pt. Meig., Schin.), Brussa, Amoor, p. 149, *erberi*, Corfu, p. 151, *cyanops*, Syria, p. 153, *Tabanus* (*Atylotus*) *rupium*, Salzburg, &c., p. 163, *latistriatus*, Spain, Dalmatia, Corfu, p. 170, *Tabanus* (true) *miki* (= *græcus*, pt. Meig., *nec* Fabr.), Austria, p. 195, *gerkii*, S. Russia, p. 205, spp. nn., Brauer, Denk. Ak. Wien, xlii.

Pangonia tigris, sp. n., Bigot, Ann. Soc. Ent. Fr. (5) x. p. 143, North Persia, or Caucasus.

Tabanus niveipalpis and *elegans*, spp. nn., *id. l. c.* pp. 145 & 146, North Persia, or Caucasus.

Chrysops mlokosiewiczi, id. *l. c.* p. 146, N. Persia, or Caucasus ; *C. disalis*, Williston, Tr. Conn. Ac. iv. : spp. nn.

Silvius pollinosus, sp. n., *id. ibid.*

Hæmatopota obscura, sp. n., Bigot, *l. c.* p. 147, N. Persia, or Caucasus.

Acanthomera rubriventris, Guatemala, and *fulvida*, Guiana, spp. nn., *id.* Bull. Soc. Ent. Fr. (5) x. p. v.

Therevidæ.

Psilocephala indica, sp. n., Van der Wulp, Tijdschr. Ent. xxiii. p. 169, Java.

Nemestrinidæ.

Rhyncocephalus sackeni, sp. n., Williston, Tr. Conn. Ac. iv.

Bombyliidæ.

Larva [subsequently proved to belong to this family] destructive to eggs of locusts in the Troad ; Sir J. Lubbock, P. E. Soc. 1880, p. xxxiii.

Systœchus oreas and *Triodytus mus*, Ost.-Sack., destructive to locusts in America, described and figured in all stages ; Riley, Packard, & Thomas, 2nd Rep. U. S. Ent. Comm. on Rocky Mountain Locust, pp. 262–269, pl. xvi. *Cf.* also Riley, Am. Ent. iii. pp. 279–283, figs. 147–151; Lemmon & Osten-Sacken, Ent. M. M. xvii. p. 161.

Anthrax aterrima, Dol. (= *proferens*, Walk.), redescribed ; *A. argyropyga*, Dol., = *distigma*, Wied.: Van der Wulp, Tijdschr. Ent. xxiii. pp. 165 & 166.

Systropus, Wied., and *Cephenus*, Latr., discussed, and history and distinctive characters pointed out ; Karsch, Z. ges. Nat. (3) v. pp. 654-657.

Bombylius pulchellus, sp. n., Van der Wulp, Tijdschr. Ent. xxiii. p. 164, pl. x. fig. 8, Java.

Systropus clavatus, sp. n., Karsch, *l. c.* p. 657, Cape of Good Hope.

Cephenus columbianus, Bogota, *angulatus* and *infuscatus*, Texas, p. 657, *femoratus*, St. João del Rey, and *imbecillus*, Georgia, p. 658, spp. nn., *id. l. c.*

Midasidæ.

Phyllomydas, g. n., Bigot, Ann. Soc. Ent. Fr. (5) x. p. xlvi. Allied to *Ectyphus* ; type, *P. phyllocerus*, sp. n., *l. c.* p. xlvii., Rocky Mountains.

Asilidæ.

Asilus. Oviposition ; Hubbard, Am. Ent. iii. p. 250.

Mallophora orcina, Wied. Notes on oviposition and eggs; *id.* 2nd Rep. U. S. Comm. on Rocky Mountain Locust, p. 262.

Isopogon hottentottus recorded as new to Britain ; Pascoe, P. E. Soc. 1880, p. iii.

Alcimus ponticus, sp. n., Bigot, Ann. Soc. Ent. Fr. (5) x. p. 148, N. Persia or Caucasus.

Leptogaster varipes, sp. n., Van der Wulp, Tijdschr. Ent. xxiii. p. 166, Padang.

Promachus vittula, sp. n., *id. l. c.* p. 167, Borneo.

Empidæ.

Enoplempis, g. n., Bigot, Bull. Soc. Ent. Fr. (5) x. p. xlvii. Allied to *Empis*; type, *E. mira*, sp. n., *ibid.*, California.

Megacyttarus, g. n., id. *ibid.* Allied to *Ocydromyia*; type, *M. argenteus*, sp. n., *ibid.*, Colorado.

Clinocera barbatula, *plectrum*, Austria, &c., p. 347, *tibiella*, Salzburg, Tyrol, *storchi*, Salzburg, Galicia, p. 348, *hastata*, Austria, *longipennis*, Hungary, p. 349, *pirata*, Bohemia, *phantasma*, Austria, Bavaria, p. 350, *wachtli*, Austria, *impudica*, Norway, p. 351, and *braueri*, Austria, p. 352, spp. nn., Mik, Verh. z.-b. Wien, xxx.

Dolichopodidæ.

Medeterus ambiguus, Zett., and other species noticed; Mik, Verh. z.-b. Wien, xxx. pp. 590 & 591.

Dolichopus thalassinus, Hal., redescribed and figured; *id. l. c.* pp. 594 & 596, pl. xvii. figs. 2–4 (the terminal portion of the abdomen of *D. simplex*, Meig., figured for comparison, fig. 5).

Hercostomus papillifer, sp. n., *id. l. c.* pp. 353–358, woodcuts, Austria.

Syrphidæ.

Eristalis varipes, Macq., = *macquarti*, Dol., = *Megaspis errans*, Fabr.; *Syrphus fuscipennis*, Macq., = *Didea ellenriederi*, Dol., = *Syrphus ægrotus*, Fabr.: Van der Wulp, Tijdschr. Ent. xxiii. pp. 170 & 171.

Scæva scambus. Occurrence of the larva in the human intestinal canal; Malm, Ent. Tidskr. i. pp. 170 & 171.

Chilosia gigantea, Zett. (*velutina*, Löw). Supposed larva described; Brischke, Ent. Nachr. vi. p. 56.

Plagiocera magnifica, Colombia, and *nitens*, Dorey, spp. nn., Bigot, Ann. Soc. Ent. Fr. (5) x. pp. 84 & 85.

Orthoneura varipes, sp. n., *id. l. c.* p. 150, N. Persia or Caucasus.

Eristalis barbatus, p. 214, *ursinus*, *albibasis*, India, p. 215, *parens*, p. 216, *zonatus*, N. America, and *inca*, Peru, p. 217, spp. nn., *id. l. c.*

Eristalomyia paria, p. 218, *picta*, India, p. 219, *fo*, Amoy, *flaveola*, Senegal, p. 220, *rufo-scutata*, Mexico, p. 221, *E.* (?) *incerta*, Brazil, *E. zebrina*, Ternate, p. 222, *tricolor*, Tidore, p. 223, *sackenis*, *pachypoda*, p. 224, *fulvipes*, Mexico, p. 225, *milesioides*, Brazil, p. 226, *croceipes*, S. America, *calops*, Colombia, p. 227, *soulouquensis*, Haiti, *albiventris*, Montevideo, p. 228, *E.* (?) *calomera*, S. America, and *E. sapphirina*, New Guinea, p. 230, spp. nn., *id. l. c.*

Conopidæ.

Sphyxosoma flavicauda, sp. n., Bigot, Ann. Soc. Ent. Fr. (5) x. p. 149, N. Persia or Caucasus.

Conops quadrimaculata, sp. n., Ashmead, Orange Insects, p. 69, fig. 23, Florida.

Muscidæ.

Conil, P. A. Nouveaux cas de Myiasis observés dans la province de Cordoba (République Argentine), et dans la République de Venezuela. Period. Zool. Argent. iii. pp. 146–175.

Various South American species of *Calliphora* are discussed, as an appendix to medical details. *C. anthropophaga*, Conil, is redescribed, and the differences between this species and *montevidensis*, Big., pointed out.

Hammond, A. On the Thorax of the Blow-fly (*Musca vomitoria*). J. L. S. xv. pp. 9–31, pls. i. & ii.

After an elaborate discussion of the structure and analogies of the thorax of *M. vomitoria*, the writer arrives at the conclusion that it is almost exclusively mesothoracic, the pro- and meta- thorax and appendages being but slightly developed.

Kowarz, F. Die Dipterengattung *Lasiops*, Meig. ap. Rond., ein Beitrag zum Studien des europäischen Anthomyiden. MT. Münch. ent. Ver. iv. p. 123.

Macloskie, G. The Proboscis of the House-fly. Am. Nat. xiv. pp. 153–161, woodcuts.

The proboscis consists of three principal portions, the base, mid-segment, and tip. The former contains (1) the fulcrum, sometimes improperly called the pharynx; (2) two palpi, supported by a weak cross-piece of chitin; and (3) a membranous sheath. The mid-segment folds on to the basal segment by an elbow-joint; it includes the mentum, operculum, the plate curving upwards round the operculum, which forms a canal with it, and the lingua, or hypopharynx. The third segment, or tip, is a singular scraping and suctorial apparatus, with the oral opening on its upper part amidst the large prehensile lips, and when spread out, its surface is covered by a system of about eighteen pairs of curved transverse ridges, called pseudo-tracheæ. After a somewhat minute description of these parts, the writer treats of their functions, retraction, protrusion, and homologies.

Rondani, C. Species Italicæ ordinis Dipterorum (*Muscaria*, Rond.) collectæ et observatæ. Stirps xxv., *Copromyzinæ*, Zett. Bull. Ent. Ital. xii. pp. 3–45.

Wallengren, H. D. J. Öfversigt af Skandinaviens Arter af Diptergruppen Phasinæ. Ent. Tidskr. i. pp. 16–21.

Brief descriptions of known species of *Xysta* (1), *Phasia* (1), *Alophora* (16), and *Micra* (1).

Lucilia flaviceps, Macq., = *Chrysomyia duvauceli* = *L. dux*, Esch.; *L. viridi-aurea*, Wied., redescribed; *Musca torosa*, Wied., = *Bengalia testacea*, Rob., = *Ochromyia jejuna*, Fabr.; *O. ferruginea*, Dol., = *abdominalis*, Fabr.; *Ophyra riparia*, Dol., = *Anthomyia gracilis*, Wied., = *nigra*, Wied.; *Loxoneura decora*, Fabr., noticed; *Senopterina abrupta*, Thoms., = *Michogaster bambusarum*, Dol., = *S. eques*, Schin.; *Chloria*

clausa, Macq., and *Dacus fascipennis*, Wied., discussed. Van der Wulp, Tijdschr. Ent. xxiii. pp. 172–181.

Ophyra anthrax, Meig., *Homalomyia canicularis*, *L. scalaris*, Meig., and *aprica*, Hal., *Hyetodesia* (*Aricia*) *abdominalis*, Zett., *Hydrostœa velutina*, Desv., and *Pyezura pardalina*, Rond., noticed, the two last being new to Britain; Meade, Ent. xiii. pp. 177–179.

Nemorea acridiorum, Weyenb., redescribed in all stages, with details of habits; Conil, Period. Zool. Argent. iii. pp. 215–230, pl. iii. figs. 16–22, pl. iv. figs. 26–31.

Tachina larvarum, L., and *Exorista vulgaris*, Fall., parasitic on *Zygœna filipendulæ*; Bignell, Ent. xiii. p. 17.

Meigenia bisignata, Meig. Transformations described and figured; it is parasitic on *Lina tremulæ*, and the larva of the *Lina* is also attacked by that of a species of *Phora*. Bugnion, Bull. Soc. Vaud. (2) xvii. pp. 17–31, pls. i. & ii.

Musca. Parasites (*Gordius* ?) of house-fly; Green, Sci. Goss. xvi. p. 161.

Lucilia bufonivora, Menier, probably = *splendida*, Zett. (*sylvarum*, Rond.); Portschinsky, Hor. Ent. Ross. xv. p. iv.

Sarcophila (?). "Screw-worms" attacking men and animals in Texas; Kilpatrick, Am. Ent. iii. pp. 275 & 276.

Sarcophila ruralis, Meig. Mégnin's remark that the larvæ found in the wounds of animals generally belong to this species, probably applies to *S. wohlfarti*, Portsch.; Portschinsky, Hor. Ent. Ross. xv. p. v.

Compsomyia macellaria, Fabr. Characters, variation, synonymy, &c., discussed; Arribálzaga, An. Soc. Arg. x. pp. 70–84. Two main varieties occur:—

A. Femora entirely obscure. [Synonyms, *Musca macellaria*, Fabr., *Lucilia macellaria*, *vittata*, and *rubrifrons*, Macq., *L. hominivorax*, Coq., *Musca* (*Chrysomyia*) *bata*, *combrea*, and *fasciata*, Walk., *Calliphora infesta*, Phil., and *C. anthropophaga*, Con.]

B. Hind femora more or less fulvous. [Synonyms, *Calliphora fulvipes*, Maq., *C. annulipes*, Phil., *Musca* (*Chrysomyia*), *lyrcea*, *verena*, *caruca*, and *gamelia*, Walk.]

Morellia, Desv., recharacterized and the following species redescribed: *simplex*, Loew, Schin. (= *hortorum*, Meig. ?, Macq. ?, Rond., Desv., Hal., = *importuna*, pt., Hal.), *hortorum*, Fall. (Wied., Meig. ?, Zett., Walk., Loew, Schin., Hal., = *pilipes*, Rond., = *importuna*, pt., Hal., = *agilis*, Desv.), *podagrica*, Loew, and *curvipes*, Macq. (Zett., Rond., = *œnescens*, Desv.); Meade, Ent. M. M. xvii. pp. 22–28.

Actora æstuum, Meig. Habits, structure, and transformations described; G. Joseph, Zool. Anz. iii. pp. 250–252.

Sciomyza (*Colobœa*) *bifasciella*, Fall., noticed; C. W. Dale, Ent. M. M. xvi. pp. 184 & 185.

Note on North American *Trypetinæ*; Osten-Sacken, Psyche, iii. p. 53.

Aricia floralis, Zett. Habits and transformations; Holmgren, Ent. Tidskr. i. pp. 189–191 & 214.

Anœropsis, Bigot, recharacterized; Bigot, Ann. Soc. Ent. Fr. (5) x. p. 92.

Diopsis fallax and *belzebuth*, Bigot, belong to *Teleopsis*, Rond.; Bigot, *l. c.* p. 94.

Tæniaptera albimana, Dol., ? = *Calobata cæruleifrons*, Macq.; Van der Wulp, Tijdschr. Ent. xxiii. p. 192.

Piophila casei attacking hams; Am. Ent. iii. pp. 23 & 24.

Notes on British *Oscininæ*, including *Selachops flavo-cincta* and *Siphonella* (*Madiza*) *oscinia* recorded as new to Britain; C. W. Dale, Ent. M. M. xvi. pp. 233 & 234.

Phytomyza aquifolii, Gour. (= *ilicis*, Kalt.), redescribed, with notes on transformations; Laboulbène, Ann. Soc. Ent. Fr. (5) x. pp. 95 & 96. *P. lateralis*, Fall., useful as a destroyer of groundsel; Fitch, Ent. xiii. pp. 166 & 167.

Savia melanocephala noticed, and abnormal wing figured; Mik, Verh. z.-b. Wien, xxx. p. 588, pl. xvii. fig. 1.

New genera and species:—

Psecacera, Bigot, Bull. Soc. Ent. Fr. (5) x. p. liii. Allied to *Meigenia* and *Trixa*; type, *P. chiliensis*, sp. n., *ibid.*, Chili.

Anoxycampta, id. *l. c.* p. cl. Allied to *Petagnia*, Rond.; type, *A. hirta*, sp. n., *l. c.* p. cli., Lower Alps.

Gonioneura, Rondani, Bull. Ent. Ital. xii. p. 18. Allied to *Limosina*; type, *G. bisangula*, sp. n., *ibid.*, Parma.

Elachisoma, id. *l. c.* Allied to *Limosina*; type, *E. atomus*, sp. n., *l. c.* p. 19, Parma.

Trachyops, id. *l. c.* p. 24. Differs from *Limosina* by its hairy eyes; type, *L. melania*, Hal.

Metallea, Van der Wulp, Tijdschr. Ent. xxiii. p. 174. Allied to *Rhynchomyia* and *Gymnostylina*; type, *M. notata*, sp. n., *l. c.* p. 175, pl. x. figs. 10–12, Java.

Ptilona, id. *l. c.* p. 183. Allied to *Acanthoneura*, &c.; types, *P. brevicornis*, Java, *dunlopi* and *notabilis*, Padang, pp. 185–187, spp. nn.

Laglaisia, Bigot, Ann. Soc. Ent. Fr. (5) x. p. 92. Antennæ plumose; palpi short, ovaloid; basal cells of wings of nearly equal length. Type, *L. caloptera*, sp. n.. *ibid.*, Amberbaki, New Guinea.

Calliphora interrupta, Conil, Period. Zool. Argent. iii. pp. 230–297, pl. iv. figs. 32–34, Argentine Republic.

Theria persica, *flavidula*, and *birufa*, Bigot, Ann. Soc. Ent. Fr. (5) x. pp. 150–152, N. Persia, or Caucasus.

Rutilia castanipes, p. 87, *ruficornis*, *castanifrons*, p. 88, and *semifulva*, p. 89, *id. l. c.*, Australia.

Anthomyia spinaciæ, Holmgren, Ent. Tidskr. i. p. 89, Sweden.

Borborus nigriceps (= *nitidus*, Macq., *nec* Meig.), Apennines, p. 10, *limbinervis*, Italy, and *roseri*, Germany, p. 12, Rondani, Bull. Ent. Ital. xii.

Sphærocera curvina and *pallidimana*, id. *l. c.* pp. 16 & 17, Parma.

Limosina akka, p. 25, *nana*, Italy, Bohemia, *exigua*, Bohemia, p. 26, *retracta*, p. 27, *liliputana*, Italy, p. 28, *plumosula*, Parma, *ciliosa*, p. 29, *cilifera*, p. 31, *simplicimana*, Italy, *fucata*, Naples, p. 33, *luteilabris*,

Parma, p. 34, *puerula*, *fulviceps*, Bohemia, p. 36, *cænosa*, p. 38, *roralis*, Italy, p. 39, *hirtula*, p. 40, and *albipennis*, Parma, p. 41, *id. l. c.*

Lauxania hispanica. Mik, Verh. z.-b. Wien, xxx. p. 597, pl. xvii. figs. 6 & 7, Spain.

Aricia goberti, id. *l. c.* p. 599, France, Austria; *A. betæ*, Holmgren, *l. c.* p. 89, Sweden.

Teuchophorus simplex, Mik, *l. c.* p. 602, pl. xvii. fig. 8, Austria.

Pyrgota vagæ, Bigot, *l. c.* p. 152, N. Persia or Caucasus.

Spilographa caucasica, id. *l. c.* p. 153, N. Persia or Caucasus.

Ochthiphila pallipes, id. *l. c.* p. 154, N. Persia or Caucasus.

Cyrtoneura pruinosa, Van der Wulp, Tijdschr. Ent. xxiii. p. 176, Java.

Senopterina marginata, id. *l. c.* p. 179, Java.

Zigotricha robusta, Bigot, *l. c.* p. 93, New Guinea.

Teleopsis fulviventris, id. *l. c.* p. 94, India.

Dacus cylindricus, Van der Wulp, *l. c.* p. 181, Java.

Campylocera myopina and *robusta*, id. *l. c.* pp. 189 & 190, Java.

Sapromyza scutellaris, id. *l. c.* p. 191, Java.

Formosia papua [*-uæ*, vel *-uana*], Bigot, *l. c.* p. 87, New Guinea.

Celyphus dohrni, id. Bull. Soc. Ent. Fr. (5) x. p. cli., Candahar.

Œstridæ.

Œstrus-larva infesting head of sheep in New Zealand; W. G. Mair, Tr. N. Z. Inst. xii. p. 446.

Hypoderma bovis: larva penetrating to the brain of horses, and causing death; Mégnin, Bull. Soc. Ent. Fr. (5) pp. lxx. & lxxi.

Phoridæ.

Phora aletiæ not truly parasitic; Am. Ent. iii. pp. 128 & 277.

Hippoboscidæ.

Captures in Modena; Fiori, Bull. Ent. Ital. Resoconti, 1880, pp. 12 & 13.

Olfersia spinifera, Leach, discussed; Van der Wulp, Tijdschr. Ent. xxiii. pp. 193 & 194.

Polyctenidæ.

Polyctenes longiceps, sp. n., C. O. Waterhouse, Tr. E. Soc. 1880, p. 319, pl. ix., on a bat (*Molossus abrasus*, Temm.), from Guatemala.

(APHANIPTERA.)

Pulicidæ.

Ritsema, C. Versuch einer chronologischen Uebersicht der bisher beschriebenen oder benannten Arten der Gattung *Pulex*, Linn., mit Berücksichtigung ihrer Synonymen. Z. ges. Naturw. (3) v. pp. 181–185.

40 species enumerated.

Taschenberg, O. Die Flöhe. Die Arten der Insectenordnung Suctoria nach ihren Chitinskelet monographisch dargestellt. Halle: 1880, 8vo, pp. 120, pls. iv.

The structure, transformations, bibliography, &c., of the fleas occupy a third of the work. The author considers them to belong to a distinct Order, in which he recognizes two families, *Sarcopsyllidæ* and *Pulicidæ*. The structure, &c., of each species is described in great detail, and many species are figured.

Pulex. Very large specimen from ferret or rabbit; Tatem, J. Quek. Club. vi. pp. 127 & 128. It possesses remarkable pygidial appendages, not known to exist in other species; R. T. Lewis, *op. cit.* pp. 168 & 169. Ethics and natural history; Provancher, Nat. Canad. xii. pp. 48–56, figs. 3 & 4.

Sarcopsylla penetrans. Taschenberg's statement that this insect attacks the lion appears to be erroneous; Ehlers, Zool. Anz. iii. pp. 429 & 430.

New genera and species:—

Hystrichopsylla, Taschenberg, *l. c.* p. 83. Eyes absent; head truncated in front, mouth surrounded by a circle of long spines; body very hairy and bristly. Type, *Pulex obtusiceps*, Rits. (redescribed and figured, *l. c.* pl. iii. fig. 21).

Typhlopsylla, id. *l. c.* p. 86. Eyes absent or rudimentary, head rounded in front, with only 4 bristles at most on each side; body slender. To contain *Ceratopsyllus octactenus*, Kol., and allies; also *T. caucasica* (= *Pulex typhlus*, Motsch., figs. 26 & 26 *a*, from *Spalax typhlus*, from the Caucasian Steppes, p. 94, *assimilis* (? = *Pulex talpæ*, Bouché), figs. 27 *a* & *b*, from *Sorex*, *Mus*, *Talpa*, and *Arvicola*, p. 95, and *gracilis* (? = *talpæ*, Bouché, *nec* Curt.), figs. 28 & 29, pl. iv., from mole, p. 96, spp. nn.

Rhynchopsyllus pulex, g. & sp. nn., Haller, Arch. f. Nat. xlvi. pp. 72–87, pl. vi. Intermediate between *Pulex* and *Rhynchoprion*; parasitic on a *Molossus* from Brazil.

Pulex pallidus, pl. i. fig. 9, from *Herpestes ichneumon* (Egypt), p. 65; *globiceps* (? = *vulpes*, Motsch.), figs. 10, 10 *a*, & 11, from fox, &c.; *kerguelensis*, fig. 12, Kerguelen's Land, p. 68, also Notes Leyd. Mus. iii. p. 169; *avium* (= *gallinæ*, Bouché, &c.), figs. 14 & 14 *a*, on birds generally, whence it has been described under a great variety of names, p. 70, pl. ii.; *glacialis*, figs. 17 & 17 *a*, from *Lepus glacialis* (Arctic Regions), p. 76, *goniocephalus* (= *leporis*, Leach, MS.), fig. 20, pl. iii., on hares, rabbits, and foxes, p. 82; Taschenberg, Die Flöhe. *P. grossiventris*, Weyenbergh, Bol. Ac. Arg. iii. pp. 188–193, & Period Zool. Argent. iii. pp. 83–86; on *Dasypus minutus*, Desm., Argentine Republic.

NEUROPTERA.

BY

ROBERT MCLACHLAN, F.R.S., F.L.S., &c.

THE GENERAL SUBJECT.

HAGEN, H. A. Neue Neuropteren in "Die Insecten" von Dr. Vitus Graber. S. E. Z. xli. pp. 106 & 107.

A satire on certain figures in Graber's work.

KOLBE, H. Ueber die Linné'schen species *Phryganea flavilatera* und *Hemerobius lutarius*. S. E. Z. xli. pp. 351–355.

After an examination of the conflicting views of authors on the probable identification of these Linnæan species, and of the evidence afforded by the descriptions, the author arrives at the conclusion that *P. flavilatera* = *Sialis lutaria*, auctt. (*Sialidæ*), and that *H. lutarius* = *Nemoura variegata*, Oliv.: a conclusion which the Recorder ventures to think can never be accepted by others.

MCLACHLAN, ROBERT. Notes on the Entomology of Portugal. II. *Pseudo-Neuroptera* (in part) and *Neuroptera-Planipennia*. Ent. M. M. xvii. pp. 103–108.

Enumerates the *Termitidæ*, *Psocidæ*, *Odonata*, and *Planipennia*, collected in 1880 by A. E. Eaton. As the country was almost unworked so far as regards these insects, nearly everything is recorded for the first time. The most prominent species are here alluded to under their family headings.

MÜHLEN, M. VON ZUR. Verzeichniss der in Liv-, Ehst-, und Kurland bisher aufgefundenen Neuropteren. Arch. Nat. Livl. (2) ix. pp. 221–236.

Enumerates 85 *Trichoptera* and 40 *Planipennia*.

SCUDDER, SAMUEL H. The Devonian Insects of New Brunswick. Anniversary Mem. Bost. Soc. 1880, pp. 1–41, pl. i.

A lengthy memoir on certain broken wings discovered in the Devonian shales near St. John, New Brunswick, in 1862, all of which have been previously named and described by the author. It commences with an introduction, in which it is stated that all the fossils have especial rela-

tionship with the *Ephemeridæ*. Then follows an essay on the structure of the wings in that family. After this are detailed descriptions of the species, viz., *Platephemera antiqua*, p. 7, pl. i. figs. 5, 9 & 10 (with a reply to Eaton's criticisms); *Gerephemera simplex*, p. 12, pl. i. figs. 8 & 8 *a*, considered as representing a distinct group, for which the term *Atocina* is proposed; *Homothethus fossilis*, p. 17, pl. i. figs. 1 & 2, considered a connecting link between *Neuroptera* proper and *Pseudo-Neuroptera*, and as the type of a family termed *Homothetidæ*; *Dyscritus vetustus*, p. 20, pl. i. fig. 4; *Lithentomum harti*, p. 22, pl. i. fig. 3, not to be placed in any existing group, and the group *Cronicosialina* is invented for its accommodation; *Xenoneura antiquorum*, p. 24, pl. i. figs. 5–7, also not to be placed in any recent group, and the family *Xenoneuridæ* is proposed for it. In his general summary, the author states, amongst other things, that the general type of wing-structure has existed from the earliest times; all the Devonian insects were *Heterometabola*; nearly all are synthetic types, often more complicated than the more recent carboniferous insects; all were of great size and probably aquatic in their early stages, &c., &c. The memoir ends by a note on the geological relations of the insects, from the pen of Principal Dawson, in which the correlation of plant-remains with the various insects is examined in connection with the different strata.

Wallengren, H. D. J. Ett försök att bestämma en del af de utaf H. Ström beskrifna Norska Insekter. Forh. Selsk. Chr. 1880, pp. 1–24.

An attempt to identify species of insects described by Ström between 1765 and 1781, mostly in "Trondhiemske Selskab Skrifter." Some *Neuroptera* are referred to; but only those cases in which priority is apparently involved will be alluded to here.

Trichoptera.

Hagen, H. A. Ueber die Bestimmung der von Linné beschriebenen Gattung *Phryganea*. S. E. Z. xli. pp. 97–106.

The author critically examines the published evidence concerning the identification of the Linnæan species of *Trichoptera*, with especial reference to Wallengren's paper and McLachlan's remarks thereon [*cf.* Zool. Rec. xvi. *Ins.* p. 203]. He objects to the whole of Wallengren's proposed changes, and, on the whole, leaves the subject much as in the generally-accepted condition. A suggestion to the effect that *P. flavilatera*, L., = *Neuronia lapponica*, Hag., is the chief novel feature. (On this point, compare Kolbe, S. E. Z. xli. p. 351.) Too much importance is attached to information received, second-hand, many years ago, from the then Librarian (not "Secretary") of the Linnæan Society.

McLachlan, Robert. A Monographic Revision and Synopsis of the *Trichoptera* of the European Fauna. Part ix. pp. 501–523, with Supplement, pt. ii. pp. xiii.–lxxxiv., and Appendix and Index, pp. lxxxv.–ciii. pls. lii.–lix. London and Berlin: June, 1880, 8vo.

The work also published in its complete form, pp. 1–532 and i.–ciii., with 59 plates; reviewed in Scot. Nat. v. p. 370, and by Rostock in Ent.

Nachr. vi. p. 72. The concluding pt. ix. deals with the *Hydroptilidæ*. The Supplement, pt. ii., notices such additions, corrections, local information, &c., as have come to hand since the publication of Part i. of this portion, with addenda. The Appendix consists of a Systematic Catalogue, in which 474 species are enumerated, of which 409 have been noticed within the geographical limits of Europe ; and a Geographical Summary, in which a comparative table of the number of species occurring in those districts that have been tolerably well worked is given, together with analytical remarks for each of those countries or districts. Then follows an Index (including synonyms) of families, genera, and species.

Müller, Fritz. Sobre as casas construidas pelas larvas de Insectos Trichopteros da provincia de Santa Catharina. Arch. Mus. R. Jan. iii pp. 99–134 & (explanation of plates) 209–214, pls. viii.–xi. (dated 1878 on cover). [*Vide infrà.*]

——. Über die von den Trichopterenlarven der Provinz Santa Catharina verfertigen Gehäuse [Archivos de Museu national, vol. iii. pp. 99–134 & 209–214. Rio de Janeiro : 1880. Aus dem Portugiesischen übersetz von dem Bruder des Verfassers, Dr. Hermann Müller in Lippstadt]. Z. wiss. Zool. xxxv. pp. 47–87, pls. iv. & v.

This memoir has mostly been anticipated by the scattered and (in many cases) reduplicated observations noticed in Zool. Rec. xvi. *Ins.* pp. 203–207. It is accompanied by two large plates, with crowded figures of details, which do much to elucidate the text. The Recorder would add that he has received from Dr. F. Müller a series of specimens (both of cases and of the insects bred from the larvæ that manufactured them), typical so far as the memoir is concerned. As the greater part of the observations have been already recorded, only special citations will be noticed under the family headings.

McLachlan's notes on egg-masses deposited on leaves of trees far from water [*cf.* Zool. Rec. xvi. *Ins.* p. 204] reprinted in Am. Ent. iii. p. 59.

Carnivorous habits of Caddis-worms ; G. C. Goody, Sci. Goss. xvi. p. 94.

Phryganeidæ.

Wallengren, H. D. J. Om Skandinaviens Arten af Familjen *Phryganeidæ*. Ent. Tidskr. i. pp. 64–75.

Consists of a tabular arrangement of genera according to neuration (in which the old genera *Neuronia* and *Phyganea* are broken up into several), and brief descriptions of the native species, with localities, &c. The author retains *Holostomis* (Mannerheim) for *N. phalænoides*, *Oligostomis* (Kol.) for *N. reticulata* and allies, *Neuronia* (Leach) for *lapponica* and *ruficrus*, which latter he continues to consider the true *striata*, L. ; *Phryganea* is limited to *grandis* and *striata*, which latter he terms *bipunctata* (Retz.) (and in a foot-note enters into a long discussion on the subject). *P. varia* and *obsoleta* form a new genus, and *Trichostegia* (Kol.) is retained for *P. minor*.

Dasystegia, g. n., Wallengren, *l. c.* p. 66. Differentiated on certain

points in the neuration of the posterior wings. Types, *P. variegata*, Fourc. (= *varia*, F.), and *obsoleta*, Hag.

Oligostomis melanoptera, sp. n., *id. l. c.* p. 68, Scandinavia (= *clathrata*, Kol., var. ?).

Phryganea sahlbergi, sp. n., McLachlan, Revision and Synopsis, Suppl. p. xiv. pl. liii., N.W. Siberia.

Limnophilidæ.

Limnophilus exulans, McLach., = *L. picturatus*, McL., ♂; McLachlan, Revision and Synopsis, Suppl. p. xxi.

Limnophilus instillatus, Wallengren, = *L. sparsus*, Curt., ♀; *id. l. c.* p. xxiii.

Limnophilus præteritus, Walker, is a *Chilostigma*, and has occurred in N.W. Siberia; *id. l. c.* pl. xliii. (redescribed) pl. lv.

Anabolia nervosa flying by day; J. E. Fletcher, Ent. M. M. xvi., p. 277.

Limnophilus subcentralis, Brauer, discovered in Scotland; McLachlan, Ent. M. M. xvi. p. 277.

Stenophylax fissus, McLach., is a *Micropterna*; id. *l. c.* p. xxxv.

Halesus radiatus is divided into *H. radiatus*, Curt., and *H. interpunctatus*, Zett.; *id. l. c.* p. xxxvii. pl. lv. *H. mucoreus*, McLach., 1876, = *H. guttatipennis*, McL., 1865, and *H. guttatipennis*, McLach., 1876, is renamed *nepos*, p. xl.

New genera :—

Asynarchus, McLachlan, *l. c.* p. xxvi. Formed to receive *Stenophylax fusorius* (Wallengren), McLachlan, *S. thedeni*, Wallengren, *S. cœnosus*, Curt. (as an aberrant form), and the following spp. nn., *A. iteratus*, p. xxviii. pl. liv., N.W. Siberia, *contumax*, p. xxix. pl. liv., N.W. Siberia and Finland, *devius*, p. xxx. pl. liv., N.W. Siberia, *bicornis*, ibid. pl. liv., Scandinavia, *servatus*, p. lxxxi. (addenda) pl. lix., N.W. Siberia.

Metancea, id. *l. c.* p. xl. As in *Drusus*, but the hind wings of the ♂ without a pouch and pencil of hairs. Formed for *Halesus flavipennis*, Pict.

Catadice, id. *l. c.* p. xl. Allied to *Drusus*, but with 1-2-3 spurs ♂ & ♀, and the ♂ without the pouch and pencil in the hind wings. *C. bolivari*, sp. n., p. xl. pl. lv., Spain.

Stasiasmus, id. *l. c.* p. xlii. Allied to *Drusus*, but with 0-2-3 spurs in the ♂. Type, *Drusus rectus*, McLach.

Philarctus, id. *l. c.* pl. lxxx. (addenda). Spurs 1-3-4; possibly allied to *Acrophylax*. Type, *P. bergrothi*, sp. n., *ibid.*, pl. lix., N.W. Siberia.

New species :—

Astratus samoedus, id. *l. c.* p. xvi. pl. liii., N.W. Siberia.

Limnophilus correptus, id. *l. c.* p. xviii. pl. liii., Amur Land, *asaphes*, p. xix. pl. liii., N.W. Siberia, *diphyes*, p. xxii. pl. liii., N.W. Siberia.

Stenophylax impar, id. *l. c.* p. xxxi. pl. lv., Lapland and N.W. Siberia, *consors*, p. xxxiii. pl. liv., Savoy, *amurensis*, p. lxxxii. (addenda), pl. lix.,

Amur Land, *grammicus*, p. lxxviii. pl. lix., Amur Land, *mucronatus*, p. lxxxiv. pl. lix., Switzerland.

Apatania crymophila, id. *l c.* p. xliv. pl. lv., N.W. Siberia, *meridiana*, ibid. pl. lv., Pyrenees, *eatoniana*, p. xlv. pl. lv. Auvergne.

Sericostomatidæ.

Rougemont, Ph. de. Note sur l' *Helicopsyche sperata* (McLachlan). Bull. Soc. Neuch. xii. pp. 29–38.

Corrections to his former paper [*cf.* Zool, Rec. xvi. *Ins.* p. 204]; notes on the supposed occurrence of *Helicopsyche* cases at Pissevache in Savoy [the Recorder saw these cases at Zürich in 1880, and believes them to be Lepidopterous]: account of a fruitless journey in the Valais in search of cases; and an abstract of Fritz Müller's remarks on Brazilian species.

The S. Brazilian cases of *Helicopsyche* [cf. Zool. Rec. xvi. *Ins.* p. 204] are again treated upon by Fritz Müller in Z. wiss. Zool. xxxv. pp. 65 & 82, pl. iv. figs. 18–21, pl. v. figs. 36 & 37.

Sericostoma timidum, Hag., is distinct from *carinthiacum*, McLach.; McLach., Revision and Synopsis, Suppl. p. xlvii. pl. lv. *S. hamiferum*, McLach., is probably identical with *galeatum*, Rbr., *id. l. c.* p. xlviii.

Œcismus monedula, Hg., redescribed; *id. l. c.* p. xlix. pl. lv.

Silo obscurus and *incanus*, Hg., belong to the genus *Lithax*, and are redescribed; *id. l. c.* pp. l. & li. pl. lvi.

Silo duplex, Hg., redescribed; *id. l. c.* p. liii. pl. lvi.

Thremma, McLach., an amended description given; *id. l. c.* p. lvii.

Helicopsyche, a detailed redescription given, both of the genus and of *H. sperata*, McLach.; *id. l. c.* pp. lviii.–lxii. pls. lvi. & lvii.

New species:—

Sericostoma indivisum, McLachlan, *l. c.* p. xlviii., Pomerania.
Schizopelex furcifera, id. *ibid.* pl. lv., Pyrenees.
Brachycentrus adoxus, id. *l. c.* p. liv. pl. lvi., Siberia.
Micrasema gentile, id. *l. c.* p. lvi. pl. lvi., N.W. Siberia.
Thremma gallicum, id. *l. c.* p. lviii. pl. lvii., Pyrenees and Auvergne.

Leptoceridæ.

Berœa and *Berœodes*. These genera are removed here, and should probably head the family; McLachlan, Revision and Synopsis, Suppl. pl. lxiii.

Œcetis notata, Ramb., occurs in Yorkshire; F. G. Binnie, Ent. M. M. xvii. p. 91.

Very full details with figures of S. Brazilian species are given by Fritz Müller in Arch. Mus. R. Jan. iii. pp. 105–115, 127, & 76–82, Z. wiss. Zool. xxxv. pp. 53–64, pl. iv. figs. 7–15, pl. v. figs. 32–35. For the genus in which the perfect insect has the eyes of the ♂ large and contiguous [*cf.* Zool. Rec. xvi. *Ins.* p. 205] the generic term *Marilia* is proposed (p. 76), with two species, *M. major* and *minor*; to a *Setodes* (or allied genus), the name *S. gemma* is given (p. 80); and for the form that lives in the water collecting at the base of the leaves of *Bromeliaceæ*

the genus *Phylloicus* (p. 81) is erected, with 3 species, *major*, *intermedius*, and *bromeliarum*.

Parasetodes, g. n., McLachlan, *l. c.* p. lxvi. Spurs 1-2-2; allied to *Setodes*, but differs in the dilated anal portion of hind wing. Type, *Setodes resperella*, Rbr., p. lxvii. (redescribed) pl. lvii.

Mystacides monochroa (*longicornis*, var. ?), sp. n., *id. l. c.* p. lxiv., Zürich.

Tricænodes reuteri, sp. n., *id. l. c.* p. lv. pl. lvii., Sweden and Finland.

Hydropsychidæ.

Fritz Müller, Arch. Mus. R. Jan. iii. pp. 103–105 & 125–127, and Z. wiss. Zool. xxxv. pp. 51–53 & 75 & 76, pl. vi. figs. 5 & 6, amplifies his former notes on the cases and larval habits of S. Brazilian species [*cf.* Zool. Rec. xvi. *Ins.* p. 205].

Hydropsyche stictica and *pallida*, Ed. Pict., are synonyms, or slight vars. of *H. instabilis*; McLachlan, Revision and Synopsis, Suppl. pl. lxxi.

Chloropsyche, g. n., *id. l. c.* p. lxix. Belongs to the *Œstropsidæ* of Brauer; spurs, 0·2·2, all the legs slender, ♂. Type, *C. evanescens*, sp. n., *ibid.* pl. lvii., Amur Land.

Plectrocnemia scruposa, p. lxxii., and *lætabilis*, p. lxxiii. pl. lvii., Pyrenees, *id. l. c.* spp. nn.

Tinodes algirica, sp. n., *id. l. c.* p. lxxiv. pl. lviii., Algeria.

Rhyacophilidæ.

Fritz Müller, Arch. Mus. R. Jan. iii. pp. 101–103, and Z. wiss. Zool. xxxv. pp. 49–51, pl. iv. figs. 1–4, notices and figures several forms of cases found at Santa Catharina, one of which is free when the inmate is in the larval state [*cf.* Zool. Rec. xvi. *Ins.* p. 206].

Synagapetus dubitans, McLach., ♂ described; McLachlan, Revision and Synopsis, Suppl. p. lxxviii. pl. lvii.

Rhyacophila proxima, p. lxxvi. pl. lvii., and *rougemonti*, p. lxxvii. pl. lvii., Switzerland, *id. l. c.* spp. nn.

Hydroptilidæ.

McLachlan, Revision and Synopsis, pp. 501–523, describes 18 species as pertaining to the European fauna, discussing their structural characters, and the position of the family; whilst retaining the family in the division *Æquipalpia*, he does not consider its precise sequential position as settled, principally on account of the habits of the larvæ. In view of the apparently inextricable confusion existing in the synonymy, the nomenclature employed by Eaton is generally followed, but the genus *Hydroptila*, Dalman (= *Phrixocoma*, Eaton), is restored, and a new term proposed for the forms formerly considered by Eaton to represent Dalman's genus. At pp. 522–523, attention is directed to an imperfectly known form, noticed as *Hydroptila flabellifera* (Bremi) by Hagen, and described as *Liochiton fagesi* by Guinard. Each species is figured in detail, as usual.

Very full details, with a multitude of figures, of the cases of curious S. Brazilian species, are given by Fritz Müller, in Arch. Mus. R. Jan. iii.

pp. 116–124 & 123, and Z. wiss. Zool. xxxv. pp. 65–74 & 82 & 83, pl. iv. figs. 22–24, pl. v. figs. 25–30 & 38, all of which have been previously noticed in abstract in Zool. Rec. xvi. *Ins.* pp. 206 & 207.

New genera and species :—

Allotrichia, g. n., McLachlan, *l. c.* p. 508. Allied to *Agraylea*, but differing in the form and neuration of wings, &c. Type, *Agraylea pallicornis*, Eaton.

Stactobia, g. n., *id. l. c.* p. 515 (= *Hydroptila*, Eaton, *olim*, noticed). Differs from all other European species in having 1·2·4 spurs. Includes *Hydroptila fuscicornis*, Schneider, and *S. eatoniella*, sp. n., p. 517, pl. lix., Pyrenees, Savoy, and Switzerland.

Agraylea cognatella, sp. n., *id. l. c.* p. 507, pl. lviii., Finland.

Oxyethira distinctella, sp. n., *id. l. c.* p. 521, pl. lxix., Finland.

Neuroptera-Planipennia.

McLachlan, Robert. Notes on some *Neuroptera-Planipennia* described by the late M. A.-Edouard Pictet in his Névroptères d'Espagne, 1865. Ent. M. M. xvii. pp. 62–64.

Critical notes on a species of *Sialis* and on *Chrysopa*, from an examination of types.

Meinert, F. Om Mundens Bygning hos Larven af Myrmeleontiderne, Hemerobierne (og Dytiscerne). Vid. Medd. 1878–79, pp. 69–72.

Panorpidæ.

An anonymous observer records, in Feuill. Nat. xi. p. 14, that two small fish, that he had caught and placed on the river bank, were attacked by *Panorpa*, which inserted its rostrum into the nostrils, and pierced the eyes.

Sialidæ.

Sialis nigripes, E. Pict., = a small form of *S. fuliginosa*, Pict. père ; McLachlan, Ent. M. M. xvii. p. 62.

Indications of a possibly new species of *Sialis*, from Portugal; *id. op. cit.* xviii. p. 106.

Sialis lutaria, auctt., is considered by Kolbe to be represented by *Phryganea flavilatera*, L., and thus becomes *S. flavilatera* ; S. E. Z. xli. p. 351.

Mantispidæ.

Cavanna notices the occurrence of *Mantispa perla*, Pallas, on Monte Volture, South Italy ; Resoconti Ent. Ital. 1880, p. 16.

Osmylidæ.

Sisyra dalii, McLach., occurs in Portugal ; McLachlan, Ent. M. M. xvii. p. 106.

Hemerobiidæ.

Hemerobius subnebulosus, Steph., bred from galls of *Cynips kollari* ; E. A. Fitch, Ent. xiii. p. 263.

Dilar prestoni, sp. n., McLachlan, Ent. M. M. xvii. p. 39, Rio Janeiro.

Chrysopidæ.

Eggs of some Australian species on a leaf of *Eucalyptus*, exhibited; G. Francis, P. E. Soc. 1880, p. vi.

Chrysopa thoracica, E. Pict. (name preoccupied), renamed *picteti*; McLachlan, Ent. M. M. xvii. p. 63.

Chrysopa clathrata, E. Pict., *nec* Schneider, renamed *lineolata*; id. *l. c.* p. 63.

Chrysopa. Six known species recorded from Portugal; *id. l. c.* p. 107.

Chrysopa pallida, Schnd., in Switzerland; *id. l. c.* p. 141, and Schoch, MT. schw. ent. Ges. vi. p. 51.

Nothochrysa italica, Rossi. McLachlan, *l. c.* p. 64, calls attention to certain spines concealed in a pouch in the abdomen of this species.

Observations on the larvæ of some species of *Chrysopa*, made *ab ovo*, are given by H. N. Ridley, in Ent. xiii. pp. 21–23.

Ascalaphidæ.

Ascalaphus bœticus, Rbr. A variety from Catalonia described; De Selys-Longchamps, CR. Ent. Belg. xxiii. p. xlviii. A similar variety occurs in Portugal; McLachlan, Ent. M. M. xvii. p. 108.

Coniopterygidæ.

Coniopteryx lutea, Wallengren. Notes on examples from Finland and N.W. Siberia, referred thereto; McLachlan, Ent. M. M. xvii. p. 21.

Pseudo-Neuroptera.

Thysanura.

Haller, G. Mittheilungen über Poduriden. MT. schw. ent. Ges. vi. pp. 1–6.

Reuter, O. M. *Collembola* and *Thysanura* found in Scotland in the summer of 1876 by Lina & O. M. Reuter. Scot. Nat. v. pp. 204–208 (January, 1880).

Enumerates 22 species (with localities), of which 4 (*Sminthurus lineatus*, Reuter, *Macrotoma vulgaris*, Tullbg., *Isotoma crassicauda*, Tullbg., and *Achorutes viaticus*, Tullbg.) had not been previously noticed as British, and some new species are described.

——. Sur l'accouplement chez deux espèces de l'Ordre des Collemboles. Ent. Tidskr. i. pp. 159–161.

According to observations made on *Sminthurus apicalis* and *elegantulus*, Reut., the author confirms the statement by Olfers to the effect that the ♂ seizes with its antennæ those of the ♀, round which its own are coiled (see fig., p. 160), and then leaps back to back upon her, remaining in this position several days; the antennæ of the ♂ are furnished with hooks or processes, those of the ♀ are simple. The actual generative act has not been observed. The males die after being thus coupled by the antennæ,

but it is probable that the females increase much in dimensions, and that the structure of the antennæ and fork is modified in them after a moult, for the large females are never coupled, and differ in the structure of these organs, or possibly this difference is the effect of alternation of generations.

——. Sur la fonction du tube ventral des Collemboles. *L. c.* pp. 162 & 163.

After reviewing the opinions held by authors on the functions of the tube in question, to the effect that it may enable the creature to grasp polished surfaces by means of a secreted fluid, or by suction, or may enable it to diminish the force of the shock caused in leaping, or to right itself if overturned, the writer agrees with none of them. He observed that the animals from time to time rub their hairy antennæ rapidly with the feet; this results in a drop of clear water, which is seized between the claws and conveyed to the mouth; at this moment, the long sacs sent out from the tube at first diverge, but afterwards converge, and seize the drop between the extremities, conveying it into the tube itself. The friction of the feet and antennæ collects the moisture from the atmosphere by means of the hygroscopic hairs, and it is then absorbed by the tube.

Podur[o]hippus pityriasicus, Mégnin, fully redescribed (with fig.), in Mégnin's "Les Parasites," pp. 102–104.

Beckia argentea, *Lipura*, sp.?, *Campodea*, sp. n., *Lepidocyrtus lanuginosus* and *Templetonia nitida*, in the Falkenstein Caves; S. Fries, JH. Ver. Württ. xxxvi. p. 115.

Campodea. Notes on the species found in the Mammoth Cave of Kentucky, presumably *C. cookii*, Packard, are given by H. G. Hubbard, in Am. Ent. iii. pp. 34 (woodcut) & 79.

Campodea fragilis, Meinert. W. S. Barnard, Am. Ent. iii. p. 199, records the occurrence of this European species at Ithaca, New York, and gives woodcut, with *Degeeria lanuginosa*, Nicolet, also a European form.

New genus:—

Lubbockia, g. n. Haller, Z. ges. Nat. (3) v. p. 749, and MT. schw. ent. Ges. vi. p. 4. Body cylindrical. Segments unequal. Antennæ somewhat longer than the body, 5-jointed. No scales nor dilated hairs. Two strong, slightly curved pairs of spines near the apex of the abdomen. Spring-apparatus very small. *L. cærulea*, sp. n., *id.* p. 750, woodcuts (MT. schw. ent. Ges. *l. c.*), Zürich.

New species:—

Lipura aurantiaca, H. N. Ridley, Ent. M. M. xvii. p. 1, Britain.

Isotoma cœca, Reuter, Scot. Nat. v. p. 207, Orkney; *I. turicensis*, Haller, MT. schw. ent. Ges. vi. p. 6, Zürich.

Anurida crassicornis, Reuter, *l. c.* p. 208, Perth.

Achorutes schupplii[*-li*, named after Schuppl.—Ed.], Haller, *l. c.* p. 3, Zürich.

Machilis brevicornis, H. N. Ridley, *l. c.* p. 2, Britain.

Mallophaga.

Piaget, E. Les Pédiculines. Essai monographique ; i. texte (pp. i.–xxxix. & 1-714), ii. planches (i.–lvi.). Leide : 1880, folio.

The most important work on these animals that has appeared since the publication of Nitzsch's posthumous "Insecta Epizoa," edited by Giebel [*cf.* Zool. Rec. xi. p. 453]. The copious introduction contains a bibliographical sketch from the earliest authors (by whom lice were considered to be generated spontaneously) to date, marked by most unsparing criticism in many cases, more especially with regard to Denny & Giebel. The author does not consider the evident difference in the mouth-parts as of more than family importance, and hence places both *Anoplura* and *Mallophaga* as forming only a degraded division of *Rhynchota*. His tabular division of this group is as follows :—

1	Lice with a sucker and only one claw (*Haustellata*) .	Pediculidæ.
	Lice with mandibles, without a distinct sucker, and with one or two claws (*Mallophaga*), 2.	
2	Antennæ 5- or 3-jointed ; tarsi without cushions, 3 .	Philopteridæ.
	Antennæ 4-jointed ; tarsi with or without cushions, 4	Liotheidæ.
3	Antennæ 5-jointed	*Philopterus.*
	Antennæ 3-jointed	*Trichodectes.*
4	Tarsi with 2 claws, and with a cushion . . .	*Liotheum.*
	Tarsi with 1 claw, and without cushion . . .	*Gryopus.*

Then follow directions for collecting and preserving these parasites, with notes on the parts of the bodies of their hosts mostly frequented by the various groups. The principal feature in the descriptions and figures is the prominence given to sexual characters, hitherto little understood. Each genus is divided into groups, for the most part founded on the families of their hosts, which appears also to be to a large extent natural. Many previously known species are re-figured, but it does not appear necessary to cite these figures. The work concludes with addenda, a table of species classified according to their hosts, an alphabetical table of genera and species, and a systematic index (cf. *Rhynchota* for the family *Pediculidæ*). As to the families, *Philopteridæ* are divided into 9 genera (of which 1 is new), and *Liotheidæ* into 10 (1 new).

Philopteridæ.

New genus :—

Akidoproctus, g. n., p. 208. Front of head deeply crenulate; the last abdominal segment conical and even acuminate. Includes *Nirmus stenopygus*, Nitzsch, and 3 spp. nn., *A. marginatus*, p. 209, pl. xvii. fig. 4, on *Larus spinicauda*, *A. bifasciatus*, p. 210, pl. xvii. fig. 5, on *Dromas ardeola*, and *A. maximus*, p. 212, pl. xvii. fig. 6, on *Dendrocygna arborea*.

New species, &c. :—

Docophorus nudipes, p. 26, pl. i. fig. 6 (on *Brachyotus otus*), *angustoclypeatus*, p. 34, pl. ii. fig. 3 (on *Platycercus barrabandi*), *assimilis*, p. 35,

pl. ii. fig. 6 (on *Paradisea viridis* or *Cacatua* ?), *rotundatus*, p. 47, pl. iii. fig. 5 (on *Corvus corone*), *albidus*, p. 48, pl. iii. fig. 6 (on *Corvus scapulatus*), *communis*, Nitzsch, var. *rubeculæ*, p. 57 (on *Sylvia rubecula*, *Emberiza nivalis*, and *Fringilla cœlebs*), var. *cardinalis*, p. 58, pl. iv. fig. 5 (on *Carduelis cucullata*), var. *pyrrhulæ*, ibid. (on *Pyrrhula vulgaris*), var. *passeris*, p. 59 (on *Passer domesticus*), var. *garrulæ*, ibid. pl. iv. fig. 7 (on *Bombycilla garrula*), *compar*, p. 61, pl. vii. fig. 1 (on *Loxia curvirostris*), *leontodon*, Nitzsch, var. *affinis*, p. 67, pl. v. fig. 3 (on *Sturnus cristatellus*), var. *subacuta*, p. 68 (on *Lamprotornis* sp.?), var. *femorata*, ibid. (on *Dacelo princeps*), *acutus*, p. 68, pl. v. fig. 4 (on *Paradisea aurea*), *forficuloides*, p. 72, pl. v. fig. 6 (on *Alcedo* sp. ?), *setosus*, p. 74, pl. v. fig. 7 (on *Tropidorrhynchus moluccensis*), *productus*, p. 87, pl. vi. fig. 8 (on *Ardea* sp. ?), *continuus*, p. 88, pl. vi. fig. 9 (on *Porphyrio smaragdinus*), *angulatus*, p. 93, pl. viii. fig. 5 (on ?), *indicus*, p. 98, pl. vii. fig. 6 (on *Tantalus lacteus*), *antennatus*, p. 101, pl. viii. fig. 6 (on *Dromas ardeola*), *dilatatus*, p. 102, pl. ix. fig. 3 (host not named), *bipustulatus*, p. 103, pl. ix. fig. 1 (on *Ardea egretta*), *nirmoides*, p. 104, pl. ix. fig. 2 (on *Numenius arquata*), *brevi-antennatus*, p. 108, pl. ix. fig. 9 (on *Sula australis*), *lari*, Denny, vars., (p. 112) *magna* (on *Larus atricilla*), *brevi-appendiculatus* (on *Larus fuscus*), and *parva* (on *Larus dominiacus* and *crassirostris*), *pilosus*, p. 116, pl. x. fig. 4 (on *Phœnicopterus antiquorum*), *brevimaculatus*, p. 119, pl. x. fig. 7 (on *Bernicla brenta*), *maculipes*, p. 661, pl. liv. fig. 3 (on *Picus* sp. ?), *trabecula*, p. 662, pl. liv. fig. 4 (on *Dicrurus retifer*), *longiceps*, p. 663, pl. liv. fig. 6 (on *Brachypteracias leptosomus*).

Nirmus angulatus, p. 134, pl. xi. fig. 4 (on *Strix flammea*), *paraboliceps*, p. 135, pl. xi. fig. 5 (on *Psittacus aterrimus*), *coniceps*, p. 136, pl. xi. fig. 6 (on *Buceros cassidix*), *subacutus*, p. 137, pl. xi. fig. 7 (on *Scissirostrum pagii*), *bifasciatus*, p. 143, pl. xi. fig. 11 (on *Xulla mangola*), *pallidus*, p. 144, pl. xi. fig. 12 (on *Ptilorrhynchus buccoides*), *platy-clypeatus*, p. 145, pl. xii. fig. 4 (on *Motacilla alba*), *frater*, ibid. pl. xii. fig. 2 (on *Lamprotornis amethystina*), *dilato-fasciatus*, p. 147, pl. xii. fig. 4 (on *Eudynamis picatus*), *acutus*, p. 148, pl. xii. fig. 6 (on *Edolius* sp. ?), *brachythorax*, Giebel, vars. (p. 151) *cedrorum* (on *Paroaria cucullata*) and *modularis* (on *Accentor modularis*), *acutangulatus*, p. 156, pl. xiii. fig. 5 (on *Gracula religiosa*), *nigro-signatus*, p. 157, pl. xiii. fig. 6 (on *Gracula javanensis*), *bicurvatus*, p. 159, pl. xiii. fig. 8 (on *Vidua paradisea*), *longipes*, p. 160, pl. xiii. fig. 9 (on *Scissirostrum pagii*), *nigro-marginatus*, p. 166, pl. xiv. fig. 1 (on *Euplocamus horsfieldi*), *acuto-fasciatus*, p. 172, pl. xiv. fig. 5 (on *Plotus melanogaster*), *interruptus*, p. 173, pl. xiv. fig. 6 (on *Phalacrocorax carbo*), *dispar*, p. 174, pl. xiv. fig. 7 (on *Carbo sulcirostris*), *trimaculatus*, ibid. pl. xiv. fig. 8 (on *Ciconia leucocephala*), *bicolor*, p. 175, pl. xiv. fig. 9 (on *Vanellus cristatus*), *inæqualis*, p. 176, pl. xv. fig. 1 (on *Numenius arquatus*), *brevipes*, p. 179, pl. xv. fig. 3 (on *Tringa subarquata*), *signatus*, p. 186, pl. xv. fig. 8 (on *Recurvirostra avocetta*), *subscalaris*, p. 189, p. xvii. fig. 1 (on *Phalaropus hyperboreus*), *scalaris*, p. 190, pl. xvii. fig. 2 (on *Machetes pugnax* and *Calidris arenaria*), *lineatus*, p. 204, pl. xvi. fig. 7 (on *Xema sabinii*), *goniodes*, p. 665, pl. lv. fig. 1 (on *Coua seriana*), *bi-ocellatus*, p. 666, pl. lv. fig. 2 (on *Pica leucoptera*), *sexmaculatus*, ibid., pl. lv. fig. 3 (on *Dicrurus retifer*), *seta*, p. 667, pl. lv. fig. 4 (on *Muscicapa*

sp. ?), *quadrisetaceus*, p. 668, pl. lv. fig. 5 (on *Rhynchæa variegata* and *Cryptonyx coronatus*), *parvulus*, p. 669, pl. lv. fig. 6 (on *Gallinula chloropus*).

Oncophorus affinis, p. 217, pl. xviii. fig. 3 (on *Rougetius bernieri*), *bisetosus*, ibid. pl. xviii. fig. 4 (on *Rallina plumbeiventris*, *tricolor*, and *isabellina*), var. *porzanæ*, p. 218 (on *Porzana noveboracensis*), *sulcatus*, ibid. pl. xviii. fig. 5 (on *Parra sinensis* and *gallinacea*), *fallax*, p. 220, pl. xviii. fig. 6 (on *Porphyrio melanotus*), *subfallax*, p. 221, pl. xviii. fig. 7 (on *Porphyrio melanopterus*), *unguiculatus*, p. 671, pl. lv. fig. 8 (on *Eurylæmus cucullatus*).

Goniocotes fasciatus, p. 236, pl. xix. fig. 11 (on *Nymphicus novæhollandiæ*), *major*, p. 239, pl. xxi. fig. 1 (on *Megapodius rubripes*), *minor*, p. 241, pl. xxi. fig. 2 (on *Megapodius rubripes*), *latus*, p. 672, pl. lv. fig. 9 (on *Goura coronata*), *menadensis*, ibid, pl. lvi. fig. 1 (on *Macropygia menadensis*).

Goniodes assimilis, p. 248 (on *Francolinus capensis*), *ocrea*, p. 252, pl. xx. fig. 6 (on *Megapodius rubripes*), *longipes*, p. 253, pl. xx. fig. 7 (on *Crax galeata*), *minor*, p. 256, pl. xxi. fig. 3 (on various *Columbæ*), *subdilatatus*, p. 257, pl. xxi. fig. 4 (on *Tinamus variegatus*), *laticeps*, p. 259, pl. xxi. fig. 6 (on *Tinamus julius*), *spinosus*, p. 261, pl. xxi. fig. 7 (on *Tinamus julius*), *complanatus*, p. 262, pl. xxi. fig. 8 (on *Tinamus obsoletus*), *setosus*, p. 263, pl. xxi. fig. 9 (on *Tinamus variegatus*), *aculeatus*, p. 266, pl. xxii. fig. 2 (on *Momotes lessoni*), *latifasciatus*, p. 269, pl. xxii. fig. 4 (on *Euplocamus ignitus*), *major*, p. 274, pl. xxiv. fig. 1 (on *Crossoptilon auritum*), *parviceps*, p. 277, pl. xxiii. fig. 2 (on *Pavo cristatus*), *bicuspidatus*, p. 278, pl. xxiii. fig. 3 (on *Tragopan satyrus* and *temmincki*), *excavatus*, p. 280, pl. xxiii. fig. 4 (on *Tinamus canus*), *elongatus*, p. 281, pl. xxiii. fig. 5 (on *Perdix coturnix*), *fasciatus*, p. 673, pl. lvi. fig. 3 (on *Freron vernans*), *lævis*, ibid. pl. lvi. fig. 2 (on *Cryptonyx coronatus*).

Lipeurus oviceps, p. 295, pl. xxiv. fig. 4 (host not named), *elongatus*, p. 297, pl. xxiv. fig. 3 (on *Spizaetus cirratus*), *albidus*, p. 300, pl. xxiv. fig. 5 (on *Coracopsis vasa* and *nigra*), *circumfasciatus*, p. 301, pl. xxiv. fig. 6 (on *Platycercus melanurus*), *interrupto-fasciatus*, p. 302, pl. xxiv. fig. 7 (on *Eclectus sinensis* and *puniceus*), *angusticeps*, p. 306, pl. xxv. fig. 4 (on *Procellaria cinerea*), *subangusticeps* (= *pelagicus*, Denny ?), p. 308, pl. xxv. fig. 5 (on *Thalassidroma leachi*), *gracilicornis*, p. 309, pl. xxv. fig. 6 (on *Fregata minor*), *signatus*, p. 310, pl. xxv. fig. 7 (on *Anastomus lamelligerus*), *prælongus*, p. 312, pl. xxv. fig. 7* (on *Tantalus lacteus*), *æqualis*, p. 314, pl. xxvi. fig. 1 (on *Phœnicophæus calorrhynchus*), *parviceps*, p. 321, pl. xxvi. fig. 6 (on *Sterna hirundo*), *grandis*, p. 323, pl. xxvi. fig. 7 (on *Thalassidroma pelagica*), *mutabilis*, p. 324, pl. xxvii. fig. 1 (on *Procellaria glacialis* and *capensis*), *emarginatus*, p. 328, pl. xxviii. fig. 2 (on *Totanus ochropus*), *longipes*, p. 329, pl. xxviii. fig. 3 (on *Tinamus obsoletus*), *latus*, p. 330, pl. xxv. fig. 1 (on *Rhea americana*), *setosus*, p. 335, pl. xxvii. fig. 4 (on *Phalacrocorax sulcirostris*), var. *brevisignatus*, ibid. (on *Carbo javanicus*), *subsetosus*, p. 336, pl. xxvii. fig. 5 (on *Phalacrocorax melanotus*), *brevicornis*, p. 337, pl. xxviii. fig. 6 (on *Carbo sulcirostris* and *africanus*), *annulatus*, p. 340, pl. xxvii. fig. 10 (on *Sula fusca*), *bifasciatus*, p. 342, pl. xxviii. fig. 1 (on *Pelecanus crispus*), *squalidus* (Nitzsch) vars. (p. 346), *major* (on *Anas gibberiformis*), *colorata*[*-tus*] (on *Anas melanotus*), *pallida*[*-dus*] (on

Cygnus buccinator), *antennata* [*-tus*] (on *Cygnus atratus*), *thoracicus*, p. 346, pl. xxx. fig. 6 (on *Anas radjah*), *unicolor*, p. 354, pl. xxviii. fig. 6 (on *Perdix javanica*), *inæqualis*, p. 355, pl. xxviii. fig. 7 (on *Megapodius rubripes*), *appendiculatus*, p. 356, pl. xxviii. fig. 8, and var. *major*, p. 357 (on *Megapodius rubripes*), *docophorides*, ibid. pl. xxviii. fig. 9 (on *Ortyx californicus*), *dissimilis*, p. 359, pl. xxix. fig. 1 (on *Ortyx virginianus*), *tricolor*, p. 363, pl. xxx. fig. 4 (on *Diomedea fuliginosa*), *intermedius*, p. 368, pl. xxix. fig. 7 (on *Euplocamus ignitus*), *longus*, p. 370, pl. xxix. fig. 8 (on *Tragopan satyrus* and *temminckii*), *femoratus*, p. 675, pl. lvi. fig. 4 (on *Eclectus*, sp. ?), *megalops*, ibid. pl. lvi. fig. 8 (on *Cryptonyx coronatus*), *parum-setosus*, p. 676, pl. lvi. fig. 7 (on *Rhynchæa lævigata*), *uncinatus*, p. 677, pl. lvi. fig. 6 (on *Cryptornix coronatus*) *platy-clypeatus*, p. 678, pl. lvi. fig. 5 (on *Perdix*, sp. ?), *exilicornis*, p. 679, pl. lvi. fig. 9 (on *Sterna*, sp. ?).

Trichodectes inæqualis, p. 388, pl. xxxii. fig. 3 (on *Herpestes ichneumon*), *parum-pilosus* (= *equi*, Denny), varr. *ocellata* [*-tus*] (p. 398) (on *Equus burchelli*), and *tarsata* [*-tus*] (p. 399) (on *Equus*, sp. ?), *forficula*, p. 400, pl. xxxii. fig. 7 (on *Cervus porcinus*), *crenelatus* [sic], p. 402, pl. xxxii. fig. 8 (on *Antilope albifrons*), *appendiculatus*, p. 403, pl. xxxiii. fig. 1 (on *Antilope subgutturosa*), *pallidus*, p. 405, pl. xxxii. fig. 9 (on *Nasua fusca*), *penicillatus*, p. 406, pl. xxxii. fig. 10 (on *Macropus penicillatus*).

Liotheidæ.

New genus :—

Boopia, p. 599. Antennæ produced beyond the margins of the head; the temples produced into right angles; eyes very large, simple. Type, *B. tarsata*, ibid. pl. i. fig. 1 (on *Phascolomys fossor*).

New species, &c. :—

Menopon fulvo-fasciatum, p. 417, pl. xxxiii. fig. 3 (on *Buteo vulgaris*), var. *minor*, p. 418 (on *Accipiter nisus*), *parum-pilosum*, p. 421, pl. xxxiii. fig. 6 (on *Trichoglossus ornatus*), *acuticeps*, p. 422, pl. xxxiii. fig. 7 (on *Sittace ararauna*), *bifurcatum*, p. 423, pl. xxxv. fig. 10 (on *Psittacus erythacus*), *semilunare*, p. 424, pl. xxxiii. fig. 8 (on *Cuculus orientalis*), *obovatum*, p. 429, pl. xxxiv. fig. 1 (on *Corvus scapulatus*), and var. *intermedium*, p. 430 (on *Corvus torquatus*), *ovatum*, ibid. pl. xxxiv. fig. 6 (on *Corvus scapulatus*), *trinoton* [sic], p. 431, pl. xxxiii. fig. 10 (on *Corvus validissimus*), *pilosum*, p. 432, pl. xxxiii. fig. 9 (on *Corvus senex*), *albiceps*, p. 437, pl. xxxiv. fig. 4 (on *Garrulus caledonicus*), *flavidum*, p. 438, pl. xlii. fig. 5 (on *Eurylæmus cucullatus*), *flavescens*, p. 439, pl. xxxv. fig. 9 (on *Sturnus cristatellus*), *quadrifasciatum*, p. 440, pl. xxxv. fig. 6 (on *Passer domesticus*), and var. *major*, p. 441 (on *Emberiza nivalis*), *breviventre*, ibid., pl. xxxv. fig. 8 (on *Pastor tricolor*), *scitum*, p. 442, pl. xlii. fig. 6 (on *Copsychus mindanensis*), *inæquale*, p. 443, pl. xxxv. fig. 1 (on *Lanius collurio*), *parvulum*, p. 444, pl. xxxv. fig. 4 (on *Cypselus apus*), *parviceps*, p. 446, pl. xxxvi. fig. 3 (on *Alauda arvensis*), *meniscus*, p. 447, pl. xxxvi. fig. 7 (on *Emberiza lapponica*), *delicatulum*, p. 448, pl. xlii. fig. 7 (on *Piconotus ochrocephalus*), *spinosum*, p. 449, pl. xxxvi. figs. 4 & 5 (on *Cardinalis virginianus* and *Carduelis cucullata*), *germanum*, p. 450, pl. xxxvi. fig. 1 (on *Pogonorrhynchus rolleti*), *crassipes*, ibid. pl. xxxv. fig. 7 (on *Epimachus*

magnificus), *integrum*, p. 451, pl. xxxv. fig. 5 (on *Chalybæus viridis*), *dubium*, p. 452, pl. xxxvi. fig. 6 (on *Edolius longus*), *subrotundum*, p. 453, pl. xxxv. fig. 2 (on *Gracula sulcirostris*), *perforatum*, ibid. pl. xlii. fig. 9 (on *Eremophila chrysolæna* and *Rhipidura* sp. ?), *latum* (= *giganteum*, Denny ?), p. 457, pl. xxxvii. fig. 1 (on *Columba*), *menadense*, p. 458, pl. xlii. fig. 8 (on *Macropygia menadensis*), *triseriatum*, p. 460, pl. xxxvii. fig. 3 (on *Gallus bankiva*), *longipalpe*, p. 461, pl. xxxviii. fig. 2 (on *Euplocamus melanotus*), *productum* (= *fulvo-maculatum*, Denny ?), p. 461, pl. xxxvii. fig. 8 (on *Phasianus pictus* and *colchicus*), var. *major*, p. 462 (on *Lophophorus resplendens*), *albicans*, p. 463, pl. xxxviii. fig. 3 (on *Euplocamus horsfieldi*), *subæquale*, ibid. pl. xxxvii. fig. 5 (on *Euplocamus ignitus*), *uniseriatum*, p. 464, pl. xxxvi. fig. 4 (on *Phasianus prælatus*), *lativalvatum*, p. 465, pl. xxxvii. fig. 6 (on *Megapodius rubripes*), *latifasciatum*, p. 467, pl. xxxviii. fig. 4 (on *Gallophasis cuvieri*), *pallescens*, Nitzsch, vars. (p. 471) *pallida* (on *Caccabis saxatilis*) and *major* (on *Perdix rubra*), *unicolor*, p. 471, pl. xxxviii. fig. 5 (on *Perdix javanica*), *tarsatum*, p. 472, pl. xlii. fig. 4 (on *Cryptonyx coronatus*), *abdominale*, p. 473, pl. xxxvi. fig. 9 (on *Perdix cothurnix*), *appendiculatum*, ibid. pl. xxxvi. fig. 8 (on *Perdix cinerea*), *abnorme*, p. 481, pl. xxxviii. fig. 8 (on *Gallinula hæmatopus*), *concretum*, ibid., pl. xxxviii. fig. 9 (on *Porphyrio melanopterus*), *gracile*, p. 482, pl. xl. fig. 1 (on *Porphyrio smaragdinus*), *atro-fulvum*, p. 483, pl. xxxix. fig. 2 (on *Platalea leucorodia*), *femorale*, p. 484, pl. xxxix. fig. 8 (on *Platalea leucorodia*), *sulcatum*, p. 485, pl. xxxix. fig. 7 (on *Ardea egretta*), *temporale*, p. 487, pl. xxxix. fig. 6 (on *Leptoptilus aryala*), *albescens*, p. 491, pl. xli. fig. 4 (on *Sula australis*), *fusco-fasciatum*, p. 492, pl. xl. fig. 9 (on *Lestris pomarina*), *interpolatum*, p. 493, pl. xlii. fig. 1 (on ?), *grandiceps*, p. 494, pl. xli. fig. 6 (on *Xulla mangola*), *brevithoracicum*, p. 495, pl. xli. fig. 2 (on *Cygnus musicus* and *nigricollis*), *albo-fasciatum*, p. 496, pl. xl. fig. 6 (on *Tadoma vulpanser*), *intermedium*, p. 497, pl. xl. fig. 4 (on *Attagen minor*), *obscurum*, ibid, pl. xl. fig. 8 (on *Anas radjah*), *brevipalpe*, p. 498, pl. xl. fig. 5 (on *Phalacrocorax carbo*), *brevifimbriatum*, p. 499, pl. xli. fig. 1 (on *Procellaria glacialis*), *longithoracicum*, p. 500, pl. xli. fig. 5 (on *Procellaria cinerea*), *eurum*, p. 502, pl. xl. fig. 3 (on *Carbo javanicus*), *titan*, p. 503, pl. xl. fig. 7 (on *Pelecanus onocrotalus*), *longitarsus* [*-sum*, if *brevipalpe*, suprà, is admitted], p. 504, pl. xli. fig. 7 (on *Halmaurus giganteus*), *extraneum*, p. 506, pl. xlii. fig. 2 (on *Cavia cobaya*).

Colpocephalum maculatum, p. 516, pl. xliii. fig. 1 (on *Polyborus brasiliensis*), *subpachygaster*, p. 517, pl. xliii. fig. 2 (on *Strix*), *dissimile*, p. 520, pl. xliii. fig. 4 (on *Milvus ægyptius*), *setosum*, p. 521, pl. xliii. fig. 5 (on *Cathartes gryphus*), *pustulatum*, p. 522, pl. xliii. fig. 6 (on *Gypogeranus cirratus*), *longipes*, pl. xliii. fig. 7 (on *Eclectus puniceus*), *trimaculatum*, p. 525, pl. xliii. fig. 8 (on *Platycercus palliceps* and *barrabandi*), *pallidum*, p. 526, pl. xliii. fig. 9 (on *Plictolophus moluccensis*), *elongatum*, p. 529, pl. xliv. fig. 2 (on *Pyrrhocorax alpinus*), *parviceps*, p. 531, pl. xliv. fig. 4 (on *Lamprotornis ænea*), *biseriatum*, p. 522 (on *Gracula javanensis*). *parumpilosum*, p. 536, pl. xliv. fig. 8 (on *Lophophorus resplendens*), *spinosum*, p. 537, pl. xliv. fig. 9 (on *Francolinus capensis*), *majus*, p. 538, pl. xliv. fig. 10 (on *Megapodius rubripes*), *minus*, p. 539, pl. xlv. fig. 1 (on *Megapodius rubripes*), *truncatum*, p. 540, pl. xlv. fig. 2 (on *Grus cinerea* and

Phascolomys fossor), *atro-fasciatum*, p. 542, pl. xlv. fig. 3 (on *Grus communis* and *pavonina*), *abdominale*, p. 543, pl. xlv. fig. 4 (on *Grus leucachen*), *assimile*, p. 544 (on *Grus americana*), *penicillatum*, p. 552, pl. xlvi. fig. 2 (on *Ibis cristata*), *gracile*, p. 555, pl. xlvi. fig. 5 (on *Platalea leucorodia*), *umbrinum*, p. 556, pl. xlvi. fig. 6 (on *Tringa subarquata* and *cinerea*), *grandiceps*, p. 558, pl. xlvi. fig. 7 (on *Hæmatopus ostralegus*), *bicolor*, p. 561, pl. xlvii. fig. 1 (on *Strepselas interpres*), *uniseriatum*, p. 562, pl. xlvii. fig. 2 (on *Recurvirostra avocetta*), *spinulosum*, p. 563, pl. xlvii. fig. 3 (on *Limosa melanura*), *sulcatum*, p. 565, pl. xlvii. fig. 5 (on *Sterna nigra*), *crassipes*, p. 566, pl. xlvii. fig. 6 (on *Sterna poliocerca*), *fuscipes*, p. 567, pl. xlvii. fig. 7 (on *Larus dominicanus*), *angulaticeps*, p. 569, pl. xlvii. fig. 8 (on *Fregata minor*), *incisum*, ibid. pl. xlvii. fig. 9 (on *Phaeton flavirostris*), *ellipticum*, p. 570, pl. xlviii. fig. 1 (on *Xulla mangola*), *subflavescens*, p. 571, pl. xlviii. fig. 2 (on *Xenorrhynchus senegalensis*), *heterosoma*, p. 572, pl. xlviii. figs. 3 & 4 (on *Phœnicopterus antiquorum*).

Nitzschia tibialis, p. 576, pl. xlviii. fig. 5 (on *Cypselus apus*).

Læmobothrium titan, p. 578, pl. xlix. fig. 1 (on *Milvus ætolius*), *emarginatum*, p. 584, pl. xlviii. fig. 8 (on *Gallinula hæmatopus*).

Trinotum continuum (= *conspurcatum*, var. ?), p. 591 (on the domestic goose), *femoratum*, p. 593, pl. xlix. fig. 4 (on *Phœnicopterus antiquorum*), *intermedium*, p. 595, pl. xlix. fig. 5 (on *Anas radjah*), *spinosum*, p. 596, pl. xlix. fig. 6 (on *Mareca penelope*).

Physostomum thoracicum, p. 606, pl. li. fig. 1 (on *Centropus lyricercus*).

Gyropus turbinatus, p. 612, pl. l. fig. 7 (on *Arctomys marmotta*).

A succinct but useful sketch of the genera of *Mallophaga*, with an account of the habits, and with figures typical of the various genera, appears in "Les Parasites et les Maladies Parasitaires," by P. Mégnin, Paris, 1880, pp. 79–96.

Thysanoptera.

Reuter, O. M. Thysanoptera Fennica. i. Tubulifera. Bidr. Finl. Nat. 1880; separate copy, pp. 1–26.

A monograph of the Finnish species of *Tubulifera*. It commences with a sketch of the characters of the "Order" *Thysanoptera*, followed by a tabular synopsis of the 12 indigenous species, ending with detailed descriptions of each.

New species :—

Phlœothrips nigripes, Reuter, Bidr. Finl. Nat. 1880, p. 11, *dentipes*, p. 12, *parvipennis*, p. 14, *nodicornis* (= *ulmi*, Halid., *nec* F. ?), p. 16, *simillima* (= *ulmi*, Heeger, *nec* F. ?), *annulipes*, p. 19, *monilicornis*, p. 21, *apicalis*, p. 25, all from Finland; *P. setinodis*, id. Scot. Nat. v. p. 310, Scotland.

Termitidæ.

Berg, Cárlos. La vida y costumbres de los Termitos. Conferencia popular Soc. Cient. Argent. Buenos Aires : 1880, pp. 1–16, 1 pl.

Concerns the habits of *Termitidæ* in general, and of the species of the Argentine Republic in particular. The author enumerates 4 species as

occurring there, viz., *Eutermes testaceus*, L., *Termes similis*, Hg., *saliens*, F. Müller, and *lespesi*, F. Müller; a new species from Banda Oriental is noticed (but not described) as *Termes uruguayensis*. The plate illustrates the general form of the insects, with sections of the termitarium of *T. lespesi*.

Termes flavipes. E. A. Schwarz has discovered *Trichopsenius depressus*, Lec., and three other undescribed *Staphylinidæ* inquilinous on this species in Texas; Am. Ent. iii. p. 15.

Embidæ.

Embia solieri, Rbr. Notes on the habits of the larvæ, as observed in the vicinity of Toulon; Lucas, Bull. Soc. Ent. Fr. (5) x. p. xcvii.

Psocidæ.

Kolbe, H. Ueber die Genera *Atropos*, Leach, and *Troctes*, Burm. Ent. Nachr. vi. p. 84.

The author maintains that *Atropos* should be reserved for the species forming the genus *Clothilla*, Westw., whereas *Troctes* should include those usually placed in *Atropos* by modern authors.

——. Bemerkungen zu Dr. Jacob Spångberg's Psocina Sueciæ et Fenniæ. S. E. Z. xli. pp. 176–178.

A critique in which, under 8 divisions, the author notices various points of structure, synonymy, &c., with especial regard to his own views, as detailed in his monographic work noticed below.

——. Das Flügelgeäder der Psociden und seine systematische Bedeutung. *L. c.* pp. 179–186, with pl.

A comparison of the neural terminology and the structural homologies, as defined by McLachlan and Spångberg, in their British and Scandinavian monographs respectively, with the system adopted by the author; ending with a new arrangement of the sub-family, with outline characters of the genera; the whole forming little else than an extract from the author's comprehensive work noticed below, and which was published almost simultaneously. The plate consists of outline figures of neuration.

——. Monographie der deutschen Psociden, mit besonderer Berücksichtigung der Fauna Westfalens. JB. zool. Sect. westf. Ver. 1879–80, pp. 74–142, pls. i.–iv.

Possibly the most original treatise that has appeared on these insects, and very valuable from the full manner in which the subject is worked out. After a short introduction, the systematic position is discussed, in which the author states that this is nearer to the *Embidæ* than to the *Termitidæ*. A discussion of the characters of the family occupies pp. 76–83, the author maintaining the (probably erroneous) ideas regarding the homologies of the wing-nervures foreshadowed in S. E. Z. [*vide suprà*]. Geographical distribution generally, forms the next chapter. Then follows the mode of life, and food, the egg, larva and nymph, in which it

is asserted [most certainly in error] that the short-winged forms occurring in certain species are only nymphs ; this is succeeded by a note on the times of appearance, the broods in a year, &c. The history of the subject is next considered, then the natural systematisation and "Darwinismus," the author asserting that the first *Psocidæ* were undoubtedly evolved from the *Embidæ*. In this portion, the author has taken into consideration the numerous instances of aberrant neuration, which almost invariably point to genetic relationships ; one species is considered to exhibit a case of atavism. The least satisfactory features of the memoir are the tendency shown to excessive multiplication of genera (and probably also of species) on slight foundations, the giving of varietal names to slight aberrations in neural characters, the occasional peculiar ideas as to nomenclature [e.g., *Psocus nebulosus* is re-christened *nebuloso-similis*, because Stephens described the ♀ as *nebulosus*, and the ♂ as *similis*!], and the revival of obsolete names on the slightest possible foundation [e.g., *P. longicornis*, F., is identified with *Phryganea saltatrix*, L. ; why, the Recorder cannot conceive]. The descriptions are excellent, and the bibliographical references very full. The plates are full of well-executed figures, mostly of details, representing minute structural characters, neuration, &c., &c. The systematic portion occupies pp. 102–137 ; all the German species are described, and reference is made to those European species not occurring in Germany. A conspectus of the tribes and genera appeared in the paper in S. E. Z. xli., noticed above (which was probably published almost simultaneously with this), but it is thought better to allude to them specially here. The author adopts 5 tribes, viz.: 1, *Psocini* (including *Psocus*, auctt., and a new genus split off from it) ; 2, *Cœcilini* (including *Elipsocus*, which is divided into three genera, and *Cœcilius*) ; 3, *Stenopsocini* (which includes *Stenopsocus* and a new genus formed at its expense) ; 4, *Peripsocini* (limited to *Peripsocus*) ; and 5, *Atropini* (in which the terms *Troctes* and *Atropos* are used in the sense alluded to above, and an entirely new genus is erected).

Spångberg, Jacob. Sur quelques espèces européennes de la sous-famille des Psocines. Ent. Tidskr. i. pp. 94–98, pl. i. figs. 4–6.

Stenopsocus striatulus, F., *Psocus morio*, Latr., and *subnebulosus*, Steph., redescribed and wings figured. [The statement that the Recorder determined a variety of *S. immaculatus*, Steph., as *nervosus*, St., is based on some error ; *nervosus* is a variety of *cruciatus*, L.]

Psocidæ in the Mammoth Cave of Kentucky ; H. G. Hubbard, Am. Ent. iii. p. 84, mentions *Atropos divinatoria* (possibly introduced), and on the authority of Hagen, two species of *Psocina* with 3-jointed tarsi, but with abbreviated wings, either belonging to *Myopsocus* or *Elipsocus*.

Elipsocus cyanops, Rostock, discovered in England ; McLachlan, Ent. M. M. xvii. pp. 21 & 71.

Stenopsocus stigmaticus, Imhoff, from a new British locality ; J. E. Fetcher, Ent. M. M. xvi. p. 211.

Elipsocus westwoodi, McLach., bred from galls of *Cynips kollari* ; E. A. Fitch, Ent. xiii. p. 263.

Cœcilius pedicularius, L., in extreme abundance in cornfields in England; T. H. Hart, Ent. M. M. xvii. p. 141.

New genera, &c.:—

Amphigerontia, Kolbe, JB. zool. Sect. westfal. Ver. 1879–80, p. 104. Differs from *Psocus* (restricted) in the discoidal cell being quadrangular instead of pentagonal. Includes *Psocus subnebulosus*, Steph., *bifasciatus*, Latr., *fasciatus*, F., and *variegatus*, Latr.

Mesopsocus, id. *l. c.* p. 112. An offshoot of *Elipsocus*, Hag. (differing only in a minute neural character). Type, *E. unipunctatus*, Müll.

Philotarsus, id. *l. c.* p. 116. Also formed on minute neural characters. Type, *Elipsocus picicornis*, F. (*sec.* Kolbe, = *flaviceps*, Steph.), *stigma*, ibid., and var.

Pterodela (subg. n. of *Cœcilius*), id. *l. c.* p. 118. Differs from *Cœcilius* (as restricted by Kolbe) in the hyaline wings, claviform pterostigma, naked veins, &c. Includes *C. pedicularius*, L., and *quercus*, sp. n., p. 120, pl. iii. fig. 13, Westphalia.

Graphopsocus, id. *l. c.* p. 124. An offshoot of *Stenopsocus*, differing in slight neural details. Type, *S. cruciatus*, L.

Hyperetes, id. *l. c.* p. 132. Allied to *Atropos* (Kolbe, = *Clothilla*, Westw.), but without wing-rudiments, and with the terminal joint of the maxillary palpi securiform. Type, *H. guestfalicus*, sp. n., *ibid.*, p. 132, pl. iv. fig. 22.

New species, &c.:—

Psocus nebulosus St. (= *nebuloso similis*, Kolbe), var. *amphigerontoides*, Kolbe, *l. c.* p. 108 (a neural aberration), Westphalia; *sexpunctatus*, L., var. *major*, id. p. 109 (principally a neural aberration), Westphalia; *bipunctatus*, L., var. *spangbergi*, id. *ibid.* (a neural aberration), Westphalia and Switzerland; *quadrimaculatus*, Latr., var. *latreillii*, id. p. 110 (a neural aberration), Saxony and Holland.

Elipsocus laticeps, id. p. 114, pl. i. fig. 6, Westphalia, and Würtemburg, *abietis*, ibid., pl. ii. fig. 8, Westphalia.

Cœcilius burmeisteri, Burm., var. *helveticus*, id. p. 121, Switzerland, *obsoletus*, Steph., var. *perlatus*, p. 122, Westphalia, *flavidus*, Steph., var. *pedunculatus*, ibid. (a neural aberration), Westphalia, *fuscopterus*, Latr., var. *affinis*, p. 123 (a neural aberration), Westphalia.

Stenopsocus lachlani, p. 127, pl. iii. fig. 17, Westphalia, *striatulus*, F. (sec. Kolbe, = *stigmaticus*, Imhoff), var. *furcata* [*-tus*], *ibid.*, Westphalia.

Peripsocus phœopterus, Steph., var. ?, *similis*, p. 130, Westphalia, *alboguttatus*, Dalm, var. *parvulus*, ibid., Westphalia.

Perlidæ.

Nemoura variegata, Oliv., is considered by Kolbe to be represented by *Hemerobius lutarius*, L., and thus becomes *N. lutaria*; S. E. Z. xli. p. 353.

EPHEMERIDÆ.

JOLY, E. Sur la nymphe du genre d'Éphémérines *Bætisca*, par Benj. D. Walsh, M.A., traduit de l'anglais et annoté. Bull. Soc. Angers, viii. & ix. pp. 157–173, with plate.

The original memoir appeared in 1864, the translator's annotations to a large extent are comparative with respect to *Prosopistoma*.

SCUDDER, S. H. The Devonian Insects of New Brunswick. [See *Neuroptera*, The General Subject.]

ZIMMERMANN, O. Ueber eine eigenthümliche Bildung des Rückengefässes bei einigen Ephemeriden-larven. Z. wiss. Zool. xxxiv. pp. 404–406, woodcuts.

Concerns the manner in which the blood is forced into the caudal appendages of larvæ of various species; the author argues that these tails have a respiratory function in addition to being organs of locomotion.

Prosopistoma punctifrons. E. Joly announces the breeding of the perfect insect by Vayssière; Bull. Soc. Ent. Fr. (5) x. p. lxxv. McLachlan denies Joly's assertion that he formerly held the opinion that the insect might be a permanent larval form, and points out how the error probably originated; *l. c.* p. cxii., Ent. M. M. xvii. p. 117, Nature, xxii. p. 460; *cf.* also Vayssière in C. R. xc. p. 1370, translated in Ann. N. H. (5) vi. p. 262.

Bætisca obesa, Say: short additional characters given by Eaton, P. E. Soc. 1880, p. v.

Cœnis dimidiata reported to be luminous; Eaton, *l. c.* p. viii.

Oligoneuria rhenana. Notes on an immense swarm observed at Basle on August 25th, 1880; McLachlan, Ent. M. M. xvii. p. 164.

Method of preserving nymphs in fluid, or for transmitting; A. E. Eaton, Canad. Ent. xii. p. xl.

Hexagenites (g. n.) *weyenberghi* (sp. n.), Scudder, Anniversary Mem. Bost. Soc. 1880, p. 6, fossil in the Jurassic of Solenhofen.

ODONATA.

BRAUER, F. Verzeichniss der von Fedtschenko in Turkestan gesammelten Odonaten. Verh. z.-b. Wien, xxx. p. 229–232.

A list of 27 species mainly drawn up from the author's more detailed memoir in Fedtschenko's Travels in Turkistan [*cf.* Zool. Rec. xiv. *Ins.* p. 205].

GERARD, W. R. Notes on the eggs and larvæ of an unknown Dragon-Fly. Am. Ent. iii. pp. 174 & 175 (woodcuts).

Long gelatinous egg-masses observed on stems of *Potamogeton* in a lake on the Catskills. During the night the masses apparently sank, and reappeared on the surface during the day, receiving the full rays of the sun. The larvæ were hatched. but died in a few days; they bore resemblance to those of *Diplax* as figured by Packard.

Hagen, H. A. Beitrag zur Kenntniss der Tracheen-systems der Libellen-Larven. Zool. Anz. iii. pp. 157–161.

Consists of criticisms on some statements in Palmén's "Morphologie des Tracheen-systems," with notes from direct observation. With regard to the statement that the stigmata are closed, he is of opinion that they may be open during moulting or become mechanically closed afterwards. The stigmata of the first abdominal segment are often overlooked because they lie in rather a different position to the others. (Notes on the tracheal system of *Agrionidæ* are referred to under *Calopterygina*, which see.)

An abstract of Stefanelli's paper on the preservation of the colours of Dragon-flies [*cf.* Zool. Rec. xvi. *Ins.* p. 213] appears in Ent. Nachr. vi. p. 145.

9 additional species for Tuscany are recorded by Stefanelli in Resoconti Ent. Ital. 1880, pp. 14 & 15.

Libellulina.

Great migratory swarms of *Libellula 4-maculata* and *L. depressa* observed in various localities in Galizia in May, 1880; J. Schaitter, SB. z.-b. Wien, xxx. p. 40; *cf.* also Ent. Nachr. vi. pp. 133 & 167. An anonymous note in Feuill. Nat. x. p. 15, on a great swarm of *Libellulidæ* observed at Havre on Oct. 7th, perhaps refers to some species of *Sympetrum*. B. Torrey, Am. Nat. xiv. p. 132, records an enormous swarm of Dragon-flies (species not given) at Weymouth, Mass., on June 2nd; the column was at least a quarter of a mile in width, and the migration lasted all day; on the 23rd of the same month a similar swarm was observed near Boston; in both cases the course was westward. At p. 594, the same writer records another swarm observed on May 24th in the next year.

Corduliina.

Cordulia arctica, Zett., occurs in the Engadine, Switzerland; McLachlan, Ent. M. M. xvii. p. 141; Schoch, MT. schw. ent. Ges. vi. p. 51.

Cordulia alpestris, Selys. Notes on its distribution in Switzerland; G. Schoch, MT. schw. ent. Ges. vi. pp. 17, 18, & 51.

Æschnina.

Amphiæschna irene, Fonsc., recorded from Portugal; McLachlan, Ent. M. M. xvii. p. 105. From Switzerland; G. Schoch, MT. schw. ent. Ges. v. pp. 553 & 554.

Æschna borealis, Zett., occurs in the Engadine, Switzerland; *id. l. c.* p. 141.

Libellula cærulea, Ström (1783), = *Æschna borealis*, Zett., the former name having priority; Wallengren, Forh. Selsk. Chr. 1880, pt. ii. p. 21.

Gomphina.

Gomphus graslini, Rbr., recorded from Portugal; McLachlan, Ent. M. M. xvii. p. 105.

Calopterygina.

Hagen, H. A. Quelques Additions aux Caloptérygines. CR. Ent. Belg. xxiii. pp. lxii.–lxv.

——. Essai d'un Synopsis des Larves des Caloptérygines. *L. c.* pp. lxv.–lxvii.

Short notices on the larvæ of *Calopteryx*, *Phaon*, *Hetærina*, *Anisopleura*, *Euphœa*, and *Cora* ?. In *Euphœa*, there are lateral abdominal branchiæ in addition to the caudal, so that respiration is possible by four different methods, viz., by stigmata, and by lateral, caudal, and rectal branchiæ. (Abstracted by McLachlan in Ent. M. M. xvii. p. 90; *cf.* also Zool. Anz. iii. pp. 304 & 305.)

McLachlan, R. On *Calopterygina* from the Island of Sumatra, collected by Herr Carl Bock. Ent. M. M. xvi. pp. 203–206.

Notes on various known species, and a new one described.

Selys-Longchamps, E. de. *Lais devillei*. CR. Ent. Belg. xxiii. pp. xlix.–li.

Under this title, the author enters into an examination of the entire genus, with table of species.

Branchiæ persistent on the abdomen of the imago of *Euphœa*; H. A. Hagen, Zool. Anz. iii. p. 304.

Calopteryx virgo in a migratory swarm at Lake Neuchâtel on Sept. 17th from north-east to south-west; E. A. Gödlin, Zool. Gart. xxi. p. 125.

Lais hauxwelli, *fulgida*, and *cuprea*, Selys, redescribed; Selys, *l. c.* pp. xlix. & l.

Psolodesmus mandarinus, McLach., redescribed from complete examples from Formosa; Hagen, *l. c.* p. lxii.

Euphœa formosa, Hag., fully described; *id. l. c.* p. lxiv.

Anisopleura comes, sp. n., Hagen, CR. Ent. Belg. xxiii. p. lxiii., Himalayas.

Euphœa bocki, sp. n., McLachlan, *l. c.* p. 204, Sumatra.

Lais devillei, sp. n. (= *hauxwelli*, Selys, partim), Selys, *l. c.* p. 1, Ecuador and Upper Amazons.

Agrionina.

Sympycna pœdisca, Eversm., redescribed by Brauer, Verh. z.-b. Wien, xxx. p. 231.

ORTHOPTERA.

BY

Robert McLachlan, F.R.S., F.L.S., &c.

The General Subject.

Burmeister, H. *Cephaloccema* und *Phylloscirtus*, zwei merkwürdige Orthopteren-Gattungen der Fauna Argentina. Abh. Ges. Halle, xv. pp. 1–20, pl. i.

Malfatti, G. Intorno ad alcune specie di Ortotteri genuini Lombardi. Atti Soc. Ital. xxii. pp. 309–320.

Contains lists, in tabular form, of species noticed by R. Pirotta, as already published, with additional personal observations. *Pezotettix alpina*, Koll., *Gryllus burdigalensis*, Latr., *Saga serrata*, F., *Thamnotrizon striolatus*, F., and *Ephippiger terrestris*, Yersin, are given as new for Lombardy (the last new also for Italy).

Meinert, F. Om Ordenen *Diploglossata*. Vid. Medd. 1879–80, pp. 343–346.

After noticing the characters of this anomalous insect [*cf.* Zool. Rec. xvi. *Ins.* p. 220], the author arrives at the conclusion that whilst the external form is Orthopterous, the mouth-structure is nearest that of the *Thysanura*.

Ninni, A. P. Contribuzione per lo studio degli Ortotteri Veneti. II. Catalogo degli Ortotteri genuini. Boll. Com. Agrario Treviso, No. 9, with one plate.

Enumerates 66 species. [Not seen by the Recorder; *cf.* Bull. Ent. Ital. xii. p. 287.]

Scudder, S. H. List of the *Orthoptera* collected by Dr. A. S. Packard in the Western United States in the Summer of 1877. Second Report U. S. Ent. Commission, Appendix ii., pp. 23–28, with one plate (xvii.).

Enumerates about 46 species of various families; some are described as new, others, apparently new, are only indicated.

A few species captured by Cuni y Martorell at San Miguel del Fay, Spain, noticed in An. Soc. Esp. ix. p. 208.

Forficulidæ.

Bormans, A. de. Étude sur quelques Forficulides exotiques du Musée Royal d'histoire naturelle de Bruxelles. CR. Ent. Belg. xxiii. pp. lxviii.-lxxiv.

Appears to be a catalogue of the species in the Museum, with localities and notes.

——. Étude sur quelques Dermaptères exotiques. An. Soc. Esp. ix. pp. 506–515.

Note on structure, additional localities, and descriptions of new species.

Camerano, Lorenzo. Note intorno allo svilluppo della *Forficula auricularia*, Linn. Bull. Ent. Ital. xii. pp. 46–50.

The eggs are laid in winter or early spring. The ♀ collects them in a heap by means of her mandibles and palpi if intentionally scattered, and places herself over them. In one case, eggs laid on March 10th produced larvæ which moulted the first time from the 24th to the 30th of the same month, a second time on the 15th April, a third time in the beginning of May, and by the 22nd of this month the perfect insects appeared.

Ancistrogaster arthritica, Scudder, ♀ described ; De Bormans, An. Soc. Esp. ix. p. 508.

Labia arcuata, Scudder, ♀ described; *id. l. c.* p. 509.

Sparatta nigrina, Stål, ♂ described and forceps figured; *id.* CR. Ent. Belg. xxxiii. p. lxxii.

Anisolabis tasmanica, sp. n., *id.* CR. Ent. Belg. xxiii. p. lxviii., forceps figured, pl. lxx., Tasmania; *A. peruviana*, sp. n., *id.* An. Soc. Esp. ix. p. 505, Peru.

Labia chelidiuroides, sp. n., *id. l. c.* p. 509, Peru.

Sparatta bolivari, sp. n., *id. l. c.* p. 510, Peru.

Forficula japonica, p. 512, *scudderi*, p. 514, spp. nn., *id. l. c.*, Japan.

Blattidæ.

Geinitz, F. E. Die Blattinen aus der unteren Dyas von Weissig bei Pillnitz. Leop. xli. pp. 423–442.

[Not seen by the Recorder.]

Scudder's "Fossil Cockroaches" [*cf.* Zool.Rec. xvi. *Ins.* p. 218] reviewed in Bull. Ent. Ital. xii. p. 94.

Mantidæ.

Wood-Mason, James. Synopsis of the species of *Chæradodis*, a remarkable genus of *Mantodea* common to India and Tropical America. Ann. N. H. (5) vi. pp. 160–162, and J. A. S. B. xlix. pp. 82–84.

Notices 7 species, 1 of which is Indian.

Wood-Mason's observations on Asiatic species [*cf.* Zool. Rec. xvi. *Ins.* p. 219] reproduced in abstract in Ann. N. H. (5) v. pp. 261 & 262.

Chœradodis servillii, Wood-Mason, Ann. N. H. (5) vi. p. 161, and J. A. S. B. xli. p. 83, Costa Rica and Chiriqui, *stali*, id. *l. c.* p. 162, *l. c.* p. 84, Ecuador, spp. nn.

Eremiaphila aristidis, sp. n., Lucas, Bull. Soc. Ent. Fr. (5) p. lxxv., Suez.

Phasmatidæ.

A large species from St. Vincent exhibited; Sir J. Lubbock, P. E. Soc. 1880, p. xxxv.

Gryllidæ.

Phylloscirtus, Guérin. Burmeister, Abh. Ges. Halle, xv. pp. 12–19, recharacterizes the genus, and gives a tabular synopsis of the species, with descriptions and figures, viz., *P. colliuroides*, Gerst., pl. i. fig. 11, *vittatus*, Gerst., *pulchellus*, Uhler, pl. i. fig. 13, *elegans*, Guérin, *cicendeloides*, Gerst., and 2 spp. nn., *amœnus*, p. 17, pl. i. figs. 8–10, and *setosus*, p. 18, pl. i. fig. 18, Buenos Aires.

Œcanthus niveus, Harris. A. S. Fuller records the damage occasioned to raspberry canes by this insect, in Am. Ent. iii. p. 91; woodcuts of insect and eggs *in situ*, at p. 92.

Locustidæ.

Bolivar, Ignacio. Note sur les Locustiens cavernicoles d'Europe. Ann. Soc. Ent. Fr. (5) x. pp. 71 & 72.

Especially concerns the synonymy and position of *Locusta palpata*, Sulzer. The paper concludes with a table giving the characters of all the European cave-frequenting genera, of which the author recognizes *Hadenœcus*, Scud., *Rhaphidophora*, Serv., *Troglophilus*, Krauss, *Ceuthophilus*, Scud., and a new genus.

Novak, Ottomar. Ueber *Gryllacris bohemica*, einen neuer Locustidenrest aus der Steinkohlenformation von Stradonitz in Böhmen. JB. geol. Reichsanst. xxx. pp. 69–74, pl. iii.

In addition to a detailed description, the author discusses the affinities of *G. brongniarti*, Mantell, and the fossil Arthropods generally of the formation.

Anabrus. Under the title, "The Western Cricket," Packard gives, in the 2nd Report U. S. Ent. Comm. chap. viii. pp. 163–178, a full account of the habits, ravages, anatomy, &c., of the species of this genus found in Western N. America, with a synopsis of the genera of *Decticidæ*, and short comparative descriptions of the species of *Anabrus*, in which he includes 3 U. S. species, viz., *simplex*, Hald., *purpurascens*, Uhler, and *coloradus*, Thomas (*similis*, Scudder, he considers only a var. of *purpurascens*). *A. purpurascens* and *simplex* are figured.

Larvæ of *Meconema varium* inquilinous in galls of *Cynips kollari*; E. A. Fitch, Ent. xiii. p. 262.

Dolichopoda, g. n., Bolivar, Ann. Soc. Ent. Fr. (5) x. p. 72. Allied to *Hadenœcus*, but the rows of spines on the posterior tibiæ less crowded, &c. Type, *Locusta palpata*, Sulz. (= *Phalangopsis linderi*, Dufour).

Anostosoma alatum, sp. n., A. G. Butler, P. Z. S. 1880, pp. 152–154, woodcuts, Madagascar.

Gryllacris bohemica, sp. n., Novak, *l. c.* p. 70, pl. ii., fossil at Stradonitz in Bohemia.

ACRIDIIDÆ.

BARBER, M. E. Locusts and Locust Birds. Tr. S. Afr. Phil. Soc. i. pp. 193–218.

An interesting popular account of the habits of *Pachytylus pardalinus* in South Africa. Quite a number of species of birds follow the swarms to feed upon these insects, and the Bushmen and Bakalhari, native tribes, devour them voraciously, the latter preparing a sort of flour from them which is stored up for future use; the Dutch settlers sometimes collect them for feeding poultry. A Dipterous insect is a parasite on them.

BERG, CARL. Sinonimia y distribucion de la Langosta peregrina (*Acridium* [*Schistocerca*] *peregrinum* [Oliv.], Stål. An. Soc. Arg. ix. pp. 275–277.

Especially concerns the S. American distribution of the species, with full synonymy.

CAMERANO, L. Osservazione intorno allo *Stenobothrus sibiricus* (Linn.). Atti Acc. Tor. xv. pp. 381–384.

Concerns the sexual characters and the distribution of the species in Italy. *Cf.* also *id. l. c.* pp. 704–706, for observations on the natural colour of the trachea in the same insect, which he describes as "rosso-saturno."

FREY-GESSNER, E. Die *Orthoptera* des Kantons Aargau. MT. aarg. Ges. ii. pp. 1–17.

A local list preceded by generalities. 5 *Blattidæ*, 19 *Acridiidæ*, 12 *Locustidæ*, 5 *Gryllidæ*, and 4 *Forficulidæ* are enumerated.

MANN, B. PICKMAN. Bibliography of some of the literature concerning destructive Locusts. Second Rep. U. S. Ent. Com. App. iv. pp. 35–56.

An apparently exhaustive bibliography on "Locusts" (including, of course, families other than *Acridiidæ*). The citations for Europe, Asia, and Africa number 225, a supplementary list (by C. Thomas) adds 142, or, with additions to American bibliography, 154. The citations commence with the year 1542.

RILEY, C. V., PACKARD, JUNR., A. S., & THOMAS, CYRUS. Second Report of the United States Entomological Commission for the years 1878–79, relating to the Rocky Mountain Locust and the Western

Cricket, with maps and illustrations. Pp. i.–xvii. & 1–322, with 8 appendices, pp. 1–74, Washington : 1880, 8vo.

This voluminous report is of an extremely complex nature, and is divided into fourteen chapters. Chap. i., pp. 1–14, is by Packard & Riley, and consists of additions to the chronology of Locust ravages. Chap. ii., pp. 14–31, by C. Thomas, discusses the relation of the Locust and its ravages to agriculture and the settlement of the Territories. Chap. iii., pp. 31–72, also by C. Thomas, gives lengthy facts concerning, and laws governing, the migrations of Locusts in all countries. It is stated that an essentially migratory habit is confined to about four species ; occasionally a species is sedentary in one part of a continent and migratory in another ; all have areas in which they permanently breed, from which they occasionally pass into the surrounding districts. Chap. iv., pp. 72–108, likewise by C. Thomas, is on the habits and characteristics of Locusts in all countries within their areas of permanent distribution, so far as these relate to their movements. Chap. v., pp. 109-155, again by C. Thomas, notices the influence of meteorological conditions, and gives numerous tables of temperatures, winds, &c. Chap. vi., pp. 156–160, is on the southern limit of the distribution of the Rocky Mountain Locust in New Mexico. Chap. vii., pp. 160–163 (with two maps, contains a summary of flight during 1877-79. Chap. viii., pp. 163–178, by A. S. Packard, treats on the so-called Western Cricket (cf. *Locustidæ*). Chap. ix., pp. 178–183, by A. S. Packard, is anatomical, and contains an examition of the air sacs of Locusts with reference to their powers of flight and is illustrated by a plate, and contains copious extracts from Newport's writings. The author thinks that these sacs may have been suddenly produced in some remote ancestor through violent respiratory efforts, and being found useful were transmitted to the offspring, and became permanent parts of an insect's structure. Chap. x., pp. 163–222, pls. ii.–viii., is by C. S. Minot, and consists of a very valuable dissertation on the histology of the Locust and Cricket, chiefly of the latter, and forms a good general introduction to the internal anatomy of insects generally. Chap. xi. pp. 223–242, pls. ix.–xv., by A. S. Packard, is an equally valuable anatomical essay, and treats on the brain of the Locust, with an examination of the nervous system in general, concluding with a bibliography concerning the structure of the brain of insects. Chap. xii. pp. 242–249, by C. V. Riley & C. Thomas, is on the Locust of California (*Camnula pellucida*), with very full redescriptions and woodcuts, the habits appear to closely resemble those of the Rocky Mountain species (*Caloptenus spretus*). Chap. xiii. pp. 259–271, by C. V. Riley, gives additional facts about the natural enemies of Locusts, and especially concerns the larvæ of *Cantharidæ* and *Bombyliidæ* that are parasites on the egg-tubes, it is illustrated by an admirable coloured plate (xvi.). Chap. xiv., pp. 271–322, by C. V. Riley, suggests courses that may be adopted to lessen injury, to illustrate this chapter 6 large folded coloured maps are given. "Burning" the "permanent" districts is specially recommended; so also is the making of railroads, increased irrigation, &c. The appendices are very varied in their nature, some of them are here recorded separately.

Scudder, S. H. A few notes on N. American *Acridii*. Canad. Ent. xii. pp. 75 & 76.

Principally on dimorphism in western species.

Thomas, Cyrus. Notes on *Orthoptera*. Canad. Ent. xii. pp. 222–224.

Consists principally of notes also published in the Second Rep. U. S. Ent. Com.

——. The *Acridi* [*i*] *dæ* of Illinois. Rep. Ins. Illinois, ix. pp. 73–140.

A monograph of the species known to inhabit the State. It commences with a detailed sketch of the structure of the family, with illustrative diagrams. Then follows a sketch of classification, in which the family is divided into 3 sub-families, viz.: *Proscopinæ*, *Acridiinæ*, and *Tettiginæ*. Afterwards there is a key to the families of *Orthoptera*; another to the sub-families and groups of *Acridiidæ*, the *Acridiinæ* being divided into *Truxalini*, *Œdipodini*, and *Acridiini*; then a key to sub-families and genera, followed by one to the Illinois species, and a synonymic list of the Illinois species, in which 39 are enumerated. Finally, all the species are described. In the course of the work woodcuts are given of the following: *Acridium americanum*, p. 81, *Stenobothrus maculipennis*, pp. 84 & 102, *Tragocephalus viridifasciata* and *Hippiscus phœnicopterus*, p. 85 (the latter also on p. 117), *Caloptenus femur-rubrum*, p. 86 & 124, *C. spretus*, pp. 121 & 123, *C. differentialis*, p. 127. No new genera or species appear to be described. At the end of the memoir is a "Life History of Locusts," notes on "injuries by grasshoppers," and "remedial agencies."

For notes on "the relations between meteorology and the Locust pest," see Cleveland Abbe, in Am. Nat. xiv. pp. 735–738; interesting comparative tables, showing the effect of temperature on the hatching of the eggs, are given.

Acridium americanum in such numbers at Carbondale, Illinois, as to frighten horses; injury to orchards occasioned. C. Thomas, Am. Ent. iii. p. 250.

G. J. Bowles gives a popular account of migratory Locusts, in Canad. Ent. xii. pp. 130–134, figuring *Caloptenus femur-rubrum*.

Eggs of 'Locusts' in the Troad destroyed by the larva of some insect believed to be Coleopterous (subsequently proved to be Dipterous); Sir J. Lubbock, P. E. Soc. 1880, p. xxxiii.

Pachytylus cinerascens in Yorkshire; W. D. Roebuck, Naturalist, vi. pp. 42 & 43. The insects appeared in some numbers in 1880, and it is just possible that they breed in the county.

Stauronotus cruciatus, F.. destructive to olives in Andalusia; M. Girard, Bull. Soc. Ent. Fr. (5) x. p. xxviii.

Œdipoda. What is the type of the genus? C. Thomas, Canad. Ent. xii. p. 222.

Cephalocœma and *Proscopia*. Burmeister, Ah. Ges. Halle, xv. pp. 1–17, discusses the differentiating characters of these two genera, and unites certain described species as only sexes; thus *P. gigantea* = *oculata*, ♀, *hispida* = *brevirostris*, ♀, *punctata* = *acuminata*, ♀, *scabra* = *ruficornis*, ♀, *granulata* = *ophiopsis*, ♀.

Cratypedes putnami, Thomas, redescribed from fresh specimens; Thomas, 2nd Rep. U. S. Ent. Comm. p. 259 (*cf.* also Canad. Ent. xii. p. 223).

Scudder, Canad. Ent. xii., makes the following synonymical remarks: *Caloptenus turnbulli*, Thomas, = *Pezotettix plagosus*, Scudd., *C. junius*, Dodge, = *P. abditum*, Dodge, *P. flavo-annulatus*, Le Munyon, = *picta*, Thomas, *P. borealis*, Scudd., = *septentrionalis*, Sauss., *P. tellustris*, Scudd., = *dawsoni*, Scudd., *P. minutipennis*, Thomas, = *gracilis*, Bruner.

New genus :—

Bradynotes, Scudder, Canad. Ent. xii. p. 76. Allied to *Pezotettix*; remarkable for the form of the sternal surface of the thorax, the obsolescence of the prosternal spine, &c. Type, *Pezotettix obesa*, Thomas.

New species :—

Bradynotes opimus, Scudder, 2nd Rep. U. S. Ent. Comm. App. ii. p. 24, Sierra Nevada and Oregon.

Pezotettix pacificus, id. *l. c.* pl. xvii. fig. 16, California.

Gomphocerus shastanus, id. p. 25, pl. xvii. figs. 15 & 18, California.

Circotettix maculatus, id. p. 26, pl. xvii. fig. 10, Sierra Nevada.

Trimerotropis latifasciata, id. *ibid.*, Washington Territory and Utah, *similis*, p. 27, Washington Territory, *cæruleipes*, ibid., Oregon and California.

Psinidia wallula, id. *ibid.* pl. xvii. figs. 13 & 14, Washington Territory, California, and Oregon.

Œdipoda obliterata, Thomas, 2nd Rep. U. S. Ent. Comm. p. 257, California (*cf.* also Canad. Ent. xii. p. 222).

Eunapius stali, De Bormans, CR. Ent. Belg. xxii. p. clxvii., Portugal ?.

Cephalocœma lancea, Burmeister, *l. c.* p. 7, figs. 1 & 2, *costulata*, p. 9, figs. 3-7, *calamus*, p. 11, Argentine Republic.

RHYNCHOTA.

BY

W. F. Kirby, M.E.S., &c.

The General Subject.

Chicote, C. Adiciones à la Enumeracion de los Hemipteros observados en Espana y Portugal. An. Soc. Esp. ix. pp. 185–203.

Fritsch, F. Jährliche Periode der Insectenfauna von Österreich-Ungarn. v. Die Schnabelkerfe (*Rhynchota*). Denk. Ak. Wien, xlii. pp. 217–255, pls. iii.

The subject is treated in a similar way to previous papers by the same author on other Orders of insects.

Reiber, F., & Puton, A. Catalogue des Hémiptères-Homoptères (Cycadines et Psyllides) de l'Alsace et de la Lorraine, et Supplément au Catalogue des Hémiptères-Hétéroptères. Bull. Soc. Colmar.

[Not seen by the Recorder.]

Reuter, A. M. Nya bidrag till Åbo och Ålands skärgårds. Hemipter-Fauna. Medd. Soc. Fenn. v. pp. 161–236.

273 species enumerated, many new. Numerous observations on known species occur, which can only be occasionally referred to here.

Signoret, V. De quelques Genres nouveaux et espèces nouvelles de l'ordre des Hémiptères faisant partie de la collection du Musée Civique de Gênes. Ann. Mus. Genov. xv. pp. 531–545.

Stål, C. Sur les charactères distinctifs des Hétéroptères et des Homoptères. Sv. Ak. Handl. Bihang v. No. 11, pp. 5.

In the *Heteroptera*, the hinder portion of the head is prolonged into a neck of a variable length, though in *Notonecta* and *Corisa* this is so short as to allow of little or no separate motion. In the *Homoptera*, there is no neck, and the head is truncated behind, and closely affixed to the thorax, rarely possessing more than a vertical motion.

Captures of *Hemiptera* at Pitlochry, Perthshire; G. Norman, Ent. M. M. xvi. pp. 175, 213 & 214.

Captures of *Hemiptera* in France; Puton, Bull. Soc. Ent. Fr. (5) x. pp. vi. & vii.

Hemiptera new to Belgium; Lethierry, CR. Ent. Belg. xxiii. p. clxi.

Captures of *Rhynchota* at Dalarö, near Stockholm, in September, 1880, including several *Homoptera* new to Sweden; Reuter, Ent. Tidskr. i. pp. 201-208, 216 & 217.

HEMIPTERA-HETEROPTERA.

Reuter, O. M. Remarks on some British *Hemiptera-Heteroptera* (concluded). Ent. M. M. xvi. pp. 172–175, xvii. pp. 10–15.

Chiefly consists of critical notes on species mentioned by Douglas and Scott.

——. Finlands och den Skandinaviska Halföns *Hemiptera-Heteroptera*. Ent. Tidskr. i. pp. 113–145.

Includes tables of families and genera, and brief descriptions of species as far as the genus *Myrmus*. Nothing new is described.

Pentatomidæ.

Distant, W. L. Biologia Centrali-Americana. [*Cf.* General Subject, *sub* Godman & Salvin]. *Rhynchota*, pp. 1–88, pls. i.–viii.

Includes the Central American *Hemiptera-Heteroptera* from *Lobostoma* to *Edessa*. The following known species are figured; the synonymic notes are too numerous to quote:—*Cyrtonemus grossus*, Dall., fig. 14, *teter*, fig. 13, pl. ii., *mirabilis*, Perty, *Syllobus emarginatus*, Stål, fig. 6, *Æthus nitidulus*, Walk., fig. 3, pl. iii, *Rhytidoporus indentatus*, Uhler, fig. 9, *Stenocoris longulus*, Dall., fig. 10, pl. iv., *Pangæus margo*, Dall., fig. 15, *piceatus*, Stål, fig. 18, pl. ii., *P. fortis*, Walk., pl. iii. fig. 8, *P. discrepans*, Uhl., fig. 19, *Ectinopus holomelus*, Burm., *Microporus testudinatus*, Uhl., fig. 24, pl. ii., *Lobonotus anthracinus*, pl. iv. fig. 7, *Thyreocoris rostratus*, Stål, pl. iii. fig. 5, *T. guttiger*, Stål, fig. 16, *T. quadrisignatus*, fig. 17, pl. ii., *T. incertus*, Uhl., pl. iii. fig. 4, *Cyrtaspis atratula*, Stål, pl. iv. fig. 13, *Tetyra farcta*, Germ., pl. iii. fig. 1, *Pachycoris torridus*, Scop., pl. i. figs. 1–7 (varr.), *Orsilochus variabilis*, Herr.-Schäff. (with varr. *punctatissimus*, Dall., fig. 9, *marginellus*, Dall., and *complicatus*, Uhl., fig. 8, pl. i.), *O. sticticus*, Dall., fig. 1, *scurrilis*, Stål, fig. 23, *Dystus puberulus*, Stål, fig. 2, *Homœmus proteus*, Stål, figs. 3 & 4, *Sphyrocoris punctellus*, Stål, fig. 5, pl. ii., *Symphylus deplanatus*, Herr.-Schäff., pl. i. figs. 12 & 13, *S. plagiatus*, Walk., fig. 7, *Camirus mœstus*, Stål, fig. 11, *socius*, Stål, fig. 10, pl. ii., *Augocoris ehrenbergi*, Germ., pl. i. figs. 10 & 11, *Stiretrus crucifer*, Stål, fig. 9, *cæruleus*, Dall., fig. 10, *ruficeps*, Dall., fig. 12, *flavipes*, Stål, fig. 11, pl. iii., *anchorago*, Fabr., figs. 14 & 15, *Hoplomus dichrous*, Herr.-Schäff., fig. 16, pl. i., *tripustulatus*, Fabr., fig. 16, pl. iv., *nigripennis*, Dall., pl. iii. figs. 13 & 14, pl. iv. fig. 19, *rutilus*, Dall., pl. iii. fig. 20, pl. iv. fig. 18, *ventralis*, Dall., pl. iii. fig. 18, *mundus*, Stål, pl. iv. fig. 17, *mutabilis*, Stål, pl. iii. figs. 16 & 19, *proteus*, Stål, pl. i. fig. 17, pl. iii. figs. 15 & 17, *Heteroscelis lepidus*, Stål, pl. iii. fig. 21, *Perillus confluens*, Herr.-Schäff., pl. i. fig. 18, *virgatus*,

Stål, pl. iii. fig. 22, *circumcinctus*, Stål, pl. iv. fig. 6, *Corynorrhaphis cruciata*, Stål, pl. ii. fig. 20, *Audinetia spinidens*, Fabr., *Mutyca grandis*, Stål, pl. iv. fig. 12, *Podisus lineolatus*, Herr.-Schäff., pl. i. fig. 10, *marginiventris*, Stål, pl. iv. fig. 24, *tinctus*, Dall., pl. iii. fig. 23, *sagitta*, Fabr., pl. i. fig. 22, *fuscescens*, Dall., fig. 20, *modestus*, Dall., fig. 4, pl. iv. *congrex*, Stål, pl. i. fig. 20, *invaria*, Walk., fig. 20, *iole*, Stål, fig. 1, *thetis*, Stål, fig. 2, pl. iv., *acutissimus*, Stål, fig. 22, *Podisus clœlia*, Stål, fig. 21, pl. ii., *Euthyrrhynchus floridanus*, Linn., pl. i. fig. 21, *Tynacantha pulchricornis*, Stål, fig. 3, *Dryptocephala obtusiceps*, Stål, fig. 23, *Discocephala humilis*, Herr.-Schäff., fig. 22, pl. iv., *clypeata*, Stål, pl. vi. fig. 1, *notulata*, Stål, fig. 1, *marginella*, Stål, fig. 2, *Dinocoris tripterus*, Fabr., fig. 3, *piceus*, Beauv., fig. 4, pl. v., *obscurus*, Dall, pl. vi. fig. 3, *Pelidnocoris stæli*, Hagl., pl. vii. fig. 2, *Empicoris ramosa*, Walk., pl. vi. fig. 4, *Macropygium reticulare*, Fabr., fig. 5, *Melanodermus tartareus*, fig. 6, pl. v., *Brochymena obscura*, Herr.-Schäff., pl. vi. fig. 5, *hædula*, Stål, fig. 7, *Cosmopepla conspicillaris*, Dall., fig. 8, *Mormidea collaris*, Dall., fig. 9, pl. v., *hypsilon*, Linn., var. *inermis*, Dall., pl. vi. fig. 7, *angustata*, Stål, fig. 10, *pictiventris*, Stål, fig. 11, *notulata*, Herr.-Schäff., fig. 12, pl. v., *tetra*, Walk., pl. vi. fig. 6. *Sibaria armata*, Dall., fig. 17, *Galedanta myops*, Fabr., fig. 13, *Euschistus verrucifer*, Stål, fig. 14, *tristigmus*, Say, figs. 20 & 21, pl. v., *rugifer*, Stål, figs. 8 & 9, *spurculus*, Stål, fig. 10, *comptus*, Walk., fig. 11, *lineatus*, Walk., fig. 12, pl. vi., *biformis* and *strenuus*, Stål, pl. v. figs. 15 & 16, *integer*, Stål, pl. vii. fig. 5, *Berecynthus delirator*, Fabr., var., fig. 14, *Padæus trivittatus*, Herr.-Schäff., fig. 16, pl. vi., *Proxys victor*, Fabr., pl. v., fig. 18, *Hymenarcys reticulata*, Stål, fig. 17, *Chlorochroa uhleri*, Stål, fig. 18, *Trichopepla semivittata*, Say, fig. 15, *Peribalus limbolarius*, Stål, fig. 19, pl. vi., *Thyanta tæniola*, pl. vii. fig. 4, *casta*, Stål, fig. 19, *Chlorocoris atrispinus*, Stål, fig. 22, *rufispinus*, Dall., fig. 23, pl. v., *rubescens*, Walk., fig. 20, *subrugosus*, Stål, fig. 21, *Loxa affinis*, Dall., fig. 22, pl. vi., *Murgantia munda*, Dall., fig. 20, *histrionica*, Hahn, fig. 21, *Arocera melanopyga*, Stål, fig. 11, *apta*, Walk., fig. 12, *splendens*, Walk., figs. 13 & 14, *rufo-notata*, Stål, fig. 15, pl. vii., *Pharypia nitidiventris*, Stål, and *fasciata*, Hagl., pl. vi. figs. 24 & 25, *Nezara stictica*, Dall., fig. 22, *marginata*, Beauv., fig. 23, *Banasa varians*, fig. 7, *imbuta*, Walk., fig. 10, *Piezodorus guildingi*, Hope, fig. 6, *Phineus fusco-punctatus*, Stål, fig. 8, *Taurocerus achilles*, Stål, fig. 24, *edessoides*, Spin., fig. 15, pl. vii., *abrupta*, Walk., fig. 1, *Brachystethus vicinus*, Sign., fig. 4, *rubro-maculatus*, Dall, var., fig. 6, *Peromatus notatus*, Burm.., fig. 8, *Edessa laticornis*, Stål, fig. 9, *costalis*, Stål, fig. 10, *taurina*, Stål, fig. 11, *hadina*, Stål, fig. 15, *pigata*, Hope, fig. 13, *ventralis*, Walk., fig. 12, *olivacea*, Stål, fig. 14, and *nigricornis*, Stål, fig. 16, pl. viii.

Characters of the *Sehirides* noticed; Signoret, Bull. Soc. Ent. Fr. (5) x. pp. cxxxvi. & cxxxvii.

Distant describes *Hoplomus marginalis*, Hope, var. from Obydos, and *Podisus œnescens*, Stål, var. from Ega, and notices *Edessa inclyta*, Walk., and *Plisthenes dilatatus*, Montr.; the differences between the last and *P. merianæ*, Fabr., are also pointed out; Tr. E. Soc. 1880, pp. 148–151.

Acanthosoma. Table of Russian species; Jakovleff, Bull. Mosc. lv. pp. 386 & 387.

Scaptocoris, Perty. Tarsi and antennæ noticed; Signoret, *l. c.* p. cxliii.

Sehirus luctuosus, M. & R., = *morio*, Fall., Sahlb., *nec* Linn.; Reuter, Medd. Soc. Fenn. v. p. 161.

Halyomorpha viridescens, Walk., variation noticed; *Dalpada remota*, Walk., = *H. picus*, Fabr.: Distant, Ent. M. M. xvi. p. 201.

Macrina dilatata and *Bathycœlia distincta*, Dist., figured; Waterhouse, Aid to Identif. of Ins., pls. vi. & vii.

New genera and species :—

Melanodema, Jakovleff, Troudy Ent. Ross. xi. p. 205. Allied to *Eurygaster*; type, *M. carbonarium*, sp. n., *l. c.* p. 206, Shahku.

Cnephosa, id. *l. c.* p. 210. Placed next to *Staria*; type, *C. flavo-marginata*, sp. n., *l. c.* p. 211, Shahku, Persia.

Macrymenus, Signoret, Bull. Soc. Ent. Fr. (5) x. p. xvii. (*Cydnidæ*). Type, *M. membranaceus*, sp. n., *l. c.* p. xviii., Australia.

Peltoxys, id. *l. c.* p. xxxiii. (*Cydnidæ*). Type, *P. pubescens*, sp. n., *l. c.* p. xxxiv., Saigon (= *brevipennis*, Fabr., wrongly referred to the genus *Legnotus*, Schiödte, by Stål); *id. l. c.* p. cxxxvi.

Stenocoris, id. *l. c.* p. xliv. (*Cydnidæ*). Type, *Æthus longulus*, Dall.

Pachymeroides, id. *l. c.* p. vii. Allied to *Amnestus*; type, *P. bolivari*, sp. n., *l. c.*, Ecuador.

Amnestoides, id. *l. c.* p. viii. Allied to *Amnestus*; type, *A. ritsemæ*, sp. n., *l. c.*, Java.

Aspideurus, id. Ann. Mus. Genov. xv. p. 535. Allied to *Euryaspis* and *Flaminia*, but with no carina or sternal plate; types, *A. quadrimaculatus*, New Guinea, and *variegatus*, Celebes, spp. nn., *l. c.* pp. 535 & 536.

Lobothyreus obscurus, Distant, Tr. E. Soc. 1880, p. 147, pl. v. figs. 1 & 1 *a*, Peru.

Palomena amplificata, Shantung, N. China, and *spinosa*, Sind, *id. l. c.* pp. 148 & 149, pl. v. figs. 2 & 3.

Caura excelsa and *marginata*, id. *l. c.* pp. 149 & 150, pl. v. figs. 4 & 5, Calabar.

Oncoscelis antennatus, id. *l. c.* p. 150, pl. v. fig. 6, Torres Straits.

Coptosoma capitatum, Jakovleff, Troudy Ent. Ross. xi. p. 200, Amur, Wladiwostok.

Phimodera oculata, Mangishlak, and *distincta*, Astracan; *id. l. c.* pp. 202 & 204.

Triyonosoma modestum, id. *l. c.* p. 207, Shahrud, Persia.

Staria obscura, id. *l. c.* p. 208, Shahku, Persia.

Picromerus angusticeps, id. *l. c.* p. 212, Amur; *P. vicinus*, Signoret, Bull. Soc. Ent. Fr. (5) x. p. xxxiv., Pekin.

Tropidocoris davidi, id. *l. c.* p. xxxv., China.

Spudœus doriæ, id. Ann. Mus. Genov. xv. p. 533, New Guinea, Salwatty.

Œstopis (?) *acuta*, id. *l. c.* p. 534, Persia.

Scotinophora scutellata, Scott, Tr. E. Soc. 1880, p. 307, Japan.

Asopus japonensis, id. *l. c.* p. 308, Japan.

Æthus pallidilarsus, id. *l. c.* p. 309, Japan.

Alcimus japonensis, id. *l. c.* p. 310, Japan.

Cyrtochilus persicus and *fuscus*, Jakovleff, Bull. Mosc. lv. pp. 163 & 165, Persia.

Acanthosoma labiduroides, Amur, Wladiwostok, p. 387, *crassicaudum*, p. 390, *forficula*, Wladiwostok, p. 392, *denticaudum*, p. 394, *spinicollis*, p. 396, and *angulatum*, Amur, p. 397, *id. l. c.*

Gynenica affinis, Distant, Ent. M. M. xvi. p. 202, Bombay, Calcutta.

Cyrtomenus excavatus, id. Biol. Centr. Am. *Rhynch.* p. 2, pl. ii. fig. 12, Costa Rica.

Pangæus impuncticollis, id. *l. c.* p. 7, pl. iii. fig. 7, Mexico, Panama.

Microporus mexicanus, id. *l. c.* p. 8, pl. iv. fig. 8, Mexico.

Thyreocoris championi, id. *l. c.* p. 11, pl. ii. fig. 25, British Honduras, Guatemala.

Sphyrocoris elongatus, id. *l. c.* p. 21, pl. ii. fig. 6, Mexico.

Symphylus modestus, Guatemala, fig. 8, p. 22, *signoreti*, fig. 9, pl. ii. and *gibbosus*, Mexico, pl. iii. fig. 2, p. 23, *id. l. c.*

Hoplomus distinctus, id. *l. c.* p. 30, pl. iv. fig. 11, Mexico.

Podisus affinis (= *fuscescens*, Stål, *nec* Dall.), pl. iii. fig. 24, Mexico, Guatemala, Colombia; *P. mexicanus*, fig. 5, p. 38, Mexico, *nigriventris*, fig. 14, *insignis*, fig. 15, pl. iv. p. 39, Guatemala, *rubro-maculatus*, p. 41, pl. vii. fig. 1, Mexico, *id. l. c.*

Eurystethus signoreti, id. *l. c.* p. 47, pl. vi. fig. 13, Panama.

Macropygium parvum, id. *l. c.* p. 50, pl. vi. fig. 2, Panama.

Mormidea lævigata, id. *l. c.* p. 55, pl. vii. fig. 3, Mexico.

Chlorocoris aberrans, Costa Rica, pl. v. fig. 24, *championi*, Guatemala, pl. vi. fig. 23, *irroratus*, Mexico, pl. vii. fig. 16, p. 69, *id. l. c.*

Loxa variegata, id. *l. c.* p. 71, pl. v. fig. 25, Costa Rica.

Arocera protea, fig. 18, p. 73, Guatemala, *affinis*, Mexico, Nicaragua, Guatemala, fig. 19, and *patibulata*, fig. 17, Costa Rica, p. 74, *id. l. c.* pl. vii.

Banasa stæli, id. *l. c.* p. 80, pl. viii. fig. 3, Costa Rica.

Phalœcus decoratus, id. *l. c.* p. 83, pl. vii. fig. 9, British Honduras, Guatemala.

Bothrocoris fusco-punctatus, id. *l. c.* p. 84, pl. viii. fig. 5, Panama, Guiana.

Peromatus truncatus, id. *l. c.* p. 86, pl. x. fig. 1, Mexico.

COREIDÆ.

Coreus tristis noticed and figured; Rep. E. Soc. Ont. 1878, pp. 30 & 31, fig. 10.

Priocnemicoris albithorax, Boisd. (= *flaviceps*, Guér., = *refulgens*, Costa), redescribed; Signoret, Ann. Mus. Genov. xv. p. 537.

Agraphopus ornatulus, sp. n., Jakovleff, Troudy Ent. Ross. xi. p. 213, Petrovsk, Caucasus.

Stenocephalus orientalis, sp. n., Distant, Ent. M. M. xvi. p. 202, Bombay, Madras.

Lygæidæ.

Thomas, C. The Chinch Bug: its history, character, and habits, and the means of destroying it or counteracting its injuries. Bull. U. S. Ent. Comm. No. 5, pp. 44, map; Am. Ent. iii. pp. 46, 47, 85, 86, & 240–242, woodcuts.

Relates to *Blissus leucopterus*, Say.

Plinthisus convexus, Fieb. (= *hungaricus*, Horv.), and *Blissus doriæ*, Ferr. Macropterous form, &c., described: K. Sajó, Ent. Nachr. vi. pp. 141, 142, & 235–240; Douglas, Ent. M. M. xvii. pp. 164 & 165.

Cymus glandicolor, Hahn, = *claviculus*, Fall., and *Pterotmetus menetriesi*, Kirsch, = *micropterum*, Curt.; Reuter, Medd. Soc. Fenn. v. p. 164.

Pachymerus. This generic name cannot be used in *Hemiptera*, having been previously employed in *Coleoptera*; Douglas, Ent. M. M xvi. p. 260, *cf.* also *op. cit.* xvii. pp. 46 & 47, and Puton, Bull. Soc. Ent. Fr. (5) x. pp. lviii. & lix.

Scolopostethus ericetorum, Leth., discussed; Reuter & Douglas, Ent. M. M. xvii. pp. 10 & 11, & note.

Gastrodes abietis, Linn. Habits, &c., noticed; Reuter, Ent. Tidskr. i. pp. 185–188 & 213.

Pamera picta, sp. n., Scott, Tr. E. Soc. 1880, p. 311, Japan, China.

Culocoris tricolor, sp. n., *id. l. c.* p. 313, Japan.

Tropidostethus flavicornis, sp. n., Signoret, Ann. Mus. Genov. xv. p. 538, Celebes.

Geocoris (*Ophthalmicus*) *annulicornis*, sp. n., *id. l. c.* p. 539, New Guinea.

Pyrrhocoridæ.

Pyrrhocoris sordidus, Persia, and *dispar*, Japan, spp. nn., Jakovleff, Bull. Mosc. lv. pp. 160 & 161.

Piezodera leprieuri, sp. n., Signoret, Bull. Soc. Ent. Fr. (5) x. p. cxxxv., Egypt.

Ectatops nigro-scutellatus, sp. n., *id.* Ann. Mus. Genov. xv. p. 539, New Guinea.

Tingididæ.

Acalypta gracilis, Fieb. Macropterous form described; Reuter, Medd. Soc. Fenn. v. p. 165.

Orthostira acutangula and *paradoxa*, spp. nn., Jakovleff, Bull. Mosc. lv. pp. 127 & 128, Sarepta.

Galeatus brevispinus, Sarepta, p. 131, *komaroffi*, Derbent, p. 133, and *decorus*, Saratov, p. 134, spp. nn., *id. l. c.*

Monanthia (*Tropidochila*) *caucasica*, Derbent, p. 137, *M.* (*T.*) *tenuicornis*, Sarepta, p. 138, *M.* (*Physatochila*) *distinguenda*, Sarepta, p. 139, and *M.* (*Catoplatys*) *dilatata*, Derbent, p. 140, spp. nn., *id. l. c.*

Leptodictya (?) *lewisi*, sp. n., Scott, Tr. E. Soc. 1880, p. 314, Japan.

ARADIDÆ.

Acorium, g. n., Signoret, Ann. Mus. Genov. xv. p. 540. Allied to *Aneurus*, but 4th joint of antennæ much shorter than 3rd. Type, *A. griseolum*, sp. n., *l. c.* p. 541, New Guinea.

Aradus spinicollis and *melas*, spp. nn., Jakovleff, Bull. Mosc. lv. pp. 166 & 168, Wladiwostok.

Aneurus macrotylus, sp. n., *id. l. c.* p. 169, Wladiwostok.

Mezira setosa, sp. n., *id. l. c.* p. 171, Wladiwostok.

Cinyphus furcatus, sp. n., Signoret, *l. c.* p. 541, New Guinea.

Neuroctenus vicinus, sp. n., *id. l. c.* p. 542, New Guinea.

CAPSIDÆ.

Reuter (Medd. Soc. Fenn. v. pp. 167–182) redescribes or notices the following known species:—*Leptopterna ferrugata*, Fall., brachypterous ♂; *Phytocoris dimidiatus*, Kirschb.; *Calocoris bifasciatus*, Hahn, *nec* Fabr., = *variegatus*, Reut., *nec* Costa, = *biclavatus*, Herr.-Schäff.; *Halticus pusillus*, Herr.-Schäff. (= *intricatus*, Fieb.), compared with *apterus*, L.; *Cyllocoris flavo-notatus*, Boh., = *flavo-quadrimaculatus*, De Geer; *Globiceps selectus*, Fieb., var. from Finland; *Chlamydatus flaveolatus*, Reut. (= *insignis*, Reut.), macropterous form; *Lygus flavinervis*, Kirschb., ? = *icterocephalus*, Hahn. *Psallus*: table of species; *Atractotomus debilicornis*, Reut., = *kolenatii*, Flor, *P. intermedius*, Sahlb., = *æthiops*, Zett.; *P. salicis*, Reut., = *lepidus*, Fieb., var.

Lygus atomarius, Meyer, recorded as new to Britain, and redescribed; J. Edwards, Ent. M. M. xvii. p. 150.

Charagochilus gyllenhali. Macropterous form noticed; Douglas, *op. cit.* p. 164.

Orthotylus. Reuter gives a table of 5 British species:—*striicornis*, *viridinervis*, and *diaphanus*, Kirschb., *prasinus*, Fall., and *scotti*, Reut.; *op. cit.* pp. 11 & 12.

Globiceps selectus, Fieb. (= *flavo-maculatus*, Fall., Sahlb., Reut.), *flavo-maculatus*, Fabr. (Fieb., Dougl., & Scott ?, = *fulvipes*, Saund. ?, = *cruciatus*, Reut.), and *salicicola*, Reut. (new name for *fulvipes*, Reut., *nec* Scop., *nec* Saund., = *flavo-maculatus* var. 1, Sahlb.), redescribed; *id. l. c.* pp. 12 & 13.

Allwonotus distinguendus, Herr.-Schäff., = *fulvipes*, Scop.; *id. l. c.* p. 14.

Macrocoleus signoreti, Reuter, and var., redescribed by him; An. Soc. Esp. ix. pp. 194 & 195.

Labops rugicollis, Jak., noticed; Chicote, *op. cit.* p. 191.

Allocotus, Mayr, recharacterized; Signoret, Ann. Mus. Genov. xv. p. 531.

New species:—

Trigonotylus brevipes, Jakovleff, Troudy Ent. Ross. xi. p. 215, Astracan.

Anoterops pennicornis, id. *l. c.* p. 216, Sarepta.

Globiceps salicicola (= *fulvipes*, Reut., *nec* Scop., = *flavo-maculatus*, Sahlb., var. 1), Reuter, Medd. Soc. Fenn. v. p. 171, Scandinavia and Finland.

Orthotylus parvulus, Jakovleff, Bull. Mosc. lv. p. 142, Astracan.

Campylomma viridula, id. *l. c.* p. 143, Astracan, Sarepta.

Macrocoleus tibialis, id. Troudy Ent. Ross. xi. p. 217, Sarepta.

Plagiognathus rutinervis, id. *l. c.* p. 218, Sarepta ; *P. olivaceus*, Reuter, An. Soc. Esp. ix. p. 193, Sierra Nevada, &c.

Macrotylus colon, id. *l. c.* p. 194, Granada.

Psallus bicolor, Jakovleff, *l. c.* p. 219, Sarepta.

Ischnocoris intermedius, Horváth, Bull. Soc. Ent. Fr. (5) x. p. lxiii., Belgium, N. Germany.

Allocotus mayri, Signoret, Ann. Mus. Genov. xv. p. 532, New Guinea.

Anthocoridæ.

Anthocoris nemorum said to be injurious to hops; McLachlan, P. E. Soc. 1880, pp. xxix. & xxx. *A. pratensis*, Hahn, redescribed ; Reuter, Medd. Soc. Fenn. v. p. 183.

Saldidæ.

Acanthia and *Salda*, Fabr. Use of these names discussed; Reuter, Ent. M. M. xvi. pp. 172 & 173, & xvii. p. 14.

Salda. On the distribution of Arctic species; Sahlberg, Ent. Tidskr. i. pp. 167 & 168. *Salda* discussed, and the species allied to *S. pallipes*, Fabr., tabulated; Reuter, Medd. Soc. Fenn. v. pp. 184-187. *S. vestita*, Dougl. & Scott, is the macropterous form of *S. stellata*, Curt. (= *c-album*, Fieb.); *id.* Ent. M. M. xvi. pp. 173 & 174, & xvii. p. 14.

Nabidæ.

The name *Coriscus*, Schrank, should be substituted for *Nabis*, Fabr.; *C.* (*N.*) *poweri*, Saund., = *lineatus*, Dahlb.; *C. major*, Costa, is distinct from *boops*, Schiödte: Reuter, Ent. M. M. xvi. pp. 174 & 175. *Coriscus* discussed, and the species allied to *C. ferus*, L., tabulated; Reuter, Medd. Soc. Fenn. v. pp. 187–190.

Prostemma guttula, F., and *æneicolle*, Stein, noticed; Letzner, JB. schles. Ges. lvii. p. 358.

Dacnister, g. n., Scott, Tr. E. Soc. 1880, p. 315. Allied to *Metastemma* and *Allœorrhyncus* ; type, *D. flavescens*, sp. n., *l. c.* p. 316, Nagasaki.

Nabis reuterianus, sp. n., Puton, Bull. Soc. Ent. Fr. (5) x. p. xliii., Montpellier, &c.

Allœorrhynchus parvulus, sp. n., Signoret, Ann. Mus. Genov. xv. p. 540, Celebes.

Reduviidæ.

Tiarodes meldolæ, sp. n., Distant, Tr. E. Soc. 1880, p. 152, Port Blair, Andaman Isles.

Durganda nigripes, sp. n., Signoret, Ann. Mus. Genov. xv. p. 543, New Guinea.

Velitra marginata, sp. n., *id. l. c.* p. 544, New Guinea.

Hydrometridæ.

Aepophilus bonnairii, Signoret. Genus and species recharacterized and figured by him; Tijdschr. Ent. xxiii. pp. 1–3, pl. i. figs. 1–9.

Gerris thoracica var. *fuscinotum* from Finland described, and the Finnish species of the subgenus *Limnotrechus*, Stål, tabulated; Reuter, Medd. Soc. Fenn. v. pp. 191 & 192.

Mesovelia parra, Sahlb., = *furcata*, M. & R.; *id. l. c.* p. 166.

Nepidæ.

Ranatra vicina, sp. n., Signoret, Bull. Soc. Ent. Fr. (5) x. p. cxxxv., Egypt.

Notonectidæ.

Ploa letourneuxi, sp. n., Signoret, Bull. Soc. Ent. Fr. (5) x. p. xxxiv., Alexandria.

Corisidæ.

Corisa præusta, Fieb., var. *producta* from Finland described; Reuter, Medd. Soc. Fenn. v. p. 193.

HEMIPTERA-HOMOPTERA.

Mayr, P. M. *Rhynchota* Tirolensia. II. *Hemiptera-Homoptera* (Cicadinen). Ber. Ver. Innsbr. x. pp. 79–101.

A local list, with localities.

Thomas, C. Eighth Report of the State Entomologist on the Noxious and Beneficial Insects of the State of Illinois. Springfield: 1879, 8vo, pp. x. & 212, woodcuts.

This volume is entirely devoted to the *Psyllidæ* and *Aphididæ* of the United States, of which a full account is given, many species of the latter being described as new. Their insect enemies are also noticed, many *Coccinellidæ*, &c., being described and figured. A Supplement contains copious extracts from Riley's & Monell's papers on the subject [*cf.* Zool. Rec. xvi. *Ins.* pp. 247 & 248].

Cicadidæ.

Rossi, A. Sul modo di terminare dei nervi nei muscoli dell' organo sonoro della *Cicada*. Rend. Acc. Bologn. 1879–80, pp. 119 & 120.

Cicada septemdecim noticed and figured; Riley, Am. Ent. iii. pp. 25–30 (map), 172 & 173, fig. 76.

Tibicina quadrisignata, Hag., and *picta*, Ger., noticed; Chicote, An. Soc. Esp. ix. pp. 198 & 199.

Cercopidæ.

Ptyelus goudoti. Variation in the imago, and the frothy secretion of the larva noticed; Distant, P. E. Soc. 1880, pp. xi. & xii., woodcut.

Philænus exclamationis, Thunb., var. *aterrima* from Finland described; Reuter, Medd. Soc. Fenn. v. pp. 202 & 203.

Fulgoridæ.

Reuter (Medd. Soc. Fenn. v. pp. 194–202) notices or redescribes the following known species :—*Cixius stigmaticus*, Germ. (= *distinguendus*, Sahlb.), var. *albipennis* from Finland described; *Oliarus pallidus*, Herr.-Schäff., Fieb., = *leporinus*, L.; *Delphax minki*, Fieb., = *Arcopus pulchellus*, Curt.; *D. bivittata* and *raniceps*, Boh., are nymphs of *Stenocarenus guttula*, Germ., and *S. pallidulus*, Boh., respectively; *Liburnia distinguenda*, Sahlb., *nec* Kirschb., = *albo-striata*, Mey.; *pellucida*, Fabr., varieties described; *fairmairii*, Perr. (= *neglecta*, Flor), redescribed; *lugubrina*, Boh., varieties described, and *exigua*, Boh., ♀ described.

Hysteropterum apterum destructive to vines in the Department of the Gironde; Blanchard, C. R. xc. pp. 1103 & 1104.

Liburnia pargasensis and *litoralis*, spp. nn., Reuter, Medd. Soc. Fenn. v. pp. 197 & 198, Finland.

Meyamelas brevifrons, sp. n., *id. l. c.* p. 235, Finland.

Fulgora andamanensis, sp. n., Distant, Tr. E. Soc. 1880, p. 152, pl. v. figs. 7 & 7 *a*, Andaman Isles.

Flata (*Colobesthes*) *pryeri*, id. *l. c.* p. 153, Borneo, Penang.

Membracidæ.

Encophyllum binotatum, Say, noticed; Am. Ent. iii. p. 154.

Iassidæ.

Signoret, V. Essai sur les *Jassides*, Stål, Fieb., et plus particulièrement sur les Acocéphalides, Puton. Suite et fin. Ann. Soc. Ent. Fr. (5) x. pp. 41–70, 189–212, 347–366, pls. i., ii., vi., vii., ix., & x.

Includes descriptions of a considerable number of new genera and species.

Reuter (Medd. Soc. Fenn. v. pp. 203–207) makes the following synonymic notes: *Idiocerus falciger*, Boh., = *pœcilus*, Herr.-Schäff.; *Bythoscopus alni*, Boh., = *reticulatus*, Curt.; *Pediopsis brevicauda*, Thoms., = *rufusculus*, Fieb.; *Strongylocephalus agrestis*, Sahlb., = *meyerlii* (Fieb.), Scott; *striatus*, Fabr., Sahlb., = *nervosus*, Schrank; and *A. rivularis*, Germ., = *flavo-strigatus*, Don., Sign.

Pediopsis nassatus, Germ., and *fuscinervis*, Boh., ♀ ♀ contrasted; *id. l. c.* pp. 204–206.

Athysanus discussed and tabulated; *id. l. c.* pp. 208–228. The following new observations and synonyms occur: *A. paludosus*, Boh., and *grisescens*, Zett., varr. described; *A. confusus*, Kirschb., *nec* Sahlb., =

sordidus, Zett.; *A. stictopterus*, Sahlb., *nec* Flor, = *distinguendus*, Kirschb.; *Thamnotettix plebeius*, Sahlb., *nec* Flor, Kirschb., = *A. schencki*, Kirschb.; *T. simplex*, var. b, Sahlb., = *A. tinctus*, Zett.

Typhlocyba ericetorum, Sahlb., = *Zygina rubro-vittata*, Leth.; *Z. tiliæ*, Fall., redescribed; *id. l. c.* p. 230. *T. diminuta*, Kirschb., = *quadrisignata*, Hardy, = *vittata*, L.; Vollenhoven, Tijdschr. Ent. xxiii. pp. cv. & cvi.

Eupteryx stachydearum, Hardy, on tansy; Douglas, Ent. M. M. xvii. p. 89.

Penthemia atra, Fab., attacking vines in the Gironde; Lichtenstein, Le Nat. ii. p. 206.

New genera and species :—

Reuteria ‖, Signoret, Ann. Soc. Ent. Fr. (5) ix. p. 45. Allied to *Glossocratus*; clypeus spatuliform, clavus with transverse nervures; prothorax wider behind than before. Type, *R. flavescens*, sp. n., *l. c.* p. 46, pl. i. fig. 40, Tasmania. (Name changed to *Reuteriella*, p. 385.)

Ectomops, id. *l. c.* p. 49. Allied to *Psegmatus*; vertical hollow with no central carina; ocellus so close to the eye, as almost to appear to rest upon it. Type, *E. chinensis*, sp. n., *l. c.* p. 50, pl. i. fig. 42 (possibly = *Ledra guttata*, Walk.).

Chelusa, id. *l. c.* p. 51. Allied to *Ectomops*, but with 5 discoidal cellules, and the eye not excavated to receive the ocellus. Type, *Acocephalus madagascariensis*, Sign. (redescribed and figured, *l. c.* pl. i. fig. 43).

Thomsoniella, id. *l. c.* p. 52. Allied to *Hecalus*, but with 6 discoidal cellules. Type, *H. kirchbaumi*, Stål (redescribed and figured, *l. c.* pl. i. fig. 44).

Distantia, id. *l. c.* p. 65. Allied to *Selenocephalus*; sides of the head with several furrows, and marginal space with oblique transverse nervures, directed inwards. Type, *D. frontalis*, sp. n., *l. c.* p. 66, pl. ii. fig. 53, Port Natal.

Fieberiella, id. *l. c.* p. 67. Allied to *Selenocephalus*, but wants the furrow behind the head; type, *S. flori*, Stål (redescribed and figured, *l. c.* p. 67, pl. ii. fig. 54).

Cœlidioides, id. *l. c.* p. 205. Allied to *Tartessus*, *Tylissus*, and *Cœlidia*; type, *C. carinatum*, sp. n., *l. c.* p. 206, pl. vii. fig. 70, Madagascar.

Macroceps, id. *l. c.* p. 363. Placed after *Tartessus*; type, *M. fasciatus*, sp. n., *l. c.* p. 364, pl. xi. fig. 89, Australia.

Tettigonia assamensis, Distant, Ent. M. M. xvi. p. 203, Assam.

Dorydium (?) *foveolatum*, Signoret, Ann. Soc. Ent. Fr. (5) x. p. 44, pl. i. fig. 39, W. Australia.

Phlepsius obsoletus (Fieb., MS.), p. 194, pl. vi. fig. 60, Sarepta, Caucasus, *laccrdæ*, p. 69, pl. ii. fig. 55, Bahia, *id. l. c.*

Stegelytra bolivari, id. *l. c.* p. 203, pl. vii. fig. 67, Spain.

Dabrescus nervoso-punctatus and *angulatus*, id. *l. c.* pp. 209 & 210, pl. vii. figs. 72 & 73, N. India.

Tartessus subniger, fig. 75, p. 350, *sahlbergi*, Australia, fig. 76, p. 351, *stæli*, fig. 77, p. 352, pl. ix., and *reuteri*, New Caledonia, pl. x. fig. 86, p. 361; *id. l. c.*

Athysanus sahlbergi (♂ ♀ = *æmulans* and *confusus*, Sahlb., *nec* Kirschb.), p. 220, *confinis*, p. 222, *fraterculus*, p. 223, *domino*, p. 226, and *prominulus*, p. 228; Reuter, Medd. Soc. Fenn. v., Finland.

Notus (*Erythria*) *montandoni*, Puton, Bull. Soc. Ent. Fr. (5) x. p. lxxx., Carpathians.

Diedrocephala flaviceps, Riley, Am. Ent. iii. p. 18, Texas.

Cicadula exitiosa, Uhler, Am. Ent. iii. p. 72, United States.

Psyllidæ.

Löw, F. Turkestanische Psylloden. Verh. z.-b. Wien, xxx. pp. 251-266, pl. vi.

Fedtschenko's collection only contained 10 species, 8 new. The other 2 were *Psylla glycirrhizæ*, Becker (redescribed and figured, p. 262, figs. 8 *a* & *b*), and *Bactericera perrisi*, Put. (p. 264, figs. 9 *a* & *b*).

Psylla cratægicola, Flor, = *peregrina*, Först.; *P. cratægicola*, Först., = *mali*, Schmidb.; *M. saliceti*, Flor, *nec* Först., = *parvipennis*, Löw; *P. sylvicola*, Leth., = *hartigi*, Flor; Reuter, Medd. Soc. Fenn. v. pp. 232 & 233. *P. peregrina*, Först., nymph and imago described; Scott, Ent. M. M. xvii. pp. 65 & 66.

Arytæna genistæ, Latr. Nymph described; *id. l. c.* pp. 132 & 133.

New species:—

Rhinocola fedtschenkoi, figs. 1 *a* & *b*, and *turkestanica*, figs. 2 *a* & *b*, Löw, Verh. z.-b. Wien, xxx. pp. 252 & 253, pl. vi., Turkistan.

Aphalara lurida, Caucasus, p. 250, *unicolor*, Sarepta, and *bicolor*, Astracan, p. 251, Scott, Ent. M. M. xvi.; *A. signata*, figs. 3 *a* & *b*, and *maculosa*, figs. 4 *a* & *b*, Löw, *l. c.* pp. 254 & 256, pl. vi., Turkistan.

Diaphorina propinqua, id. *l. c.* p. 257, pl. vi. figs. 5 *a* & *b*, Turkistan.

Psylla fasciata, figs. 6 *a* & *b*, and *reuteri*, figs. 7 *a* & *b*, *id. l. c.* pp. 259 & 261, pl. vi., Turkistan.

Trioza elæagni, Scott, *l. c.* p. 252, Petrowsk, Caucasus; *T. furcata*, Löw, *l. c.* p. 265, pl. vi. figs. 10 *a* & *b*, Turkistan.

Aphididæ.

Cabelló e Ibañez, L. La Verité sur le *Phylloxera vastatrix*. Barcelona: 1879, 8vo, pp. 50.

Cornu, M. The *Phylloxera* in France. Nature, xxiii. pp. 127–130, maps. (*Cf.* also pp. 147 & 148).

A good sketch of the measures now adapted to check its ravages.

Gennadius, P. Περι κοκκοειδῶν (ψωριασεων τῶν φυτων). Athens: 1880, 12mo, fig.

——. Φυλλόξηρα ἡ φθοροποιος. Athens: 1880, 12mo, fig.

[Not seen by the Recorder.]

Kessler, H. F. Neue Beobachtungen und Entdeckungen an den auf *Ulmus campestris*, L., vorkommenden Aphiden-Arten. Ber. Ver. Cassel, xxvi.-xxvii. pp. 57-90, pls. ii. [*Cf.* also Z. ges. Nat. (3) v. pp. 494 & 495.

Relates to *Tetraneura alba* and *ulmi*, and *Schizoneura ulmi*.

Lichtenstein, J. Chasse et collection des Pucerons. Tijdschr. Ent. xxiii. pp. 152–154.

——. Transitory or provisional Insect-Forms. Ent. M. M. xvi. pp. 224–226.

Relates chiefly to the *Pemphiginæ* of *Pistacia terebinthus*.

——. Les Pucerons du Térébinthe. Feuill. Nat. x. pp. 85–88.

Several species of *Pemphigus*, some new, are described in detail, as infesting this tree.

——. Observations critiques sur les pucerons des ormeaux et les pucerons du Térébinthe. *L. c.* pp. 124–126.

Includes a table of 6 galls (one new) infesting the elm.

Löw, F. Zur näheren Kenntniss der begattungsfähigen sexuirten Individuen der Pemphiginen. Verh. z.-b. Wien, xxx. pp. 615–620.

The wingless brood, born from the winged autumn brood, moult four times, and increase in size, although they can take no nourishment, for want of a proboscis, and this increase is accompanied with both external and internal modifications.

The *Pemphiginæ* of the poplar, elm, &c., which leave their galls as winged insects in summer, subsequently return to the trees under a second winged form, as different from the first as if it belonged to another genus; *e.g.*, the first winged form has 6-jointed, and the second 5-jointed, antennæ. Lichtenstein, SB. z.-b. Wien, xxx. pp. 13 & 14.

When the winged *Aphides* are descending to the roots of trees, the ants clip their wings, and guide them down; but when the winged brood leaves the earth for the trees, the ants open a path for them. Lichtenstein, Bull. Soc. Ent. Fr. (5) x. pp. ciii.–cv.

There are two groups of *Aphides*, one annual, passing the winter in the egg state, and the other perennial, lying torpid through the winter, and capable of resisting any amount of cold; but the first class are by far the most numerous. Lichtenstein, C. R. xc. pp. 80 & 81, and Ann. N. H. (5) v. pp. 344 & 345.

Pemphigus bursarius, L.: life-history, habits, dimorphous forms, &c. (including *P. filaginis*, Boyer); some forms differ even in the number of joints of the antennæ; *id.* C. R. xc. pp. 804 & 805, xci. pp. 339 & 340; CR. Ent. Belg. xxiii. pp. clxii.–clxiv., S. E. Z. xli. pp. 218–222 & 473–476, and Ann. N. H. (5) v. pp. 433 & 434, vi. pp. 404 & 405. *P. ulmi*, Licht., = *P. pallidus*, Hal., = *Tetraneura alba*, Ratz., but is a true *Pemphigus*, Lichtenstein, Bull. Soc. Ent. Fr. (5) x. p. lxxxi.; if = *Eriosoma pallidus*, Hal., *nec* Derbés, he proposes to rename it *P. derbesi*, l. c.

p. lxxxii., note (*cf.* also Feuill. Nat. x. pp. 124 & 125). *P. populicaulis* noticed and figured; Am. Ent. iii. p. 206, fig. 110.

Eriosoma ulmi, Riley, renamed *Schizoneura rileyi*; Thomas, Rep. Ins. Ill. viii. p. 136.

Phylloxera quercus. Transformations and migrations described; Lichtenstein, Ass. Fr. viii. pp. 772–774.

Phylloxera vastatrix. Numerous notices in C. R. xc. & xci.; Annual Report of Italian Commission, Atti Soc. Ital. xxii. pp. 337–365. On its resistance to cold; Girard, Le Nat. ii. p. 162. Discussed by Franceschini; Atti Soc. Ital. xxii. pp. 95–118, pls. iii. & iv. Nitro-benzine recommended; Papasogli, Bull. Ent. Ital. xii. pp. 108–110. Occurrence in America; Am. Ent. iii. (numerous notices); Rep. Fruit-Growers' Ass. Ont. 1878, p. 38.

New species:—

Siphonophora acerifoliæ, p. 47, fig. 11, *amerosiæ*, Iowa, p. 50, *viticola*, p. 55, *setariæ*, Illinois, *euphorbiæ*, p. 56, *euphorbiicola*, Iowa, p. 57, *erigeronensis*, Illinois, p. 58, *coreopsides*, St. Louis, p. 59, fig. 12, *S.* (?) *salicicola*, *S. verbenæ*, p. 63, *gerardiæ*, Illinois, p. 65, *heucheræ*, Wisconsin, p. 66, and *cucurbitæ*, Illinois, p. 67, Thomas, Rep. Ins. Ill. viii. *S. citrifolii*, Ashmead, Orange Insects, p. 65, Florida.

Phorodon scrophulariæ, Thomas, *l. c.* p. 72, Illinois.

Megura solani, id. *l. c.* p. 73, Illinois.

Rhopalosiphum tulipæ (? Fonsc.), *id. l. c.* p. 80, Illinois.

Aphis diospyri, p. 95, *vernoniæ*, *cephalanthi*, p. 97, *impatientis*, Illinois, p. 98, *symphoricarpi*, Iowa, and *middletoni*, Illinois, p. 99, *id. l. c.*

Chætophorus negundinis and *populicola*, Illinois, p. 103, *loniceræ* and *salicicola* (Monell, MS.), pp. 104 & 105, and *C. candicans* (name only). p. 105, *id. l. c.*

Myzocallis hyperici, id. *l. c.* p. 108, Illinois.

Callipterus ulmicola and *quercifolii*, id. *l. c.* pp. 111 & 112, Wisconsin.

Sipha rubifolii, id. *l. c.* p. 121, Illinois.

Chermes abieticolus, id. *l. c.* p. 136, fig. 30, Maine.

Schizoneura pinicola and *panicola*, id. *l. c.* pp. 137 & 138, Illinois.

Glyphina eragrostidis, Middleton & Thomas, *l. c.* p. 144, Illinois.

Pemphigus utriculoides, p. 97, *corniculoides*, *pallidoides*, *semilunoides*, and *folliculoides*, p. 98, Lichtenstein, Feuill. Nat. x. On the trunk of the terebinth. (Lichtenstein subsequently proposes, *l. c.* p. 126, to alter these names to *corniculigena*, &c., on grammatical grounds.) *P. fraxinifolii*, Wisconsin, and *rubi*, Illinois, Thomas, *l. c.* pp. 146 & 147.

Rhizobius poæ, id. *l. c.* p. 166, Illinois.

Tychea erigeronensis, id. *l. c.* p. 168, Illinois. *T. panici*, id. Bull. Ill. Labr. N. H. ii., & Rep. Ins. Ill. viii. p. 169, Illinois.

Phylloxera caryæ-scissa and *caryæ-avellana*, Riley, Am. Ent. iii. p. 230, Florida.

Tetraneura rubra, Lichtenstein (= *ulmi*, Licht., *nec* Kalt.); Feuill. Nat. x. p. 125, Bull. Soc. Ent. Fr. (5) x. p. lxxxii., on elm, France.

COCCIDÆ.

MASKELL, W. M. Further Notes on New Zealand *Coccidæ*. Tr. N. Z. Inst. xii. pp. 291–301, pl. vii.

The genera *Asterochiton* and *Powellia* must be removed from the *Coccidæ* to the *Aleurodidæ*. A list of the New Zealand species of both families is appended to the paper.

SMITH, E. A. Biological and other notes on *Pseudococcus aceris*. N. Am. Ent. i. pp. 73–87, pl. vi.

Discusses the natural history of the insect in all stages.

STILLMAN, J. W. On the origin of the lac. Am. Nat. xiv. pp. 782–787.

The gum appears to be an elaboration of the insect itself, rather than an exudation from the plant in consequence of the insect's attacks.

Ceroplastes rusci, Linn., injurious to the fig, may be destroyed by making incisions in the trunk and large branches of the tree ; Gennadius, C. R. xci. pp. 914–916. Injurious to orange ; Ashmead, Canad. Ent. xii. pp. 252–254, fig. 25.

Aspidiotus conchiformis noticed and figured; Rep. E. Soc. Ont. 1878, pp. 31 & 32, figs. 11 & 12.

Lecanium tulipiferæ, Cook, redescribed by him ; Rep. E. Soc. Ont. 1878, pp. 20 & 21, woodcuts.

Dorthesia chiton, Zett. On its occurrence in Greenland, Ireland, and Scotland ; Hart, Ent. xiii. p. 284. *D. characias*, Westw., noticed ; Riley, Am. Ent. iii. p. 20.

Orthezia. An undetermined larva, apparently belonging to this genus, described ; G. Haller, MT. schw. ent. Ges. vii. pp. 6–11. *O. urticæ* and *signoreti* discussed ; F. Buchanan White, Ent. xiii. pp. 394–396.

New genera and species :—

Poliaspis, Maskell, Tr. N. Z. Inst. xii. p. 293. Differs from *Leucaspis* by its fringed abdomen ; type, *P. media*, sp. n., *l. c.* pl. vii. figs. 3–5, New Zealand.

Cœlostoma, id. *l. c.* p. 294. *Monophlebidæ*; adult ♀ with 11-jointed antennæ; anal tubercles obsolete ; mentum, rostrum, and buccal setæ absent, but an œsophagal opening present. Type, *C. zealandicum*, sp. n., *l. c.* pl. vii. figs. 6–13, New Zealand.

Planchonia hederæ, Lichtenstein, Bull. Soc. Ent. Fr. (5) x. p. xlv. France.

Coccus comari, Künow, Ent. Nachr. vi. p. 46, Königsberg (*cf.* also Douglas, Ent. M. M. xvii. p. 90).

Eriococcus boheriæ, Maskell, Tr. N. Z. Inst. xii. p. 208, pl. vii. figs. 14–20, New Zealand.

Mytilaspis phymatodidis and *metrosideri*, id. *l. c.* pp. 292 & 293, pl. vii. figs. 1 & 2, New Zealand.

Pulvinaria innumerabilis, Putnam, P. Davenp. Ac. ii. pp. 203–346, United States.

Aspidiotus ancylus, Putnam, *l. c.* pp. 346 & 347, United States.

Chrysomphalus ficus, Riley & Ashmead, Am. Ent. iii. pp. 267–269, fig. 146, Florida (egg and scale only).

Aleurodidæ.

Aleurodes vaccinii, sp. n., Künow, Ent. Nachr. vi. p. 46, Königsberg (*cf.* also Douglas, Ent. M. M. xvii. p. 89).

(ANOPLURA.)

Pediculidæ.

Chatin, J. Études analytiques sur le rostre des Anoplures. Bull. Soc. Philom. (7) iv. pp. 59 & 60.

The retractile proboscis is composed of a modification of the labial palpi, as in *Diptera*, &c.

Piaget, E. Les Pédiculines. Essai Monographique. Leide: 1880, 4to, i. Texte, pp. xxxix. & 714, ii. Planches, i.–lvi.

The *Mallophaga* and *Anoplura* are monographed in great detail, under the three families *Philopteridæ*, *Liotheidæ* [anteà, p. 204], and *Pediculidæ*. The introduction is historical and bibliographical, and the work concludes with good indices both of parasites and of the animals infested by them. The genera *Pediculus* and *Hæmatopinus* are noted as hardly distinct, and *Hæmatomyzus elephantis*, Piag., is renamed *H. proboscideus*, and redescribed and refigured, p. 658, pl. liv. fig. 2.

Pthirius inguinalis. Blue spots on the skin in disease only appear when this parasite is present; Duguet, in Mégnin's work, "Les Parasites et les Maladies Parasitaires" (Paris: 1880), p. 457.

Pediculus consobrinus, sp. n., Piaget, *l. c.* p. 626, pl. li. fig. 4 (on *Ateles pentadactylus*).

Pedicinus longiceps, sp. n., *id. l. c.* p. 632, pl. li. fig. 7 (on *Cercopithecus mona*).

Hæmatopinus tibialis, figs. 8 *a–d.* p. 646, and varr. *antennata*, figs. 8 *e* & 8 *f*, and *appendiculata*, fig. 8 *g*, p. 647, *id. l. c.* p. 52 (on *Antilope maori* and *subgutturosa*) (*Pediculus cervicapræ*, Luc., is probably another var.), spp. nn.

VERMES.

BY

F. JEFFREY BELL, M.A., F.R.M.S., F.Z.S.

For a general account of the Embryology of the forms included here in this group, see F. M. BALFOUR'S Treatise on Comparative Embryology (London: 1880), vol. i. *Dicyemidæ* and *Orthonectidæ*, pp. 108–112; *Platyhelminthes*, pp. 156–180; *Rotifera*, pp. 183–185; *Annulata*, pp. 264–293; *Gephyrea*, pp. 294–303; *Chætognatha*, p. 306; *Nematohelminthes*, pp. 307–313; *Acanthocephali*, pp. 313–315; and *Enteropneusta*, pp. 482–485.

On the reproduction of certain *Vermes* in a state of captivity; see MT. z. Stat. Neap. ii. p. 172.

A list of the fresh-water *Vermes* that live in salt water is given by C. SEMPER (Animal Life: London [1881]), p. 433; of marine Annelids in fresh water, p. 436.

Vermes of Barents Sea; D'URBAN, Ann. N. H. (5) vi. pp. 261 & 271.

Some Annelids known from the North and Arctic seas found in Japanese seas; GRUBE, JB. schles. Ges. lvi. pp. 228–231.

SEGUENZA has lists of the tertiary *Vermes* of Calabria in Atti Acc. Rom. (3) vi. Mem. Sci. fis. pp. 42, 53, 61, 78, 79, 126, 127, 195, 196, 293, 294, 327, & 367.

KRUKENBERG, in his Vergl.-physiol. Studien an den Küsten der Adria, i. (Heidelberg: 1880), gives an account of the effects of certain drugs on *Hirudo officinalis* (pp. 82–116).

For Italian literature of *Vermes*, see CAVANNA, Elementi per una Bibliografia Italiana (Firenze: 1880), pp. 86–90.

The titles of three Polish papers on *Vermes* are given in Zool. Anz. iii. p. 362.

PLATYHELMINTHES.

1. BENEDEN, E. VAN. Rélation d'un cas de Tuberculose cestodique suivie de quelques observations sur les œufs du *Tænia medio-canellata*. Bull. Ac. Belg. (2) xlix. pp. 659–669.

2. COBBOLD, T. S. On the Rot in Sheep. Zool. Anz. iii. pp. 257 & 258.

3. Dewoletzky, R. Zur Anatomie der Nemertinen. Zool. Anz. iii. pp. 375–379, 396–400.

4. Fraipont, J. Appareil excréteur des Trématodes et des Cestoïdes Bull. Ac. Belg. (2) xlix. pp. 397–402.

5. ——. Ditto (2me communication). *Op. cit.* l. pp. 106 & 107.

6. ——. Ditto (3me communication). *Tom. cit.* pp. 265–270.

7. ——. Recherches sur l'appareil excréteur des Trématodes et des Cestoïdes. Arch. Biol. i. pp. 415–457, pls. xviii. & xix. (See also P. v. Soc. Belg. Micros. 1880, pp. xxxi.–xlii.)

8. Hubrecht, A. A. W. New Species of European Nemerteans (First Appendix to note xliv. vol. i.). Notes Leyden Mus. ii. pp. 93–98.

9. ——. Zur Nemertinen-Anatomie. Zool. Anz. iii. pp. 406 & 407.

10. ——. Zur Anatomie und Physiologie des Nervens-systems des Nemertinen. Verh. Ak. Amst. xx. pp. 47, 4 pls. (For abstract, see Q. J. M. S. xx. pp. 274–282.)

11. ——. The Peripheral Nervous System in Palæo- and Schizonemertini, one of the Layers of the Body-wall. Q. J. Micr. Sci. xx. pp. 431–442.

12. Ihering, H. v. Graffilla muricola, [not *Graffia*, as on title page], eine parasitische Rhabdocœle. Z. wiss. Zool. xxxiv. pp. 146–174, pl. vii.

13. Kahane, Z. Anatomie von *Tænia perfoliata*, Göze, als Beitrag zur Kenntniss der Cestoden. Z. wiss. Zool. xxxiv. pp. 175–255, pl. viii. 1 woodcut.

14. Krabbe, H. Undersøgelser angaande Forekomsten af Indvoldsorme i Hestens Tarmkanal. Overs. Dan. Selsk. 1880, pp. 33–40.

15. Laczko, K. Beiträge zur Kentniss der Histologie der Tetrarhynchen, hauptsächlich des Nervensystems. Zool. Anz. iii. pp. 427–429.

16. Lang, A. Untersuchungen zur vergleichenden Anatomie und Histologie des Nervensystems der Plathelminthen. II. Ueber das Nervensystem der Trematoden. MT. z. Stat. Neap. ii. pp. 24–53, pls. i.–iii. 14 zincographs.

17. ——. Notiz über einen neuen Parasiten der Tethys aus der Abtheilung der Rhabdocœlen Turbellarien. *L. c.* pp. 107–113, pl. vii.

[No name given.]

18. Lejtényi, C. von. Ueber den Bau des *Gastrodiscus polymastos*, Leuck. Abh. senck. Ges. xii. pp. 125–146, 3 plates.

19. Linstow, O. von. Helminthologische Untersuchungen. Arch. f. Nat. xlvi. pp. 41–54, pl. iii.

20. Masse, E. De l'origine du Ténia inerme de l'homme. Bull. Ass. Sci. Fr. viii. pp. 783–794.

21. Mégnin, P. Sur une nouvelle forme de ver vésiculaire. J. de l'Anat. Phys. xvi. pp. 181–192, pls. vii.–x.

22. ——. Sur la caducité des crochets et du scolex lui-même chez les Tænias. C. R. xc. pp. 715-717, and Bull. Soc. Z. Fr. 1880, pp. 117-121 ; see also J. de l'Anat. Phys. xvii. [1881] pp. 27-44, pls. iv. & v.

23. Moniez, R. Essai monographie sur les Cysticerques. Paris : 1880, 4to, pp. 180, 3 pls.

[See Journal de Micrographie, 1880, pp. 92-97 : Rev. Int. Sci. 1880, pp. 135-152.]

24. ——. Cestodes et Helminthologistes. Rev. Int. Sci. 1880, pp. 268-275.

25. ——. Études sur les Cestodes. Bull. sci. Nord, (2) ii. pp. 240-242, 356-358, 407-409.

26. ——. Embryogénie de la Ligule (*Ligula simplicissima*). L. c. pp. 112-115.

27. Pintner, T. Untersuchungen über den Bau des Bandwurmkörpers, mit besonderer Berüchsichtigung der Tetrabothrien und Tetrarhynchen. Arb. z. Inst. Wien, iii. pp. 163-242, pls. xiv.-xviii.

28. Rolleston, G. On the Rot of Sheep. Zool. Anz. iii. pp. 258-260.

29. ——. Note on the Geographical Distribution of [*Limax agrestis*, *Arion hortensis*, and] *Fasciola hepatica*. Tom. cit. pp. 400-405.

30. Sommer, F. Die Anatomie des Leberegels, *Distomum hepaticum*, L. Z. wiss. Zool. xxxiv. pp. 539-640, pls. xxvii.-xxxii.

31. Taschenberg, O. Ueber *Tristomum molæ*. Zool. Anz. iii. pp. 17 & 18.

32. Viguier, C. Mémoire sur l'organisation de la Batracobdelle (*B. latastii*). Arch. Z. expér. viii. pp. 373-390, pls. xxix. & xxx.

33. Villot, A. Sur une nouvelle forme de Ver vésiculaire, à bourgeonnement exogène. C. R. xci. pp. 938-940.

Anatomy and Development.

Kowalevsky (Zool. Anz. iii. p. 140) regards *Cœloplana metschnikowi* (Red Sea) as intermediate between the *Cœlenterata* and *Planaria*. See Giard, Bull. Sci. Nord, (2) ii. pp. 251 & 252.

Sommer (30) gives a valuable and elaborate account of the anatomy of *D. hepaticum*, which is beyond an abstract. The same remark applies to Kahane (13).

O. Maartey's essay on *Distomum hæmatobium* has not been seen by the Recorder.

For a note on the eye of Planarians, see R. Hertwig, Jen. Z. Nat. xiv. Suppl. Heft i. pp. 55 & 56, where a colourless retinal portion is distinguished from a pigmented portion containing a vitreous body.

Lang's (16) observations were chiefly made on *Tristomum molæ* ; he finds that, histologically, at any rate, the cerebrum is nothing but a specially and highly developed transverse commissure, largely composed of ganglion-cells. The eyes are extremely simple, and the retina is formed

by a typical ganglionic cell. *Pleurocotyle scombri* is without eyes, and the cerebral mass is more delicate. *Distomum nigro-planum* and *D. hepaticum* were also examined.

Pintner (27) finds that the water-vascular system consists of numerous ciliated infundibular cells, which are collected into a zone lying between the epithelium and the parenchyma, and provided with very long capillary efferent ducts. In connexion with these is a system of vessels which traverses the whole body. The original type would appear to have had a simple loop, with a dorsal and a ventral branch, which had a tendency to form anastomoses. Attention is directed to the flattening of the head in *Tetrarrhyachus longicollis*, and the gross and histological structure of the proboscis is described in detail; no pore-canals were detected in the cuticle; eth nervous system is described.

Fraipont's (4–7) investigations lead him to see two types of renal organs in the *Vermes*; in the *Platyhelminthes* and *Rotifera*, the canal-system opens into the cœlom by a number of ciliated infundibula, and has a median, or two lateral terminal vesicles; in the *Annulata*, there are true segmental organs, and in the *Gephyrea* both sets may be present. In some *Cestoda*, a number of pores communicate with the exterior. The *Hirudinea*, like the *Gephyrea*, have two sets of renal organs, but the first disappears during the course of development. It seems impossible to recognize any marked distinction between *Cœlomati* and *Acœlomati* (Hæckel), for in the *Trematoda* there are spaces in the connective tissue into which the ciliated infundibula may open, and in other *Platyhelminthes* there are considerable variations in the extent to which the cœlomatic space is developed.

Cobbold (2) directs attention to the fact that *Cercaria cystophora* (infesting *Planorbis marginata*), is the higher larval stage of *Distoma lanceolatum*, and that *Limnæa truncatula* is the bearer of the cercarian stage of *Fasciola hepatica*.

On *Solenophorus megacephalus*, see Moniez, Bull. sci. Nord, (2) ii. p. 113.

On the distribution of *Ligula*, see Landois, JB. Westf. Ver. 1879, pp. 27 & 28.

Rolleston (28) insists on a careful study of the geographical distribution of the flukes and molluscan hosts, and gives (29) a number of facts bearing on the question.

Krabbe (14) records the presence in 28 out of 100 horses, of *Tænia perfoliata*, generally in the cœcum; and of *T. mammillana*, in 8 out of 100, always in the small intestine.

On parasitic bodies found in meat, see Poincaré, C. R. xci. pp. 177–179 & 362 & 363.

For Guillebeau's observations on the cysticercus of *Tænia saginata* (found in 1 per 700 of men in Western and Central Europe), see MT. Ges. Bern, 1879–80, pp. 21 & 22.

Tænia of Chimpanzee: Studer, *tom. cit.* pp. 10 & 11.

Dewoletzky (3) directs attention to the so-called lateral organ, and suggests that the proper sensory organ (which is absent in the terrestrial forms) may have function in relation to the character of the water. In

the *Anopla*, the nervous system lies between a basilar layer of connective tissue, and the circular muscles ; in the *Enopla*, it is on the deeper (inner) side of the latter.

Hubrecht (9) finds in *Carinella* (which he looks upon as the most primitive of the *Palæonemertini*) a layer of nerve-fibres external to the supporting lamella, and forming a plexiform envelopment for the whole body. In the *Schizonemertini*, this layer lies between the circular and the outer longitudinal layers of muscles. It was not found in the *Hoplonemertini*.

Genera and Species.

Linstow describes as new (19) :—

Distomum semiflavum (intestine of *Petromyzon fluviatile*), p. 50 ; *D. spinosum* (intestine of *Sylvia rufa*), p. 51 : *D. moleculum* (intestine of *Rallus pygmæus*), p. 51.

Tænia scalaris, *T. uncinata*, and *T. tiara* were all found in *Crocidura aranea* ; *T. uncinata* also in *C. leucodon*.

Urocystis prolifer, Villot (33).

Tænia barroissi, sp. n., Moniez, Bull. Sci. Nord, (2) iii. p. 448 (from the mole).

Tænia cyclocephala, sp. n. (intestine of *Cona madagascariensis*), Chatin, Bull. Soc. Philom. (7) iv. p. 31.

Note on the vessels of *Abothrium gadi* ; Moniez, *l. c.*

Weyenbergh, Periód. Zool. Argent. iii. [1878], pp. 31–39, gives a full description of *Distoma pulcherrimum*, which he had (*op. cit.* ii. [1876] pp. 167–169) referred to *Amphistoma*.

Cercaria incistidata, sp. n. (a tailless *Cercaria* from the liver of the esculent Frog) ; Perroncito, Veter. liii. pp. 454–457.

Hubrecht (8) describes as new, *Carinella inexpectata* and *Cerebratulus eisigi*. The former species has more the external appearance of *Polia* than of *Carinella*, but agrees with other species of the latter genus in internal characters.

Langerhans (55) found 18 *Nemertina* at Madeira, of which the following are new species:—

Cerebratulus macintoshi, *C. hubrechti* ; and *Tetrastemma quadristriatum*.

Amphiporus virescens, *A. cruentatus* ; *Lineus dubius*, *L. pallidus* ; *Micrura ornata*, *M. albicla*, spp. nn., Verrill, P. U. S. Nat. Mus. ii. pp. 183–186.

Perejaslawzew (Zool. Anz. iii. p. 186) reports on the *Turbellaria Rhabdocœla* from the Black Sea, 25 new species observed, but names not given in the report. *Darwinia*, g. n. The genus *Orcus* (Ulianin) = *Trigonostomum*, O. Schmidt.

The observations of Grassi, and of Grassi and Parona (published by the Laboratory of Pavia, in 1880) have not been seen by the Recorder.

NEMATOHELMINTHES.

34. Babesin, V. Ueber einen in menschlichen Peritonäum gefunden Nematoden. Arch. path. Anat. lxxxi. pp. 158–167, pl. v. figs. 1–5. (*Filaria peritonæi-hominis.*)

35. De Man, J. G. Die einheimischen, frei in der reinen Erde und im süssen Wasser lebende Nematoden. Tijdschr. Nederl. Dierk. Ver. v. pp. 1–104 (preliminary and descriptive portion).

36. Macdonald, J. D. On the Anatomy of a new Parasitic Worm found in the Intestine of a Bat (*Megaderma frons*). Ann. N. H. (5) vi. pp. 409–412, pl. xxi. See also G. E. Dobson, Note on *Pterygodermatites macdonaldi*, the type of a new order of *Vermes* (*Metabdellada*); l. c. pp. 412–414.

37. Mégnin, P. Sur le *Syngamus trachealis*, v. Siebold, des Faisans. Bull. Soc. Z. Fr. 1880, pp. 121–152, pls. v. & vi.

38. Perroncito, E. Osservazioni elmintologiche relative alle malattia endemica fra gli operia del Gottardo (*Anchylostoma duodenalis*). Atti Acc. Rom. (3) iv. Mem. Sci. fis. pp. 179–184, & vii. pp. 381–432, 1 pl. [See also Moleschott's Untersuch. xii. (1881) pp. 532–563, & C. R. xc. pp. 1373–1375.]

Genera and Species.

De Man (35) describes the following:—

Alaimus [*-læmus*, and so in the rest], g. n.; *A. primitivus*, sp. n.
Deontolaimus, g. n.; *D. papillatus*, sp. n.
Aphanolaimus, g. n.; *A. attentus*, sp. n.
Desmolaimus, g. n.; *D. zeelandicus*, sp. n.
Ethmolaimus, g. n.; *E. pratensis*, sp. n.
Choanolaimus, g. n.; *C. psammophilus*, sp. n.
Aulolaimus, g. n.; *A. oxycephalus*, sp. n.
Prismatolaimus, g. n.; *P. dolichurus*, sp. n.
Cylindrolaimus, g. n.; *C. communis*, *C. melancholicus*, spp. nn.
Cephalobus nanus, *C. elongatus*, *C. emarginatus*, *C. filiformis*, *C. vexilliger*, spp. nn.
Teratocephalus crassidens, *T. palustris*, spp. nn.
Plectus schneideri, *P. palustris*, *P. geophilus*, *P. rhizophilus*, *P. otophorus*, spp. nn.
Rhabditis intermedia, sp. n.
Macroposthonia, g. n.; *M. annulata*, sp. n.
Rhabdolaimus, g. n.; *R. aquaticus*, *R. terrestris*, spp. nn.
Odontolaimus, g. n.; *O. chlorurus*, sp. n.
Diphtherophora, g. n.; *D. communis*, sp. n.
Tylolaimophorus, g. n.; *T. typicus*, sp. n.
Aphelenchus helophilus, sp. n.
Tylenchus lamelliferus, *T. pratensis*, *T. gracilis*, *T. intermedius*, *T. leptosoma*, *T. macrophallus*, spp. nn.

Dorylaimus primitivus, *D. labiatus*, *D. macrodorus*, *D. brachyurus*, *D. intermedius*, *D. pratensis*, *D. bryophilus*, *D. microdorus*, *D. elegans*, *D. monohystera*, *D. centrocercus*, *D. acuticauda*, *D. parvus*, *D. hartingi*, *D. lugdunensis*, *D. attenuatus*, *D. agilis*, *D. limnophilus*, *D. rotundicauda*, *D. macrolaimus*, spp. nn.

Of the 141 species described in the paper, only 12 are aquatic in habitat.

Linstow (19) describes as new:—

Ascaris patagonica (stomach of *Phoca jubata*), p. 41, pl. iii. fig. 1; *A. arctica* (stomach and œsophagus of *Diomedea leucops*), p. 42, pl. iii. figs. 2 & 3.

Oxyuris bidentata (intestine of frog larva), p. 46, fig. 10.

Angiostomum sanguinolentum (abdominal and thoracic cavity of *Strix flammea*), p. 46, fig. 11.

Ascaris siluri [Zool. Rec. xv. *Verm.* p. 6] is changed to *A. glanidis*, and *Bothriocephalus lanceolatus* [ibid. p. 6] to *B. ellipticus* (p. 53).

Angiostomum would seem (like *Ascaris nigro-venosa*) to be parasitic in its parthenogenetic stage (p. 53).

The following are reported from the following animals:—

Ascaris angulata, from intestine of *Cottus scorpio* and stomach of *Lophius piscatorius*; *A. clavata*, intestine of *Gadus morrhua*; *A. rotundata*, from *Raia clavata*; *A. osculata*, stomach of *Halichœrus grypus*; *A. capsularia*, stomach of *Phocœna communis*; *A. constricta*, from *Trachinus draco*.

Filaria strigis, from intestinal and œsophageal walls, peritoneum, and muscular coat of the stomach of *Strix noctua*, where it was present in thousands.

Strongylus depressus, intestine of *Crocidura leucodon*; *S. filaria*, from bronchi of the calf.

Pseudalius minor, from cavities beneath the eye of *Phocœna communis* and the cavum tympani of *Delphinus phocœna*; *P. inflexus* œsophagus and bronchi of *P. communis* and bronchi of *D. phocœna*.

Trichosoma felis-cati, from urinary bladder of *Felis catus*; *T. obtusum*, intestine of *Strix noctua*.

Filaria restiformis, sp. n., Leidy, P. Ac. Philad. 1880, pp. 130 & 131, Note on *F. immitis*; Leidy, *l. c.* pp. 10–12.

Spiroptera leporum, sp. n., Moniez, Bull. Sci. Nord, (2) iii. p. 447; neither described nor figured.

Pterygodermatites [*Rictularia*] *macdonaldi*, sp. n., Dobson (36).

L. Örley's Monographie der Anguilluliden (Term. füzetek, iv. pp. 165, 7 pls.) has pp. 1–138 in Hungarian; there is a German abstract, pp. 141–165.

He describes the following new species:—

Plectus demani, *P. triplogaster*.

Cephalobus gracilis.

Rhabditis heterurus.

Diplogaster macrodon.

Örley would arrange the Nematodes thus:—

(*a*) Parasita.
- Fam. *Trichotrachelides.*
- Fam. *Strongylides.*
- Fam. *Filariides.*
- Fam. *Ascarides.*

(*b*) Rhabditiformæ.
- Fam. *Rhabditidæ.*

(*c*) Anguillulidæ.
- Fam. *Plectidæ.*
- Fam. *Dorylæmidæ.*
- Fam. *Monohysteridæ.*
- Fam. *Leptolæmidæ.*
- Fam. *Tylenchidæ.*

Nectonema, g. n., for *N. agilis*, sp. n., found swimming at surface in Vineyard Sound, Mass.; Verrill, P. U. S. Nat. Mus. ii. p. 187.

Gordius acridiorum, *G. tenuis*, and *G. dubius*, spp. nn., Weyenbergh, (62).

For a note on Perroncito's (38) observations, see Veter. liii. pp. 824–828.

For Perroncito's observations on *Trichina spiralis*, see Veter. liii. pp. 601–603.

Krabbe (14) finds in the horse:—

Strongylus armatus, especially in the cœcum; of 1409 examined 1029 were females (in 86 out of 100 horses).

S. tetracanthus, particularly in the colon (in 67 of 86 horses).

Oxyurus curvula (in 2 out of 100 horses).

In addition to a revised diagnosis of the genus and species, Mégnin (37) has some anatomical remarks and some account of the development.

Ciliated embryo of *Bilharzia*; Chatin, C. R. xci. pp. 554 & 555, and Ann. N. H. (5) vi. pp. 405 & 406.

For observations on the organization and development of the *Gordii*, see Villot, C. R. xc. pp. 1569–1571 (Ann. N. H. 5, vi. pp. 169–171), in which it is pointed out that the first larval form of *Gordius* differs greatly from that of other Nematoids; also C. R. xci. pp. 774–776, and Ann. N. H. (5) vi. pp. 466 & 467.

ACANTHOCEPHALI.

39. Baltzer, C. Zur Kenntniss der Echinorhynchen. Arch. f. Nat. xlvi. pp. 1–40, pls. i. & ii.

A description of the anatomy, with especial notice of the proboscis and female generative organs.

In examples of *Echinorrhynchus proteus*, Moniez, Bull. Sci. Nord, (2) iii. p. 304, says he has found psorosperms, which were taken by O. F. Müller for the first two stages in the development of *Echinorrhynchus*.

Echinorrhynchus capitatus, sp. n., Linstow (19), p. 41, pl. iii. fig. 13, from *Pseudorca crassidens*.

ROTATORIA.

40. Claus, C. Zur Kenntniss der Organisation von *Seison*. Zool. Anz. iii. pp. 548–550.

GEPHYREA.

41. Drasche, R. von. Zur Kenntniss des Baues der Segmental-organe der Echiuren. Zool. Anz. iii. pp. 517–519.

42. Greef, R. Ueber den Bau der Echiuren. Arch. f. Nat. xlvi. pp. 88–93 (from SB. ges. Marburg, May, 1879).

43. ——. Die Echiuren (*Gephyrea armata*). Nova Acta Ac. L.-C. Nat. cur. xli.

[Not seen by the Recorder.]

44. Hatschek, B. Ueber Entwickelungsgeschichte von Echiurus und die systematische Stellung der Echiuridæ (*Gephyrei chætiferi*). Claus's Arbeiten, iii. pp. 45–79, pls. iv.–vi.

45. Spengel, J. W. Beiträge zur Kenntniss der Gephyreen. II. Die Organisation des *Echiurus pallasi*. Z. wiss. Zool. xxxiv. pp. 460–538, pls. xxiii.–xxvi., 2 woodcuts.

Hatschek (44) found a number of developing stages of a larva not altogether similar to that described by Salensky; he is of opinion that its history is conclusive as to the Annelidan affinities of *Echiurus*; he would arrange the Annelidan stem thus:—

1st Class—*Archiannelides* (*Polygordius*).
2nd „ *Chætopodes*.
1st Order—*Saccocirridæ*.
2nd „ *Polychætæ*.
3rd „ *Echiuridæ*.
4th „ *Oligochætæ*.
3rd „ *Hirudinea*.
App.: (4th „) *Sipunculacea*.

Greef (42) finds that in *Thalassema mœbii*, sp. n., the water-tubes are completely shut off from the cœlom; in it there are three pairs of genital tubes, and the author thinks that in all *Echiuri* the first pair are true segmental organs.

Daniellsen & Koren describe the following new genera and species (N. Mag. Naturw. xxvi. pp. 44–66, pls. i. & ii.):—

Bonellidæ. *Hamingia*, g. n. Body cylindrical, mouth at the anterior extremity, towards the ventral surface. Anal orifice in the centre of the posterior extremity. A slightly projecting crescentiform fold surrounds the mouth (rudiment of the proboscis). In the anterior part of the ventral surface, there are two long cylindrical papillæ, at the apex of which there is a round aperture for the efferent duct of the uterus. No setæ. *H. arctica*, sp. n., 72° 27′ N. lat. 20° 51′ E. long.

Saccosoma, g. n. Body claviform. Anterior part cylindrical, opaque, with a round buccal aperture at the free extremity; the posterior part, containing the whole of the intestinal canal, is nearly spherical, transparent, terminating in an opaque cone, at the apex of which is the anus. No hooks. *S. vitreum*, sp. n., 63° 22′ 5″ N. 5° 29′ W.

Sipunculidæ. *Phascolosoma lilljeborgi*, sp. n.

Aspidosiphon armatum, sp. n.

Onchnesoma glaciale, sp. n.

Stephanostoma, g. n. Buccal disc very broad, with ten large groups of tentacles, between which are situated some isolated tentacles. Anal aperture immediately behind the base of the proboscis. *S. hanseni*, sp. n.

Epithetosomatidæ, fam. n. Body with a cylindrical hollow tube corresponding to the crop-cavity. Behind this, on each side of the anterior extremity of the body, is a fissure furnished with apertures at the bottom. No hook-bristles.

Epithetosoma, g. n. Body cylindrical, furnished at its anterior end with a long non-retractile, tubular appendage (proboscis). Behind this, on the ventral surface, the round buccal aperture. On each side of the anterior extremity of the body a fissure, which is furnished with several apertures at the bottom; no anal appendages; anus at the posterior extremity of the body. *E. norvegicum*, sp. n.

Priapulus pygmæus and *Thalassema viridis* [*-de*], spp. nn., Verrill, Bull. U.S. Nat. Mus. ii. pp. 182 & 183.

On the metamorphoses of *Actinotrocha*, see E. B. Wilson, Am. Nat. xiv. pp. 894 & 895.

CHÆTOGNATHA.

46. Hertwig, O. Die Chætognathen. Jen. Z. Nat. xiv. pp. 196–303, pls. ix.–xiv. (also separately). (For abstracts, see *tom. cit.* Suppl. Heft i. pp. 7–11, & 38–41.)

This essay makes a very considerable contribution to our knowledge of these animals; after giving a history of the *Chætognatha*, the author proceeds to—(1) their anatomy and histology; (2) their classification; (3) their development; and, in conclusion, he reviews their relations to the *Cœlenterata* and to the rest of the *Vermes*. With regard to the second of these points, it is only necessary to say that he recognizes Langerhans's genus *Spadella*, with which he associates three species; in the old genus *Sagitta*, ten species are recognized. The importance of the mode by which the cœlom in these forms is developed, is insisted upon, and it is pointed out that there is a radical difference between the two entero-cœlic cavities bilaterally developed in them, and the radially arranged enteric prolongations which are developed in the *Actiniæ*. The resemblances which exist between these two groups are shown to be due to the fact that certain fundamental laws are obeyed by all animals in their development. The points by which the *Chætognatha* approach the Nematoid Worms are also illustrated; but their relations to the Annelids are shown to be still more marked; no definite answer, however, is (or, as it seems, can yet be) given to the question whether these resemblances are analogical or homological. The sensory organs always retain their connection with the epidermis, as do also the chief ganglia and the nerves given off from them; in addition, however, there are smaller ganglia which are embedded in the mesoderm, and appear to be derived from it; these latter belong to the motor system. The muscular fibrils are not

arranged in bundles, but in lamellæ, and there is very considerable resemblance to what is found in the *Cœlenterata*; myoblasts are to be looked for in the epithelium of the cœlom. The gastrula is of the typical character, and, before its disappearance, part of the endoblast gives rise to the first elements of the generative organs. The following system is proposed:—

I.—*Sagitta.*
Unpaired caudal; two pairs of lateral fins.

II.—*Spadella.*
Unpaired caudal; one pair of lateral fins.

On *Sagitta pontica*, see Ulianin, Zool. Anz. iii. p. 588.

Langerhans (55) distinguishes three genera:—

I.—*Sagitta.* Body delicate, two pairs of accessory jaws, and two pairs of free lateral fins. *S. magna*, sp. n.

II.—*Krohnia*, g. n. (*nec* Quatrefages). Body delicate, one pair of accessory jaws, and one pair of free lateral fins. *K. hamata*, Möbius.

III.—*Spadella*, g. n. Body compressed, subcutaneous tissue greatly developed, and extending as far as the single lateral fin, two pairs of accessory jaws. The species *cephaloptera*, Busch, *draco*, Krohn, *gallica*, Pagenstecher, and *batziana*, Giard, fall into this genus.

ANNULATA.

47. Blomfield, J. E. The general features of the Development of the Spermatozoa, in the *Vermes*, *Mollusca*, and *Vertebrata*. Zool. Anz. iii. pp. 65–67.

48. ——. On the Development of the Spermatozoa. I. *Lumbricus*. Q. J. Micr. Sci. xx. pp. 79–89, pls. vi. & vii.

49. Bourne, A. G. On the Structure of the Nephridia of the Medicinal Leech. Q. J. Micr. Sci. xx. pp. 283–302, pls. xxiv. & xxv.

50. Cosmovici, L. C. Glandes genitales et Organes segmentaires des Annélides Polychètes. Arch. Z. expér. viii. pp. 233–372, pls. xix.–xxviii.

51. Grube, E. Mittheilungen über die Familie der Phyllodoceen und Hesioneen. JB. schles. Ges. lvii. pp. 204–228.

52. Hatschek, B. *Protodrilus leuckartii*. Eine neue Gattung der Archianneliden. Claus's Arb. iii. pp. 79–93, pls. vii. & viii.

53. Hinde, G. J. Annelid Jaws from the Wenlock and Ludlow formations of the West of England. J. G. Soc. xxxvi. pp. 368–378, pl. xiv.

54. Joseph, G. Ueber *Enchytræus cavicola*, sp. n. Zool. Anz. iii. pp. 358 & 359.

55. Langerhans, P. Die Wurmfauna der Madeira, IV. Z. wiss. Zool. xxxiv. pp. 86–143, pls. iv.–vi.

56. Lankester, E. R. Observations on the Microscopic Anatomy of the Medicinal Leech (*Hirudo medicinalis*). Zool. Anz. iii. pp. 85–90.

57. ——. On Intra-epithelial capillaries in the Integument of the Medicinal Leech. Q. J. Micr. Sci. xx. pp. 303–306, pl. xxvi.

58. ——. On the Connective and Vasifactive Tissues of the Medicinal Leech. *Tom. cit.* pp. 307–317, pls. xxvii. & xxviii.

59. Leidy, J. Notice of some Aquatic Worms of the Family *Naiades*. Am. Nat. xiv. pp. 421–425.

60. Panceri, P. La luce e gli organi luminosi di alcuni Annelidi. Atti Ac. Nap. vii. [1878] art. i. pp. 20, pls. i.–iv.

61. Schneider, A. Ueber die Auflösung der Eier und Spermatozoen in den Geschlechtsorganen [*Nephelis, Aulostomum, Hirudo*]. Zool. Anz. iii. pp. 19–21, 256 & 257.

62. Weyenbergh, H. Descripciones de nuevos gusanos. Period. Zool. Argent. iii. pp. 106–111, and Bol. Ac. Arg. iii. [1879] pp. 213–219.

63. ——. Algunes nuevas sanguijuelas o chaucacas de la familia Gnathobdellia y Revista de esta familia. *Tom. cit.* iii. pp. 112–125; and *tom. cit.* pp. 231–245.

64. Wilson, E. B. Early Stages of some Polychætous Annelids. Am. J. Sci. (3) xx. pp. 291 & 292; see also Zool. Anz. iii. pp. 455 & 456, and Ann. N. H. (5) vi. pp. 407 & 408.

Anatomy, Development, &c.

Hatschek's new genus (52) appears to exhibit even greater simplicity than *Polygordius*; there is no external segmentation, and locomotion is largely effected by means of cilia. The hindermost segments are but imperfectly differentiated; a thickening of the integument is the only indication of the frontal ganglion; the ovaries are developed in the more anterior and the testes in the more posterior segments.

Blomfield's observations (48) result in a careful account of the true testes of the earthworm, an account of the minute structure of the seminal vesicles, and a history of the development of the spermatozoa; the 'spermatospores' by division of their nuclei give rise to 'spermatopheres,' each of which is made up of spermatoblasts; these become developed into spermatozoa. [*Ocnerodrilus* (Eisen) has throughout life simple testes; *cf.* J. R. Micr. Soc. (2) i. p. 44.]

Cosmovici (50) has especially studied *Arenicola piscatorum* and *Terebella gigantea*; comparisons are made with members of several other families.

On the epithelial investment of the otocyst in Annelids, see Chatin, Bull. Soc. Philom. (7) iv. pp. 130–132; on sub-intestinal system, pp. 81–83.

Lankester (56–58) and Bourne (49) have added considerably to our knowledge of the minute structure of the Leech; the latter points out

the great differentiation to which its renal organ has attained, and describes its four lobes, the ductules, and the ducts. The former finds that the epidermis is vascular, and he believes that it is the respiratory organ of the Leech. [Segmental organs, see Fraipont, *suprà*.]

On the copulatory organs of *Microphthalmus*; see report of Bobretzky in Zool. Anz. iii. pp. 139 & 140.

Wilson (64) finds that *Arenicola* has a telotrochous larva, and that the segmentation of the egg is very similar to that of *Oligochæta* and *Discophora*. In *Diopatra cuprœa*, the larvæ are at first true Atrocha, while in *Spiochætopterus oculatus* they are mesotrochal.

Stossich has some observations on the development of *Serpula* in Bol. Soc. Adriat. for 1879, which have not been seen by the Recorder.

C. K. Hoffmann's "Untersuchungen über den Bau und die Entwickellungsgeschichte der Hirudineen" (69 pp., 12 pls. Verh. Ak. Amst. 1880, and, separately), has not been seen by the Recorder.

Genera and Species.

Langerhans (55) describes:—
Aricia acustica, sp. n.
Spio atlanticus, sp. n.
Polydora hamata, *P. armata*, spp. nn.
Spiochætopterus madeirensis, sp. n.
Cirratulus viridis, sp. n.
Chætozone macrophthalma, sp. n.
Notomastus roseus, sp. n.
Axiothea cirrifera, sp. n.
Ampharete minuta, sp. n.
Polycirrus triglandula, sp. n.
Sabella rubra, sp. n.
Jasmineira, g. n. "Sabellaceæ hamis uniserialibus manubrio longo thoracalibus; abdomine hamis brevibus ut in genere Sabella formatis armato." *J. caudata*, sp. n.
Chone arenicola, *C. collaris*, spp. nn.
Oria eimeri, sp. n.
Fabricia nigra, sp. n.
Serpula concharum, sp. n.
Polygordius schneideri, sp. n.
He gives (p. 111) a table of the genera of the *Sabellidæ*.

In reviewing the results of his investigations into the Chætopod fauna of Madeira, Langerhans states that he has found 153 species; of these 57 are new, of the rest 72 are found in the Mediterranean, and of these 33 are also found on the European oceanic coasts; of the 24 not found in the Mediterranean, 3 are West Indian, 3 have been found in high latitudes; *Haphosyllis hamata*, *Syllis graciilis*, and, perhaps, *Odontosyllis ctenostoma*, and *Ehlersia cornuta* are cosmopolitan.

On some Philippine Island, and South Japanese forms, see Grube, JB. schles. Ges. lvii. pp. 228–231; *Staurocephalus microphthalmus* and *Phyllodoce rubens*, spp. nn.

Aulophorus vagus, sp. n., and *Pristina flagellum* (? sp. n.), Leidy (59).

Grube (51) describes as new *Eulalia novæ-zealandiæ* and *E. minuta*, Brazil, p. 210, *Phyllodoce* (*Anaitis*) *chalybea*, p. 215.

On *Bythonomus* (*Bathonomus*), see Grube, JB. schles. Ges. lvii. p. 228.

Verrill describes as new, Pr. U. S. Nat. Mus. ii., from the North-eastern Coast of North America :—

Sthenelais gracilis, *S. emertoni*, p. 166, *S. picta*, p. 167.
Sigalion arenicola, p. 167.
Lætmonice armata (*L. filicornis*, Verr., *nec* Kinberg), p. 168.
Eunoa spinulosa, p. 169.
Autolytus ornatus, p. 170.
Pedophylax longiceps, p. 171.
Nereis alacris, p. 171.
Ceratocephale websteri, p. 172.
Polydora gracilis, *P. concharum*, p. 174.
Spio limicola, p. 176.
Spiophanes tenuis, p. 176.
Heterocirrus fimbriatus, p. 177.
Maldane filifera, p. 179.
Notamastus gracilis, p. 180.
Polycirrus phosphoreus, p. 181.
Spirorbis stimpsoni (*S. nautiloides*, ? Verrill, *nec* Lamarck).
Tomopteris smithi, p. 182.

The only new genus is *Praxillusa*, one of the *Maldanidæ*, p. 178, for *P. ornata*, sp. n.

Eusyllis leucifer is an *Odontosyllis*, p. 170; *Nectonereis megalops* a *Nereis*, p. 172; *Lumbrinereis hebes* = *L. obtusa*, Verrill; and *Eone gracilis* is a *Goniada*, p. 174.

G. A. Hansen, N. Mag. Naturv. xxv. pp. 224–234, pls. i.–v., gives a list of the Annelids collected in the North Sea Expedition of 1878, and describes as new :—*Polynoe assimilis*, *P. spinulosa*, *P. foraminifera*, *P. glaberrima*, *Phylodoce arctica*, *Brada granulosa*, *Trophonia arctica*, *T. borealis*, *T. rugosa*.

In discussing the characters of *Polygordius*, Giard, C. R. xci. pp. 341–343, Ann. N. H. (5) vi. pp. 324–326, proposes to retain the name of *Lymnotrypane* (Macintosh) for the dicœcious Polygordians, and *Polygordius* for the hermaphrodite, smaller, and more archaic forms. He describes as sp. n. *L. erythrophthalma*. In discussing the systematic affinities he denies that the Polygordians are intermediate forms; he looks upon them as having their closest allies in *Polyophthalmus*.

Enchytræus cavicola, sp. n., Joseph (54).

Polynoe turcica, p. 15 (figures); and *Pholoe brevicornis*, p. 16 (figures), spp. nn. Panceri (60).

Lumbricus matutinus, *L. argentinus*, *L. corduvensis*, spp. nn., Weyenbergh (62).

Nephelis argentina, *N. cinerea*, *N. similis*, *N. picta*, *N. corduvensis*, *N. subolivea*, spp. nn., *id.*

Schlegelia, g. n. for *S. nepheloides*, sp. n., id.

Cyclobdella, g. n. for *C. glabra*, sp. n.

Hybobdella, g. n. for *H. doringi* and *H. flavo-lineata*, spp. nn., *id.* (63).

ORTHONECTIDA.

Giard's observations [Zool. Rec. xvi. *Verm.* p. 17] are reprinted with additions in Q. J. Micr. Sci. xx. pp. 225–240, pl. xxii.

Jourdain (in Rev. Sc. Nat. ii. p. 68, not seen by the Recorder) describes a new genus *Prot[o]helminthus* for *P. hessei* which may belong to this group.

ECHINODERMATA.

BY

F. Jeffrey Bell, M.A., F.R.M.S., F.Z.S.

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1. Agassiz, Alex. Reports on the Results of Dredging, under the Supervision of A. Agassiz, in the Caribbæan Sea, 1878–79, and along the Atlantic coast of the United States during the summer of 1880, by the U. S. Coast Survey Steamer 'Blake.' ix. Preliminary Report on the *Echini*. Bull. Mus. C. Z. viii. No. 2, pp. 69–84.

2. ——. Note on some points in the History of the Synonymy of the *Echini*. P. Z. S. 1880, pp. 33–38.

3. Bell, F. J. On *Palæolampas*, a new Genus of the *Echinoidea*. P. Z. S. 1880, pp. 43–49, pl. iv.

4. ——. On the Names to be applied to certain *Echinoidea*. L. c. pp. 220–222.

5. ——. Observations on the Characters of the *Echinoidea*. iii. On some Genera and Species of the *Temnopleuridæ*. L. c. pp. 422–440, pl. xli.

6. ——. Note on an Abnormal (Quadriradiate) Specimen of *Amblypneustes formosus*. J. L. S. xv. pp. 126–129, pl. v.

7. ——. Exhibition of an Immature Echinid. P. Z. S. 1880, pp. 356–358.

[Not a *Palæolampas*, but an *Echinolampas*.]

8. Carpenter, P. H. On some undescribed *Comatulæ* from the British Secondary Rocks. J. G. Soc. xxxvi. pp. 36–55, pl. v.

9. ——. Some disputed points in Echinoderm Morphology. Q. J. Micr. Sci. xx. pp. 321–329.

10. ——. On the Genus *Solanocrinus*, Goldfuss, and its Relations to Recent *Comatulæ*. J. L. S. xv. pp. 187–217, pls. ix.–xii.

11. ——. On some new Cretaceous *Comatulæ*. J. G. Soc. xxxvi. pp. 549–558, pl. xxiii.

12. Duncan, P. M. On a Synthetic Type of Ophiurid from the North Atlantic. J. L. S. xv. pp. 73–78, pl. iii.

13. ——. On an Unusual Form of the Genus *Hemipholis*. Tom. cit. pp. 138–144, pl. vi.

14. Foettinger, A. Découverte de l'hémoglobine dans le système aquifère d'un Echinoderme. Bull. Ac. Belg. (2) xlix. pp. 402–405.

15. ——. Sur l'existence de l'hémoglobine chez les Echinodermes. Arch. Biol. i. pp. 405–413, pl. xvii.

16. Geddes, P. Observations sur le fluide périviscéral des Oursins. Arch. Z. expér. viii. pp. 483–497, pls. xxxvii. & xxxviii., and see P. R. S. xxx. p. 253.

17. Giesbrecht, —. Der feinere Bau der Seeigelzähne. Morph. JB. vi. pp. 79–106, pls. ii.–v.

18. Goette, A. Bemerkungen über Entwickelungsgeschichte der Echinodermen. Zool. Anz. iii. pp. 324–326.

19. Greef, R. Ueber den Bau und die Entwickelung der Echinodermen. vi. Arch. f. Nat. xlvi. pp. 94–101.

20. Hutton, F. W. Notes on some New Zealand *Echinodermata*, with descriptions of new species. Tr. N. Z. Inst. xi. pp. 305–308.

21. Ludwig, H. Ueber einige seltenere Echinodermen des Mittelmeeres. MT. z. Stat. Neap. ii. pp. 53–72, pl. iv.

22. ——. Ueber den primären Steinkanal der Crinoideen nebst vergleichend-anatomischen Bemerkungen über die Echinodermen überhaupt. Z. wiss. Zool. xxxiv. pp. 310–332, pls. xii. & xiii.

23. ——. Neue Beiträge zur Anatomie der Ophiuren. *Tom. cit.* pp. 333–366, pls. xiv.–xvi.

24. ——. Ueber *Asthenosoma varium*, Grube, und über ein neues Organ bei den Cidariden. *Tom. cit.* pp. 70–86, pls. ii. & iii., 1 woodcut.

25. ——. Die Bildung der Eihülle in *Antedon rosaceus*. Zool. Anz. iii. pp. 470 & 471.

26. ——. Ueber eine lebendiggebärende *Chirodota*. L. c. p. 492.

27. Lyman, T. A Structural Feature hitherto unknown among *Echinodermata* found in deep-sea Ophiurans. Anniv. Mem. Bost. Soc. pp. 1–12, pls. i. & ii.

28. ——. A Preliminary List of the known Genera and Species of Living *Ophiuridæ* and *Astrophytidæ*, with their localities and the depths at which they have been found; and reference to the principal synonyms and authorities. Cambridge, U.S.A.: 1880, 4to, pp. 45 (printed on one side only).

29. Martin, K. Revision of the Fossil *Echini* from the Tertiary Strata of Java. Notes Leyd. Mus. ii. pp. 73–85. (*Cf.* Appendix to Die Tertiärschichte auf Java. Leyden: 1880, 4to.)

30. Perrier, E. Les Étoiles de mer des regions profondes du golfe du Mexique. C. R. xci. pp. 436–439; Ann. N. H. (5) vi. pp. 326–328.

31. Rathbun, R. A List of the Brazilian Echinoderms, with notes on their distribution. Tr. Conn. Ac. v. pp. 139–159.

32. Schneider, A. Ueber Befruchtung [*Asteracanthion glaciale*]. Zool. Anz. iii. pp. 255 & 256.

33. Sladen, W. P. On a Remarkable Form of *Pedicellaria*, and the Functions performed thereby: together with General Observations on the Allied Forms of this Organ in the *Echinidæ*. Ann. N. H. (5) vi. pp. 101–113, pls. xii. & xiii.

34. Stewart, C. Note on an Abnormal *Amblypneustes griseus*. J. L. S. xv. p. 130, pl. v. figs. 4–6.

35. ——. On some Structural Features of *Echinostrephus molaris*, *Parasalenia gratiosa*, and *Stomopneustes variolaris*. J. R. Micr. Soc. iii. pp. 909–912, pl. xx.

36. Studer, T. Ueber Geschlechtsdimorphismus bei Echinodermen. Zool. Anz. iii. pp. 523–527, 543–546.

37. ——. Uebersicht über die während der Reise S.M.S. Corvette 'Gazelle' um die Erde 1874–76 gesammelten Echinoiden. MB. Ak. Berl. 1880, pp. 861–885, 2 pls.

38. Théel, H. Preliminary Report on the *Holothuridæ* of the Exploring Voyage of H.M.S. 'Challenger.' Œfv. Ak. Förh., Bihang. v. No. 19, pp. 3–20, pls. i. & ii.

General Morphology of the Group.

For a general account of the development of the *Echinodermata*, see F. M. Balfour's Treatise on Comparative Embryology (London: 1880), vol. i. pp. 453–482.

Italian works on Echinoderms; Cavanna, Elemente per una Bibliografia Italiana (Firenze: 1880), pp. 90 & 91.

A large part of Fol's observations on the fecundation, &c., of the egg were based on *Asterias glacialis* and *Toxopneustes lividus*; Mém. Soc. Phys. Genèv. xxvi. pp. 89–397.

On reproduction of *Echinodermata* in captivity; MT. z. Stat. Neap. ii. p. 172.

Action of certain drugs on *Synapta digitata*; see Krukenberg (*Vermes*, p. 1.)

The observations of Geddes (16) have a more important bearing on the morphology of the corpuscle than on Echinoderms in particular; he insists, however, on the distinctness between the vascular canals, ambulacral canals, and perivisceral cavity.

The distinct character of the vascular system is further spoken to by Fœttinger's discovery, in *Ophiactis virens*, of veritable oxyhæmaglobin (14).

Ludwig (22) announces the discovery of the fact that in the young Crinoid there is but one primary stone-canal. He believes that the oral and not the basal plates of Crinoids are to be regarded as homologous with the genital plates of the *Echinoidea*, basing this belief on the relations which the primary water-pore has to one of the orals, which rela-

tions are comparable to the constant and intimate connection that there is in all Echinoids between the madreporite and the genital plates.

Carpenter (9) raises considerable objections to this and other suggestions by Ludwig.

Viguier (Arch. Z. expér. viii. "notes, p. 1") replies to Ludwig's criticisms [Zool. Rec. xvi. *Ech.* p. 3], and asserts that the first ambulacral piece is really double.

The more important results of Ludwig's essay (23) on the *Ophiuroidea* were noted last year [Zool. Rec. xvi. *Ech.* p. 3]. The full paper contains an historical and critical account of the work of earlier observers, and an enlargement of some points on which the author has previously insisted. The Ophiurids are stated to be provided, like the Crinoids, with a genital cord placed within blood-vessels, and on this cord the separate genital tubules are set. Pl. xvi. fig. 18 gives a useful diagram of the typical relations of the organs in an Ophiuran.

Lyman (27) describes, as existing in *Ophiotholia* and *Ophiohelus* (gg. nn., see *infrà*), minute spines arranged in bunches and enclosed in a thick skin-bag, in form "resembling long-stemmed agarics, or parasols with small shades," and arranged in two, or even three, parallel vertical rows.

Agassiz (Am. J. Sci. 3, xx. pp. 294–303, 375–390, and Ann. N. H. 5, vi. pp. 348–372) discusses "Palæontological and Embryological Development," as illustrated by the *Echinoidea*, and comes to the general conclusion that, as the actual number of species in any one group must always fall short of the possible number, "it is out of the question for us to attempt the solution of the problem of derivation, or to hope for any solution beyond one within the most indefinite limits of correctness."

Bell (3) suggests that the suddenness of the changes observed in ontological and palæontological development may be explained by the supposition that between definite points in organization neither larval nor adult forms are enabled to maintain the necessary equilibrium, and that consequently the intermediate forms have been so rapidly passed over as to make the chance of their being preserved practically *nil*. Inclining, however, to the view that our limited opportunities, as well as the imperfect record of the past and the possible falsification of the record in species best adapted for investigation, should make us hesitate to favour the view that sudden transitions have really occurred, he points out that, if they have, there is both embryological and palæontological evidence at present in its favour, and that consequently the two factors in evolution here, as elsewhere, seem to run parallel.

Stewart (34) describes a specimen of *Amblypneustes griseus*, in which there was an increase, and Bell (6) one of *A. formosus*, in which there was a decrease, in the normal number of ambulacra.

Sladen (33) describes enormous pedicellariæ globiferæ in *Sphærechinus granularis*.

Studer (36) gives an account of sexual dimorphism in *Echinodermata*, and distinguishes those cases in which these are secondary sexual differences due to the parent's care for the young, from others in which differences could only be found to be associated with a difference in sex,

as demonstrated by an examination of the germ-glands (this latter was seen in *Oreaster turritus* and *Ophiothrix petersi*, sp. n.).

Bell (5) suggests that the difference in the size of the genital pores to be detected in dry tests of *Amblypneustes griseus* and *A. formosus*, may be due to a difference in the sexes.

Giesbrecht (17) finds that the teeth of the *Echinoidea* are made up of lamellæ, or scales and prisms, but never of a calcareous meshwork; there appear to be generic and perhaps specific differences.

Carpenter's studies on *Solanocrinus* (10) lead him to the following conclusions:—(1) In all the Jurassic and some of the Cretaceous *Comatulæ*, the basals are the embryonic basals, reduced in relative size; (2) In all recent *Comatulæ* the embryonic basals are modified and form a rosette; the basal rays which appear externally are only analogous to the true basals of the older *Comatulæ*: (3) A parallel variation in the presence or absence of external basals is seen in the *Pentacrini*; (4) The variations in the development of the basals are useless as generic distinctions.

In (11), Carpenter discusses the hypothesis of Wachsmuth and Springer* that the "column" was subservient to respiration in some, at any rate, of the Palæocrinoids; he points out that the characters which obtain in them are found also in some fossil Crinoids, and suggests that the minute ciliated pores of all recent Crinoids may be found in those Palæocrinoids in which there are no "hydrospires."

Genera and Species.

Verrill, Am. J. Sci. (3) xx. p. 401, gives a "partial list of the *Echinodermata*" collected from the Outer Banks off Southern New England.

J. E. T. Woods, P. Linn. Soc. N. S. W. v. pp. 193–203, has notes on the habits of some Australian *Echini*. See also *id. tom. cit.* pp. 125–131.

Echinoderms of Barents' Sea; see D'Urban, Ann. N. H. (5) vi. pp. 259–261, 270 & 271.

Echinoderms of Bay of Biscay; see Norman, *tom. cit.* pp. 435 & 436.

Echinoderms of the Red Sea; H. Ludwig, in Kossmann's Zoolog. Ergebnisse. (Leipzig: 1880), 7 pp.

Ludwig (21) describes as new *Ophioconis brevispina*, and gives notes on *Antedon phalangium*, *Astropecten squamatus*, *Thyone aurantiaca*, and *Holothuria mammata*.

ECHINOIDEA.

Agassiz (1) describes the following new species:—
Dorocidaris bartletti.
Porocidaris sharreri.
Podocidaris scutata.
Aspidodiadema antillarum, *A. jacobii.*
Asthenosoma reynoldsi.
Phormosoma sigsb[e]ei, *P. petersi.*

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* Revision of the *Palæocrinoidea*; P. Ac. Philad. 1879.

Echinus wallisi.
Palæotropus thomsoni.
Palæopneustes hystrix.
Hemiaster mentzi.
Schizaster orbignianus.

Studer (37) describes as new:—

Amblypneustes grossularia, p. 873, pl. i. fig. 5, New Zealand (perhaps the young of a described form).

Catopygus loveni, p. 878, pl. i. figs. 1–1 *d*, South of Cape of Good Hope.

Spatangus (*Loncophorus*) *interruptus*, p. 880, pl. ii. figs. 2–2 *b*, West Australia.

Hemiaster florigerus, p. 882, pl. ii. figs. 3–3 *c*.

Schizaster capensis, p. 884, pl. ii. fig. 4.

He also figures the lately described *Schleinitzia crenularis* and *Astropyga elastica*, and pedicellariæ of *Arbacia dufresni*, *A. alternans*, *Echinus margaritaceus*, and *E. diadema*.

Stomopneustes atropurpurea (? sp. n.), J. E. T. Woods, P. Linn. Soc. N. S. W. v. p. 198.

Bell (3) defines *Palæolampas*, g. n., as "A petalostichous Echinid, in which the completely parallel ambulacral pores remain paired as far as the ambitus, and in which the tendency to the shortening of one of the two sets is only very slightly indicated in the antero-lateral pair; the outer row of each pair of pores is regularly distributed from the apical area to the actinostome. Bourrelets feebly developed. Anus elongated transversely, infra-marginal. Four genital pores; ocular pores large. Tubercles all primary, and equally distributed over the test. Test not very high. Apical system and actinostome a little in front of the true centre of the test." *P. crassa*, sp. n.

Martin (29) describes as new:—

Pleurechinus javanus and *Laganum multiforme*; and points out that in his opinion:—

Cidaris myxta, Herklots, = *Phyllacanthus baculosa*, Ag.

Temnopleurus areolatus, Herk., and *T. cœlatus*, Herk., are varieties of *T. toreumaticus*, Ag.

Heliocidaris variolosa, Herk., = *Stomopneustes variolaris*, Ag.

Scutella decagona, Herk., = *Peronella decagonalis*, Ag.

Clypeaster latus, Herk., = *C. humilis*, Ag.

Clypeaster tumescens, Herk., = *Echinanthus testudinarius*, Gray.

Echinolampas subangulata (Herk.) = (?) *E. oviformis*, Ag.

Brissopsis latior, Herk., = *Verberkia dubia*, V. Fritsch (?) = *B. luzonica*, Ag.

Pericosmus granulatus, H., = *P. rotundatus*, = *P. planulatus*, = *P. distinctus*, all species of Herklot's.

Eupatagus magnus, Herk., is a *Breynia*, and is closely allied to *B. australasiæ*, Gray.

Spatangus prælongus, Herk., = *S. affinis*, H., = *Maretia planulata*, Gray. *Sp. pulchellus*, Herk., is probably a *Maretia*.

Our present knowledge of the *Echini* of Java shows that the recent

fauna may be traced up to the tertiary strata; and, further, these strata contain no fossils yet found in extra-tropical tertiary deposits; the tropical oceanic fauna was, therefore, in the tertiary epoch, quite as distinct as at the present day.

On Pliocene *Echinoidea*, see Manzoni, Atti Soc. Tosc. iv. 2.

On recent and fossil Echinids, see De Loriol, Bull. Ass. Sci. Fr. viii. pp. 650–654.

The sixth fasciculus of the 'Échinides fossiles de l'Algerie'. (Cotteau, Peron & Gauthier) deals with the 'Étage bathonien.'

P. de Loriol, Monog. des Échinides contenus dans les Couches Nummulitiques de l'Égypte, Mém. Soc. Phys. Genèv. xxvii. pp. 59–148, pls. i.–xi., describes twenty-four new species; there are remarks on the characters of *Conoclypeus*, and the discovery in it of a masticatory apparatus (pp. 75–78): *Echinolampas*, with which he would associate *Palæolampas* (pp. 88 & 89); a summary of the species is given on p. 142; only four of the forty-two are regular, whereas of living Mediterranean forms nine out of eighteen are regular; all but eight are peculiar to the Egyptian fauna.

The same author, *op. cit.* xxvi. i. pp. 73-83, gives a list of the Echinoderms collected by Favre in the Crimea; some are figured.

Fuchs, SB. Ak. Wien, 1880, pp. 97–101, 1 pl., describes as new the following Echinids from tertiary strata of Persia :—

Cœlopleurus tietzii : *Psammechinus affinis* and *Euspatangus siokutensis.*

On the Echinids of the 'Étage Cénomanien,' see Cotteau, Bull. Ass. Sci. Fr. viii. pp. 655–660; and on Tertiary *Echinida* of Belgium, *id.* C. R. xci. pp. 220–222.

ASTEROIDEA.

Brisinga americana, sp. n., off Nova Scotia, 175 faths.; Verrill, Am. J. Sci. (3) xix. p. 139.

Asterias palæocrystallus, Sladen, is a *Pedicellaster*; Ann. N. H. (5) v. pp. 216 & 217.

Leptasterias harti, sp. n., Rathbun (31).

Hymenodiscus agassizi, Perrier (30), g. & sp. nn., from Dominica; disk very thin, and without any regular skeleton, distinctly separated from the arms, which are elongated and flexible. Stomach lodged in a cavity of about the thickness of a sheet of paper. No genital glands in the arms, and no stomachal cœca; allied to the *Asteriidæ* by the characters of its pedicellariæ.

Zoroaster sigsbeei and *Z. ackleyi*, spp. nn., Perrier (30).

Verrill, Am. J. Sci. (3) xx., describes, all from the southern coast of New England :—

Asterias tanneri, sp. n., p. 401.

Odontaster, g. n., p. 402. "Form and appearance like *Archaster*; two rows of marginal plates; dorsal surface with paxillæ; ventral plates polygonal, spinulose. Each jaw bears a large, strong, sharp, erect or everted tooth, outside of the marginal spinules." For *O. hispidus*, sp. n.

Archaster americanus and *A. agassizi*, spp. nn., pp. 402 & 403.

Diplopteraster, p. 400, g. n., for *Pteraster multipes* of Sars; distinguished by having the suckers in four rows, and the horizontal radiating interbrachial spines of the lower surface embedded in and concealed by a thick skin when adult (exposed in the young).

Luidia elegans ?, Perrier; if the form here ascribed to that species be rightly so, Perrier described a very young example.

Tremaster, g. n. "Body thin, pentagonal, the rays united by a thin inter-radial web, extending to their tips. Five inter-radial openings, situated toward the centre of the disk, pass directly to the lower side, where they open at the ab-oral side of the jaw-plates. Ambulacral grooves wide toward the mouth. Suckers in four rows. Upper surface covered with imbricated flat plates, which may bear granules and marginal spinules. Lower surface with small imbedded plates, bearing spines." For *T. mirabilis*, sp. n. Verrill, Proc. U. S. Nat. Mus. ii. p. 201.

Porania spinulosa, sp. n., *id. l. c.* p. 202.

Leptaster, g. n. (Goniasterid), for *L. martini*; P. de Loriol, Abh. schw. pal. Ges. vii. No. 6, p. 5.

Astropecten mabillii, sp. n., *id. l. c.* p. 9, both from the 'Étage bathonien,' both figured.

OPHIUROIDEA.

Certainly the most important contribution this year to the system of this group, is Lyman's Preliminary List (28), which is wonderfully complete. 72 genera of *Ophiuridæ* and 14 of *Astrophytidæ* are mentioned. Of the former, there are 512 species (of which *Ophioglypha* has 59, *Amphiura* 89, and *Ophiothrix* 57 species), and of the latter there are 52 species; of these numbers he (27, p. 7) states that 20 new genera and 167 new species were brought by the 'Challenger.'

Amphipolis luetkeni, Ljungm., = *Amphiura luetkeni*, so *Amphiura luetkeni*, Duncan, is altered to *A. duncani*, Lyman, p. 18; and *A. flexuosa*, (?) Lyman (*nec* Ljungman), is altered to *A. palmeri*, p. 17.

Lyman (27) describes as new genera:—

Ophiotholia. "Disk and arms capable of being raised vertically; the former covered by a delicate scaling set with minute spines. Mouth-angles clothed with several rows of wide flat mouth-papillæ (as in *Ophiomyces*), and with a single row of slender sharp teeth. On outer joints of arms, near margin of each side arm-plate, is a tuft of minute, translucent supplementary spines or pedicellariæ, which have the form of a long-handled parasol. They stand a little inside the true arm-spines, which are continuous to the end of the arm." *O. supplicans*, sp. n., p. 4, pl. i. figs. 1–3, taken at 1825 faths., S.W. of Juan Fernandez.

Ophiohelus. "Disk covered with a delicate film-like scaling, without radial shields. Arm-bones composed of two halves, like curved bars, lying side by side, joined at their ends, and enclosing an oval hole. Mouth-papillæ spiniform, and arranged in a single row; teeth similar; no teeth-papillæ. On the outer joints of the arm, the true arm-spines cease, and are replaced by two or more rows of minute spines, or pedicellariæ, which have the form of a long-handled parasol. *O. umbella*,

sp. n., p. 5, pl. i. figs. 4–10 & 16, 82 faths., off Barbadoes. *O. pellucidus*, sp. n., p. 6, pl. i. figs. 11–15, near Fiji, 1350 faths.

Ophiocymbium. "Disk flat, and covered with delicate overlapping scales, without radial shields externally visible. It overlies and is scarcely attached to the arms, and there seem to be no genital openings. Arm-spines along outer edge of side arm-plates. On jaw-plate, a tuft of small spines, which correspond to teeth and tooth-papillæ. Mouth-papillæ squarish, and arranged in a close line. Tentacle-pores very large; those of the second mouth-tentacles set in a socket much like the rest." *O. cavernosum*, sp. n., p. 7, east of Kerguelen, 1950 faths.

Ophiochytra. "Disk covered with little overlapping scales and small radial shields; teeth; no tooth-papillæ; a line of squarish close-set mouth-papillæ on either side; large side arm-plates, which meet above and below and bear on their outer edge small spines, which, however, stand at nearly a right angle to the arm." For *O. epigrus*, sp. n., 'Challenger' station 276, near Low Archipelago, 2350 fathoms.

Ophiambix. "Disk flat, arms wide and flat, and both beset above with sharp grains, or spines; no radial shields or upper arm-plates externally visible; small, sharp mouth-papillæ and teeth, no tooth-papillæ; tentacle-pores very large; side arm-plates widely separated above and below, but occupying a considerable part of under surface of arm; arm-spines translucent, hollow, and with an uneven surface." For *O. aculeatus*, sp. n., 'Challenger' station 175, near Fiji Islands, 1350 fathoms.

Also, as new species :—

Ophiacantha placentigera, station 175, 1350 fathoms.

Ophiopeza æqualis, station 219, N.E. of New Guinea, 152 fathoms.

Polypholis, g. n. For *P. echinata*, sp. n., Duncan (12).

Hemipholis wallichi, sp. n., *id.* (13).

Amphiura parva, sp. n., Hutton (20).

Ophiarachna armata, sp. n., Troschel, SB. Ver. Rheinl. [1879] p. 137, Mauritius; also notes on the genus, pp. 135–138.

Ophioconis brevispina, sp. n., Ludwig (21).

Ophiothrix petersi, sp. n., Studer (36).

Ophiacantha millespina, sp. n., Verrill, Bull. U. S. Nat. Mus. ii. p. 203.

HOLOTHUROIDEA.

Théel (38) gives the following definition of the *Elasmapoda*, a new order of *Holothuroidea*: —"Body distinctly bilateral; ambulacra well defined; the lateral ambulacra of the trivium bearing large, slightly retractile pedicels, disposed either in a single row, or sometimes in two rows, along each side of the ventral surface, and sometimes with another series of larger highly elongated not retractile processes, placed externally and above the pedicels; pedicels of the two lateral ambulacra symmetrically arranged, being more or less distinctly opposed across the ventral surface; the odd ambulacrum naked, or very seldom with a few rudimental pedicels; bivium provided with very long, not retractile processes, often disposed in one or more rows along each of its ambulacra, and more or

less distinctly opposed across the dorsal surface, or with only a few rudimental ones in its anterior part, or with a single very large one, resembling a broad, branched, or unbranched lobe and near to it some small papillæ; no respiratory trees; integument naked, spiculous, or plated.'

He describes as new genera and species:

Deima, for *D. validum* and *D. fastosum*.
Oneiraphanta; *O. mutabilis*.
Orphnurgus; *O. asper*.
Cryodora; *C. spongiosa*.
Lætmogone; *L. wyville-thomsoni* and *L. violacea*.
Ilyodæmon; *I. maculatus*.
Achlyonice; *A. ecalcarea*.

Elpidia [see Zool. Rec. xiv. *Ech.* p. 4] is referred to this Order; *E. mollis*, *E. globosa*, *E. verrucosa*, *E. nana*, *E. murrayi*, *E. papillosa*, *E. elongata*.

Danielssen & Koren, N. Mag. Naturv. xxv., describe [*cf.* Ann. N. H. (5) vii. pp. 206-208]:—

Kolga, g. n. (*Elpididæ*). "Body bilateral; a buccal disk, furnished with ten tentacles, turned towards the ventral surface; anal aperture on the dorsal surface, near the posterior extremity; on the anterior part of the back a projecting collar, furnished with papillæ; just in front of this, and usually concealed by it, are two apertures, one for the generative organs, the other for the stone-canal; feet on both sides of the body and around its posterior extremity; sexes separate; no 'lungs'." For *K. hyalina*, sp. n. (71° 59′ N., 11° 40′ E.), pp. 83–106, pls. i. & ii.

Acanthotrochus, g. n. "Body cylindrical, apodal, rounded at the posterior extremity; sexes separate; no intestinal appendages; skin furnished with two kinds of differently formed calcareous wheels; the one kind has winged radii, and teeth issuing from the inner margin of the periphery; the other is more than twice as large, and has also winged radii; but from the outer margin of the periphery there spring long teeth turned inwards. Twelve digitate tentacles, which can be concealed in the body." For *A. mirabilis*, sp. n., 73° 47′ N., 14° 21′ E., pp. 115–122, pl. iii. fig. 8.

Ankyroderma [*Ancy-*], g. n. "Body cylindrical. Anterior end transversely cut off. Buccal disk furnished with 15 tubular processes, alternating with 15 oblong depressions, in which there are 15 papilliform tentacles. The posterior extremity produced into a tail-like process. Cloacal aperture surrounded by 5 papillæ. Skin furnished with perforated papillæ, together with calcareous bodies consisting of 5 to 6 spatulate calcareous rods, arranged in a stellate form, from the centre of which rises a calcareous anchor. No feet. Two intestinal appendages." For *A. jeffreysi* and *A. affine*, spp. nn., pp. 128–137, pl. v. fig. 11, & pl. vi. fig. 22.

To the genus *Trochostoma*, D. & K., belong *T. boreale*, M. Sars, *T. arcticum*, Marenz., and *T. oolitieum*, Pourt.

Hutton (20) makes the new genus *Pentadactyla* for *Thyone longidentis*, Hutton, and describes as new species—

Cucumaria thomsoni.

Labidodesmus turbinatus.
Holothuria robsoni.

Chirodota alba, Hutton, belongs to *Echinocucumis.*

Molpadia coriacea, Hutton, belongs to *Caudina* or *Echinosoma.*

On *Myriotrochus rinki*, see Danielssen & Koren, N. Mag. Naturv. xxv. pp. 107–115.

CRINOIDEA.

Carpenter (8) directs attention to the differences between the centrodorsal of *Antedon* and of *Actinometra*; the basal rays are found always in the latter, and in all species of *Antedon* except the European and those of the subgenus *Ophiocrinus.*

On recent and fossil Crinoids, see De Loriol, Bull. Ass. Sci. Fr. viii. pp. 627–636.

For the anatomy and new species of *Pentremites*, see Hambach, Tr. Ac. St. Louis, iv. pp. 145–161, pls. A & B.

Carpenter (8) describes as new—

Antedon rugosa, p. 49, pl. v. fig. 2, *A. æquimarginata*, pl. v. fig. 4, *A. oveni*, p. 51, *A. rotunda*, p. 52, pl. v. fig. 5, *A. prisca*, p. 54, pl. v. fig. 7.

Actinometra abnormis, p. 53, pl. v. fig. 8, *A. muelleri*, p. 54, pl. v. fig. 6.

In (11) he describes as new—

Antedon perforata, p. 549, pl. xxiii. fig. 2, *A. lundgreni*, p. 550, pl. xxiii. fig. 3, *A. striata*, p. 551, pl. xxiii. fig. 5, *A. laticirra*, p. 551, pl. xxiii. fig. 6, *A. incurva*, p. 552, pl. xxiii. fig. 1.

Thiolliericrinus ribeiroi, p. 11, and *Antedon choffati*, p. 13 (étage bathonien), spp. nn., P. de Loriol, Abh. schw. pal. Ges. vii. No. 6, both figured.

On the tertiary species of *Antedon*, see F. Fontanes, Bull. Soc. Géol. (3) vii. pp. 497–500.

Lecythiocrinus, g. n., from carboniferous strata, C. A. White, Pr. U. S. Nat. Mus. ii. p. 256.

Seguenza describes the tertiary Echinoderms of Calabria in Atti Ac. Rom. (3) Mem. Sci. fis. vi. pp. 42, 54–56, 61, 86, 133, 214–216, 298, 330, & 373.

Wright has published oolitic fossil *Echinodermata* (*Asteroidea* and *Ophiuroidea*) in Pal. Soc. xxxiv.

CŒLENTERATA.

HYDROZOA AND CTENOPHORA, BY ALFRED GIBBS BOURNE, B.Sc. (LOND.), &c.

ANTHOZOA, BY SYDNEY J. HICKSON, B.Sc. (LOND.), &c.

HYDROZOA AND CTENOPHORA.

1. AGASSIZ, A. Remarks on Hæckel's "Das System der Medusen", i. pt. 1. Am. J. Sci. (3) xix. pp. 245–248.
2. ALLMAN, G. J. On *Limnocodium victoria*, a new Hydroid *Medusa* of Fresh-water. J. L. S. xv. pp. 131–137, figs.
3. ——. The Fresh-water *Medusa*. Nature, xxii. pp. 117, 218, 290.
4. BROOKS, W. K. Budding in Free *Medusæ*. Am. Nat. xiv. pp. 670–671.
5. CARTER, H. J. *Stromatopora dartingtoniensis*, sp. n., with tabulation in the larger branches of the astrorhiza. Ann. N. H. (5) vi. pp. 339–347, pl.
6. ——. Report on Specimens Dredged up from the Gulf of Manaar and presented to the Liverpool Free Museum by Capt. W. H. Cawne-Warren. *Op. cit.* v. pp. 437–457, pls. xviii. & xix.
7. CHUN, C. Die Ctenophoren des Golfes von Neapel und der angrenzenden Meeres-Abschnitte. Leipzig : 1880, pp. 75, 18 pls. woodcuts. Forms Monographie i. of "Fauna und Flora des Golfs von Neapel."

The author deals in a most complete manner with the morphology (including histology) and development of the group : the remaining portion of the volume is systematic. The outline of the classification adopted is given with the list of new genera and species.

8. CIAMICIAN, J. Ueber *Lafoea parasitica*, sp. n. Z. wiss. Zool. xxxiii. pp. 673–676, pl.
9. DU PLESSIS, G. Observations sur la Cladocoryne flocconense (*Cladocoryne floccosa*, Rotch). MT. z. Stat. Neap. ii. pp. 176–196, pl.

10. [Du Plessis, G.] Catalogue provisoire des Hydroides Médusipares (Hydroméduses vraies) observés durant l'hiver 1879–80 à la station Zoologique de Naples. *L. c.* pp. 143–149.

11. D'Urban, W. S. M. The Zoology of Barents' Sea. Ann. N. H. (5) vi. p. 253.

One new species, *Sertularella quadricornuta*, described by Hincks, *tom. cit.* p. 277, xv. figs. 1 & 1 *a*.

12. Fewkes, J. W. The Siphonophores. I. The Anatomy and Development of *Agalma*. Am. Nat. xiv. pp. 617–630, fig.

13. ——. Note on the Structure of *Rhizophysa filiformis*. P. Bost. Soc. xx. pp. 292–303, pl.

Gives an account of the structure and traces the development of the feeding polyps and tentacles.

14. ——. The tubes in the large nectocalyx of *Abyla pentagona*. L. c. pp. 318–324, pl.

Describes and figures the course of the chymiferous tubes in the large swimming bell of *Abyla pentagona* and *Epibula aurantiaca*.

15. ——. Contributions to a Knowledge of the Tubular Jelly-fishes. Bull. Mus. C. Z. vi. No. 7, pp. 127–146, 3 pls.

Describes the development of the tentacular knob of *Physophora hydrostatica*; discusses the mantle-tubes of *Apolemia uvaria* and *Gleba hippopus*; and gives notes on *Halistemma*, *Agalma*, and *Agalmopsis*, and on a few *Siphonophoræ* and *Velellidæ* from the Eastern Coast of the United States.

16. Fraipont, J. Recherches sur l'organisation, histologique et le développement de la *Campanularia angulata* (Hincks). Arch. Z. expér. viii. pp. 433–467, 3 pls. (C. R. xc. pp. 43–45; Zool. Anz. iii. pp. 135–138; Guide Nat. 1880, pp. 45 & 46; Ann. N. H. 5, v. pp. 265–267).

The author shows that in *C. flexuosa* and *C. angulata* the ova are endodermic in origin, and the spermatozoa ectodermic, as was shown by Bergh to be the case in *Gonothyrea loveni* and by E. Van Beneden in *Campanularia flexuosa*, and concludes that this mode of origin is common to the whole Campanularian family. In face of the conflicting opinions as to the origin of the generative products from the germinal layers in *Cœlenterata*, researches on individual species in this respect are exceedingly interesting, though they only tend to show that the place of origin varies in different genera, and that it is impossible to follow R. & O. Hertwig in their recent assertion that the generative products originate from the ectoderm only.

17. Goette, A. Ein neuer Hydroid-Polyp, mit einer neuen Art der Fortpflanzung. Zool. Anz. iii. pp. 352–358.

18. Granger, A. Invasion des Vélelles à la plage de Cette. Actes Soc. L. Bord. 1879, pp. xlvi. & xlvii.

19. Haacke, W. Zur Blastologie der Gattung *Hydra*, specielle und generelle Studien zur Morphologie und Entwickelungslehre. Jen. Z. Nat. xiv. pp. 133–153, 2 pls.

20. Hæckel, E. Ueber die Organisation und Classification der Acraspeden. SB. Jen. Ges. 1880 (Feb.); Kosmos, iv. pp. 310–317.

21. ——. Ueber die Organisation und Classification der Discomedusen. *Ibid.*

22. ——. Ueber die Acraspeden-Arten des Mittelmeeres. *Ibid.*

23. ——. Das System der Medusen, Erster Theil einer Monographie der Medusen. Zweite Hälfte des Ersten Thiels; System der Acraspeden. Denk. Ges. Jena, 1880, 672 pp., Atlas, with 20 pls.

The present volume deals with the Acraspedote *Medusæ*. *Acraspeda* are defined as *Medusæ* possessing gastral filaments (phacellæ), with endodermal gonads devoid of true velum (often possessing pseudovelum [velarium]), with true marginal lappets to the umbrella, devoid of a double centralized nerve-ring. Phylogenetically descended in all probability, and ontogenetically, in some cases (though not at the present day in the majority), from Scyphopolypes with gastral filaments or from *Scyphistomæ*. Ontogenesis generally with alternations of generations (in the form of Strobilogenesis), often with direct development. The sexual Acraspedote generation develops by terminal budding from the asexual *Scyphistoma* generation. *Acraspedæ* may, according to Hæckel, be divided into two grades:—I. *Tesseroniæ*, Hck. *Acraspedæ* sometimes devoid of, sometimes possessing, four tentaculocysts. Stomach with four wide per-radial enteric pouches, which are separated by four inter-radial knob-shaped or ridge-shaped septa. Generative glands (or gonads) bursal (in the sub-umbral wall or in the cavity of the enteric pouch), with centrifugal growth. Umbrella highly arched, generally conical. Phylogenetic type (and probably endogenetic larval form), *Tessera*. Contains—i. *Stauromedusæ* (*Stauromedæ*, Becherquallen, Hck., 1878). *Acraspedæ* devoid of tentaculocysts, with four horseshoe-shaped generative glands (or four pairs of ad-radial generative ridges) in the wall of the sub-umbrella or of the four enteric pouches. Inter-radial septa of the enteric pouches sometimes four simple knobs, at other times four long ridges. ii. *Peromedusæ* (*Peromedæ*, Taschenquallen). *Acraspedæ* with four inter-radial tentaculocysts, with four pairs of sausage-shaped generative glands in the sub-umbral wall of the ring sinus. Inter-radial septa of the stomach pouches, four small, simple knobs; the enteric pouches communicate therefore with a large ring sinus. iii. *Cubomedusæ* (*Cubomedæ*, Wurfelquallen). *Acraspedæ* with four per-radial tentaculocysts, with four pairs of flattened generative glands, which project freely into the cavities of the four stomach pouches. Inter-radial septa of the enteric pouches, four long ridges. The other grade are—II. *Ephyrioniæ*, Hck. *Acraspedæ* with eight or more tentaculocysts (four per-radial and four inter-radial), and, in addition, frequently other accessory tentaculocysts. Stomach with eight, sixteen, thirty-two, or more enteric pouches (or radial canals instead). Generative glands or gonads, gastral (in the sub-

umbral wall of the central stomach), with centripetal growth. Umbrella depressed, generally disk-shaped. Phylogenetic type, *Ephryœa*; ontogenetic larval form, *Ephyrula*: both permanent in *Ephyra*. The grade contains the order *Discomedusæ* alone, which is divided into the suborder *Cannostomæ* (with the mouth a simple opening at the end of rudimentary manubrium), *Semostomæ* and *Rhizostomæ* (the mouth provided with four or eight arm-like processes; in the latter group, these fuse together forming secondary mouths). *Peromedusæ* are entirely new forms, and most of the *Stauromedusæ* also, the forms in both groups being of remarkable interest. Hæckel diagnoses 39 new genera for 63 species, of which 51 are new; of these, 31 genera are formed for 42 species, which are entirely new. In all, 79 new species are described.

24. Hartog, M. M. On the Mode in which *Hydra* swallows its prey. Q. J. Micr. Sci. xx. pp. 243 & 244.

The nematocysts found in the endoderm appear to have been swallowed with the prey, and to be undergoing digestion. Interstitial cells in isolated patches are found in the tentacles.

25. Hertwig, O. & R. Der Organismus der Medusen und seine Stellung zur Keimblättertheorie. Denk. Ges. Jena, ii. pp. 1–70, 3 pls.

26. Hertwig, R. Ueber den Bau der Ctenophoren. Jen. Z. Nat. xiv. pp. 313–457, 7 pls.

The author deals with the histology of the group. With regard to the structure of the generative organs, Hertwig differs from Chun, and agrees with Claus as to their ectodermal origin. The nervous system consists of two portions—a ganglionic plexus equally distributed below the epithelium (ectodermal), and a system of fibres passing separately into the gelatinous layer (mesodermal); these, no doubt, are connected with the ganglionic plexus, but the author has been unable to demonstrate the connexion. The arrangement of the nervous and muscular fibres leads the author to separate the *Ctenophora* from the *Hydrozoa* and *Anthozoa*, and regard them as derived from very primitive ancestors, when very few characteristics of *Cœlenterata* were present.

27. Hincks, T. On new *Hydroida* and *Polyzoa* from Barents Sea. Ann. N. H. (5) vi. pp. 277–286, pl.

28. Kerschner, L. Zur Entwickelungsgeschichte von *Hydra*. Zool. Anz. iii. pp. 454 & 455.

A preliminary communication.

29. Klipstein, A. von. Die Tertiärablagerungen von Waldvöckelheim und ihre Polyparienfauna. JB. geol. Reichsanst. 1879, pp. 61–68.

30. Korotneff, A. Ueber seine anatomischen, biologischen und embryologischen Beobachtungen au *Hydra*. (Verh. Zool. Sect. vi. Versammlung Russ. Naturf.) Zool. Anz. iii. pp. 165–167.

Besides describing the formation of the egg and its further development, the author remarks upon the columnar shape of the ectoderm cells in the basal portion of the body, and notes the presence of a mucous

secretion which enables the animal to attach itself. These cells may be called glandulo-muscular cells.

31. Krukenberg, C. F. W. Ueber den Wassergehalt der Medusen. Zool. Anz. iii. p. 306.

The percentage of water existing as a constituent of Medusoid tissues seems to be fairly constant, varying between 95·34 and 95·79 only.

32. ——. Bemerkungen zu der Eimer'schen Ansicht über den Ortwechsel der Rippenquallen. Vergl. physiol. Stud. iii. pp. 147–150.

Shows that Eimer's explanation of the manner in which *Beroe* rises and sinks in the water is fallacious, and that poisoned *Beroe* sinks at once, its tissue being denser than the surrounding water.

33. ——. Der Schlag der Schwingplättchen bei *Beroe ovatus*. L. c. pp. 1–22, woodcuts.

34. ——. Ueber die Curare- und Strychninwirkungen au *Turris digitalis*, *Æquorea forskalea*, und *Carmarina hastata*. L. c. pp. 124–146.

The author has tried the action of various poisons on these lower organisms, and has succeeded in mapping out the principal nervous centres in *Beroe*. He finds, moreover, differences presented in closely allied genera in their behaviour towards the poisons which our present knowledge of their anatomy is unable to explain.

35. Lankester, E. Ray. On a new Jelly-Fish of the Order *Trachomedusæ*, living in Fresh-water. Nature, xxii. pp. 147 & 148, 190 & 191, & 241; Zool. Anz. iii. p. 321.

36. ——. *Medusæ* and Hydroid Polyps living in Fresh-water. Q. J. Micr. Sci. xx. pp. 483–485.

Quotes a letter from A. Agassiz, who states that near Boston there are certain Hydroids, *Laomedea gigantea*, *Eucope diaphana*, *E. pyriformis*, and *Obelia commissurialis*, which flourish where they are exposed alternately to nearly fresh and quite salt-water. He also finds here *Sarsia*, *Tiaropsis*, and some *Aureliæ*. This shows that the mere occurrence of *Limnocodium* in fresh-water is not so very remarkable.

37. ——. On *Limnocodium sowerbii*, a new *Tracho medusa*, inhabiting fresh-water. *L. c.* pp. 351–371, 2 pls.

38. ——. Article "*Hydrozoa*," in Encyclopædia Britannica (9th ed.), xii. pp. 547–565, figs. 1–58.

The author puts forward a classification of the group which, while it agrees in the main with that recently put forward by Hæckel (Zool. Rec. xvi. *Cœl.* p. 4, and *suprà*, No. 23), differs from it in certain important respects. The class *Hydrozoa* falls into two sub-classes: i., *Scyphomedusæ*, and ii., *Hydromedusæ*. The term *Scyphomedusæ* is synonymous with Hæckel's *Acraspeda*, the Lucernarians being now called by the latter *Stauromedusæ*. The term *Hydromedusæ* includes the four orders of Hæckel's *Craspedota*, viz., *Anthomedusæ*, *Leptomedusæ*, *Trachomedusæ*, and *Narcomedusæ*, with Moseley's order *Hydrocorallinæ*, and the *Siphonophora*. The terms *Anthomedusæ* (Hck.) and *Leptomedusæ* (Hck.), are advantageously compounded with Allman's terms *Gymnoblastea* and

Calyptoblastea; the *Gymnoblastea-Anthomedusæ* (E. R. L.), and *Calyptoblastea-Leptomedusæ* (E. R. L.) forming very well defined groups. There is a complete account of the general anatomy of the group, and notes as to the terms used in classification by previous authors.

39. Lapworth, C. On the Geological Distribution of the *Rhabdophora*. Ann. N. H. (5) v. pp. 273–285 & 358–369; vi. pp. 16–29 & 185–207.

Groups the *Rhabdophora* thus :—

1. *Monograpta.* Simple and complex forms of genus *Monograptus.*
2. *Diplograpta.* Variously modified forms of the biserial genus *Diplograptus.*
3. *Didymograpta.* Simple, complex, and compound modifications of the bilateral genus *Didymograptus.*
4. *Dicellograpta.* Similar variations of the genus *Dicellograptus.*

The *Rhabdophora*, or true Graptolites, are exclusively Lower-Palæozoic. The three grand groups, 1, 3 & 4, are so restricted in their vertical range that each distinguishes a certain portion of the ascending succession of formations, and by means of a study of the distribution of the Graptolites, the Lower Palæozoic may be divided into their component zones.

40. ——. On new British Graptolites. *Op. cit.* v. pp. 149-177, pls. iv. & v.

Two new genera and one new subgenus are formed for 13 new species.

41. Mereschkovsky, C. On the origin and development of the ovum in *Eucope* before fecundation. Ann. N. H. (5) v. pp. 498–500.

42. ——. Sur l'origine et le développement de l'œuf chez la Méduse *Eucope*, avant la fécondation. C. R. xc. pp. 1012–1014.

In *Eucope* the eggs develop from the endoderm cells, and in the egg there is no nucleolus visible before fecundation, the nucleus being homogeneous.

43. Metschnikoff, E. Ueber die intercellulare Verdauung bei Cœlenteraten. Zool. Anz. iii. pp. 261–263.

Intercellular digestion has now been shown to exist in so many types of *Cœlenterata* that it may be considered as the normal method. It has been observed in *Hydra*, *Plumularia*, and *Tubularia*, in *Eucope*, *Oceania*, *Tiara*; in *Pelagia*; among *Siphonophora*; in *Praya*, *Forskalia*, *Hippopodius*; in the Ctenophoran *Beroe*; and the Actinian genera *Sargartia* and *Æptasia*. The author remarks upon its absence in the group of *Trachomedusæ*, but it has now been proved to exist in *Limnocodium sowerbii*.

44. Parker, T. Jeffrey. On the histology of *Hydra fusca*. Q. J. Micr. Sci. xx. pp. 219–224; P. R. Soc. xxx. pp. 61–66.

The fibres connected with the ectoderm cells are muscular and not sensory. The supporting lamella is a distinct structureless membrane between the muscular layer and endoderm. The endoderm is ciliated, each cell bearing two or three large cilia; its cells become plasmodial, and ingest solid particles.

45. Richiardi, S. Idroidi del mare di Toscana, in Catalogo della Sezione Italiana dell' Esposizione internazionale di pesca in Berlino, 1880, pp. 154 & 155.

[Not seen by the Recorder.]

46. Romanes, G. J. The Physiology of the Fresh-water *Medusa*. Nature, xxii. p. 191.

Refers to *Limnocodium sowerbii* [infrà, p. 8].

47. Savarinski, P. [A Russian paper supplementing Kleinenberg's monograph on *Hydra*.]

48. Studer, T. Ueber scheinbare Knospen an *Herpetolitha limax*. SB. nat. Fr. 1880, pp. 173 & 174.

49. Tenison-Woods, J. E. On the Anatomy of *Distichophora*, with a Monograph of the Genus. J. R. Soc. N. S. Wales, xiii. [1879], pp. 49–63, 2 pls.

Describes 11 species of *Distichophora* as living in Australian Seas, and gives full and historical references.

50. Weismann, A. Zur Frage nach dem Ursprung der Geschlechtszellen bei den Hydroiden. Zool. Anz. iii. pp. 226–233 (pt. 1) & 367–370 (pt. 2).

The author shows the endodermal origin of ova in the *Pennularidæ* and *Sertularidæ*, and proposes to divide Hydroids into two groups according to the development of the generative cells in the cœnosarc (Cœnogenous Hydroids) or in primary individuals (Blastogenous Hydroids).

51. Wilson, C. B. The Early Stages of *Renilla*. Am. J. Sci. (3) xx. pp. 446–449, pl.

52. Winther, G. Fortegnelse over de i Danmark og dets nordlige Bilande fundna Hydroide Zoophyter. Nat. Tids. xii. pp. 223–278.

53. Young, J. The Spiral Character of Cœlenterate Development. Ann. N. H. (5) v. p. 212.

Sub-Class HYDROMEDUSÆ.

Order i., Gymnoblastea-Anthomedusæ.

Codonium conicum, sp. n., Hæckel, (23) p. 634, Zweiter Nachtrag, Indian Ocean.

Hydrodendrium, g. n., Carter, (6) p. 454, for *H. spinosum*, sp. n., *id. ibid.* pl. xix. figs. 8 *a–g*.

Hydrella ovipara, sp. n., Goette, (17) p. 352, figs. 1 & 2, Naples. Undergoes a degeneration of some of its polypes at the period of sexual maturity; the ova are developed from the endoderm and within the stalk.

Order ii., Calyptoblastea-Leptomedusæ.

Sertularella quadricornuta, sp. n., Hincks, (27) p. 277, pl. xv. figs. 1 & 1 *a*.

Lafoea parasitica, sp. n., Ciamician, (8) p. 673, pl. xxxix., parasitic on an undescribed species of *Aglaophina*, allied to *L. parvula* and *L. pygmæa*.

Order iii., Trachomedusæ.

Petasata rabbeana, sp. n., Hæckel, (23) p. 637, Zweiter Nachtrag, Indian Ocean, south of Madagascar.

Limnocodium, g. n., Allman, (2) found in fresh-water in the *Victoria regia* tank in the Botanical Society's Gardens, Regent's Park, London. It is remarkable among the family *Petasidæ*, to which it belongs, for the great number of its tentacles, which are all solid, and for its very numerous otocysts. It differs, moreover, from all velate *Medusæ* (exclusive of *Charybdea*) in possessing centrifugal radiating canals, passing from the otocysts into the velum, where they end cœcally. For *L. victoria*, sp. n., *id. ibid.* This genus and species are anticipated by *Craspedacusta* (subsequently given as *Craspedacustes*) *sowerbii*, E. Ray Lankester (35), pp. 147 & 148, but the latter author withdraws his generic name in favour of Allman's. Further described in Q. J. Micr. Sci. xx. pp. 351-371, pls. xxx. & xxxi. (36), and J. L. S. xv. pp. 131–137, with fig. (2). See also Romanes.

Order iv., Narcomedusæ.

Solmaris weberi, sp. n., Hæckel, (23) p. 638, Zweiter Nachtrag, Tropical zone of Pacific Ocean.

Order v., Hydrocorallinæ.

Stromatopora dartingtoniensis, sp. n., Carter, (5) pp. 339-347, pl. xviii., Dartington, Devon, presents tabulation in the larger branches of the astrorhiza.

Graptolites.

Monograptus galaensis, Lapw., var. n. *basilicus*, Lapworth, (40) p. 152, pl. iv. figs. 6 *a*–6 *d* (= *M. colonus*, id. Ann. N. H. 5, v. pp. 59 & 60).

Monograptus crenularis, p. 153, figs. 10 *a*–10 *e*, and *crassus*, p. 155, fig. 8 *b*, spp. nn., *id.* (40) pl. iv.; *M. hisingeri*, Carr., var. n. *nudus*, Lapworth, (40), p. 156, pl. iv. figs. 7 *a*, *b*, & *c*.

Cyrtograptus linnarssoni, sp. n., Lapworth, *l. c.* p. 158, pl. iv. figs. 12 *a* & 12 *b*.

Azygograptus cœlebs, sp. n., *id. l. c.* p. 159, pl. v. figs. 16 *a*–16 *c*.

Dicellograptus complanatus, p 163, figs. 17 *a*–17 *c*, *intortus*, figs. 19 *a*–19 *c*, and *patulosus*, p. 162, figs. 18 *a*–18 *f*, spp. nn., *id. l. c.* pl. v.

Bryograptus, g. n., *id. l. c.* p. 164. Differs but slightly from *Dichograptus* and *Clonograptus*. For *B. kjerulfi*, p. 164, figs. 22 *a* & 22 *b* (= *Graptolithus tenuis*, Portlock, Kjerulf, Veiviser, p 3, figs. 6 *a*, *b*, A, B), and *callavii*, p. 165, figs. 21 *a* & 21 *b*, spp. nn., *id. l. c.* pl. v.

Diplograptus socialis, sp. n., *id. l. c.* p. 166, pl. iv. figs. 13 *a*–13 *e* *D.*

(*Glyptograptus*) *euglyphus*, sp. n., *id. ibid.* pl. iv. figs. 14 *a*–14 *e*, = *D. dentatus*, Brongn., Lapworth, Tr. Belfast Field Club, 1856-57, pl. vi. fig. 13, J. G. Soc. 1878, p. 329, Ann. N. H. (5) iv. [1879] p. 424.

Idiograptus, subg. n., Lapworth, *l. c.*, for *I.* (*Diplograptus*) *aculeatus*, sp. n., p. 170, pl. vi. figs. 23 *a* & 23 *b*.

Cryptograptus, g. n., *id. l. c.* p. 174. Type, *Diplograptus* (*Cryptograptus*) *tricornis*, Carr.

Lasiograptus retusus, sp. n., Lapworth, *l. c.* p. 175, pl. v. figs. 24 *a*–24 *d*.

Chun (7) characterizes the following genera and species :—

CTENOPHORÆ (Esch.).

Order i., Cydippidæ.

Fam. 1. Mertensidæ.

Euchlora filigera, sp. n., p. 227, pl. i. fig. 11.

Charistephane, g. n., p. 278, for *C. fugiens*, sp. n., pl. ii. figs. 7 & 8, = Ctenophoran larva from Messina ; Claus, Z. wiss. Zool. xiv. p. 386, pl. xxxvii. fig. 6.

Fam. 2. Callianiridæ.

Pleurobranchia rhodopis, sp. n., p. 282, pl. ii. figs. 5 & 6.

Lampetia, g. n., p. 282, for *L. pancerina*, sp. n., p. 282, pl. i. figs. 1–3, pl. iii. fig. 5, = *Pancerina singularis*, Nervens. u. Musk. d. Rippenquallen, p. 12.

Euplokamis, g. n., p. 283, for *E. stationis*, sp. n., p. 283, pl. i. fig. 4.

Order ii., Lobatæ.

Fam. 1. Leseuridæ.

Fam. 2. Bolinidæ.

Bolina hydatina, sp. n., p. 292, pl. iv. figs. 5 & 6.

Fam. 3. Deiopeidæ.

Deiopeia, g. n., p. 294, for *D. kaloktenota* [*callictenota*], sp. n., p. 294, pl. iv. figs. 1–4.

Fam. 4. Eurhamphæidæ.

Fam. 5. Eucharidæ.

Order iii., Cestidæ.

Order iv., Beroidæ.

Hæckel (23) characterizes the following genera and species :—

Order v., Stauromedusæ, Hæck., 1877.

Fam. 17. *Tesseridæ*, Hck., 1877.

Sub-fam. Tesseranthidæ, Hck.

Tessera, g. n., p. 374, for *T. princeps*, p. 374, pl. xxi. figs. 1–6, South-

east of Kerguelen Land, and *T. typus*, p. 638, Zweiter Nachtrag, Indian Ocean, South of Madagascar, spp. nn.

Tesserantha, g. n., p. 375, for *T. connectens*, sp. n., *ibid.*, near Juan Fernandez.

Tesseraria, g. n., p. 633, Ersto Nachtrag, for *T. scyphomeda*, sp. n., p. 638, Zweiter Nachtrag, Bass's Straits, between Australia and Tasmania.

Sub-fam. Depastridæ, Hck.

Depastrella, g. n., p. 376, for *D. carduella*, sp. n., pl. xxi. figs. 5–12, = *Carduella depastrella*, Hck., 1877, Canary Islands, 1866.

Depastrum polare, sp. n., p. 639, Zweiter Nachtrag, Arctic Ocean, Spitzbergen.

Fam. 18. LUCERNARIIDÆ, Johnston (1847).

Sub-fam. Haliclystidæ, Hck., = Eleutherocarpidæ.

Lucernaria pyramidalis, p. 391, pl. xxii., Labrador, *infundibulum* (= *Lucernella infundibulum*, Hck.), Spitzbergen, *bathyphila*, p. 640, N. Atlantic Ocean, between Fair Island and Shetland, 540 fath., spp. nn.

Order vi., PEROMEDUSÆ, Hck., 1877.

Fam. 19. PERICOLPIDÆ, Hck. (1877).

Pericolpa, g. n., p. 413, for *P. quadrigata*, pl. xxiii., and *P. tetralina*, p. 640, Zweiter Nachtrag, South Coast of Australia, spp. nn.

Pericrypta, g. n., p. 414, for *P. galea*, West Coast of Australia, and *campana*, near New Zealand, spp. nn.

Fam. 20. PERIPHYLLIDÆ, Hck. (1877).

Peripalma, g. n., p. 418, for *P. corona*, sp. n., *ibid.*, Straits of Gibraltar.

Periphylla regina, p. 421, South-east of Kerguelen Island, 12,000 feet, and *mirabilis* p. 422 (= *Periphenga mirabilis*, Hck., 1877), 6,600 feet deep, East Coast of New Zealand, spp. nn.

Order vii., CUBOMEDUSÆ, Hck. 1877.

Fam. 21. CHARYBDEIDÆ, Gegenbauer, 1856.

Subfam. Procharagmidæ, Hck. (1877).

Procharagma, g. n., p. 436, for *P. prototypus*, sp. n., *ibid.* pl. xxv. figs. 1 & 2, Chinese Sea.

Procharybdis, g. n., p. 437, for *P. tetraptera*, sp. n., p. 437, pl. xxv. figs. 3 & 4, Indian Archipelago, *flagellata* (? = *Marsupialis flagellata*, Lesson, 1843, Acalèphes, p. 278, Northern Coasts of Australia, ? New Guinea), *cuboides*, p. 439, Sandwich Islands, and *securigera*, p. 640, Zweiter Nachtrag, Pacific Coast of Central America, spp. nn.

Subfam. Tamoyidæ, Hck. (1877).

Charybdea pyramis, p. 440, pl. xxv. figs. 5–8 (= *Charybdella pyramis*, Hck., 1877, Atlantic Tropics), *obeliscus*, p. 441 (= *Charybdusa obeliscus*, Cape Verde Islands), and *murrayana*, p. 442 (= *Charybdusa murrayana*, Hck., Sierra Leone, 200 fath.), spp. nn.

Tamoya prismatica, sp. n., p. 443, Antilles.

Fam. 22. CHIRODROPIDÆ, Hck. (1877).

Chiropsalmus quadrigatus, p. 447, Indian Ocean, and *zygonema*, p. 641, Zweiter Nachtrag, South Atlantic Ocean, Argentine Coast, spp. nn.

Chirodropus, g. n., for *C. palmatus*, S. Atlantic, and *gorilla*, New Guinea, p. 448, pl. xxvi., spp. nn.

Order viii., Discomedusæ, Hck., 1866.

Suborder i., *Cannostomæ*, Hck.

Fam. 23. Ephyridæ, Hck. (1877).

Subfam. Palephyridæ, Hck.

Ephyra prometor, p. 482, pl. xxvii. figs. 1 & 2 (= *Archephyra prometor*, Hck., 1877, Coast of Australia), and *discometra*, p. 641, Zweiter Nachtrag, Indian Ocean, spp. nn.

Palephyra, g. n., p. 483, for *P. primigenia*, ibid. pl. xxvii. figs. 3-6, Red Sea, Arabian Coast, and *antiqua*, p. 484, Indian Ocean, spp. nn.

Zonephyra, g. n., p. 484, for *Z. zonaria*, ibid. pl. xxvii. figs. 7 & 8, China, *connectens*, p. 641, Zweiter Nachtrag, Tropical Girdle of Pacific Ocean, and *pelagica*, p. 485, Japan, spp. nn.

Sub-fam. Nausithoidæ, Hck.

Nausicaa, g. n., p. 485, for *N. phœacum*, ibid. pl. xxvii. figs. 9 & 10, Corfu.

Nauphanta, g. n., p. 487, for *N. challengeri*, sp. n., *ibid.*, S. Atlantic, Tristan d'Acunha, in 8550 ft.

Sub-fam. Collaspidæ.

Atolla, g. n., p. 488, for *A. wyvillii*, sp. n., *ibid.*, Antarctic Ocean, Indian and Atlantic portion.

Collaspis, g. n., p. 489, for *C. achillis*, sp. n., *ibid.* pl. xxviii., Antarctic Ocean, between the Crozet Islands and Kerguelen Island, 6000 ft. deep.

Fam. 24. *Linergidæ*, Hck.

Linantha, g. n., p. 494, for *L. lunulata*, sp. n., *ibid.* pl. xxix. figs. 1–3, Pacific Coast of Tropical S. America, Galapagos Island.

Linerges, g. n., p. 495, for *L. mercurius*, ibid. pl. xxix. figs. 4–6, Antilles Sea, between 19° & 21° N. lat., 73° & 82° W. long., and *pegasus*, ibid., Atlantic Coast of Tropical N. America, Campeche Gulf, West Indies, *draco*, Chinese Sea, near the Equator, and *aquila*, Indian Ocean, east of Madagascar, p. 496, spp. nn.

Liniscus, g. n., p. 496, for *L. ornithopterus*, p. 497, West Coast of Tropical Africa, Angola, Congo, *sandalopterus*, ibid., tropical portion of the Atlantic Ocean, West Coast of Tropical Africa, and Coast of New Guinea, and *cyamopterus*, ibid., West Coast of Tropical Africa, Cape Verdes, spp. nn.

Linuche vesiculata, p. 499, Gulf of Mexico, and *lamarcki*, p. 642, Zweiter Nachtrag, Atlantic Ocean, under the Equator, spp. nn.

Sub-order ii., *Semostomæ*, L. Agassiz.

Fam. 25. Pelagiidæ, Gegenbauer (1856).

Pelagia papillata, Indian Ocean, and *placenta*, Philippine Sea, Caroline Islands, Ponapé, Seniavin, spp. nn., p. 509.

Fam. 26. CYANEIDÆ, L. Agassiz (1862).

Procyanea, g. n., p. 524, for *P. protosema*, sp. n., *ibid.*, Indian Ocean, East of Madagascar.

Stenoptycha dactylometra, p. 526, Arctic Ocean, Greenland, and *gœtheana*, p. 642, Zweiter Nachtrag, S. Atlantic Ocean, Argentine Coast, spp. nn.

Desmonema annasethe, sp. n., p. 526, pl. xxx. S. Atlantic Ocean, West Coast of S. Africa.

Melusina, g. n., p. 534, for *M. formosa*, sp. n., p. 535, Pacific Coast of S. America, between Valparaiso and Juan Fernandez in 120 feet.

Drymonema, g. n., p. 633, Erster Nachtrag, for *D. dalmatina*, sp. n., p. 642, Zweiter Nachtrag, Mediterranean, Coast of Dalmatia, Island Lesina.

Fam. 27. FLOSCULIDÆ, Hck. (1877).

Floscula, g. n., p. 537, for *F. promethea*, pl. xxxii. figs. 1–4, Indian Ocean, and *pandora*, p. 643, Zweiter Nachtrag, Tropical Zone of Pacific Ocean, spp. nn.

Floresca, g. n., p. 538, for *F. parthenia*, ibid., pl. xxxii. figs. 5–8, Coast of New Caledonia, and *palladia*, p. 539, Coast of New Guinea, spp. nn.

Fam. 28. ULMARIDÆ, Hck. (1877).

Sub-fam. Umbrosidæ, Hck. (1877).

Ulmaris, g. n., p. 545, for *U. prototypus*, sp. n., *ibid.*, pl. xxxiii. figs. 1–4, S. Atlantic Ocean, St. Helena.

Umbrosa, g. n., *ibid.*, for *U. lobata*, Hck., = *U. lobata*, Hck., 1877, Prod. Syst. Med. M. p. 469, = *Discomedusa lobata*, Claus, 1877, Denk. Ak. Wien, xxxviii. p. 42, pls. viii. & ix.

Undosa, g. n., p. 546, for *U. undulata*, sp. n., *ibid.* pl. xxxiii. figs. 5 & 6. West Coast of Tropical Africa, Upper Guinea, Fernando Po.

Sub-fam. Sthenonidæ, L. Ag. (1862).

Sub-fam. Aurelidæ, L. Ag. (1862).

Aurosa, g. n., p. 559, for *A. furcata*, sp. n., *ibid.* pl. xxxiii. figs. 7 & 8, Indian Ocean.

Auricoma, g. n., p. 633, Erster Nachtrag, for *A. aphrodite*, sp. n., p. 644, Zweiter Nachtrag, Tropical Zone of Pacific Ocean.

Sub-order iii., *Rhizostomæ*, Cuvier.

Fam. 29. TOREUMIDÆ, Hck. (1877).

Sub-fam. Archirhizidæ, Hck.

Archirhiza, g. n., p. 565, for *A. primordialis*, sp. n., *ibid.* pl. xxxvi. figs. 1 & 2, Bass's Straits, between Australia and Van Diemen's Land, and *aurosa*, sp. n., p. 645, Zweiter Nachtrag, New Zealand.

Sub-fam. Polyclonidæ, L. Ag. (1862).

Toreuma, g. n., p. 566, for *T. theophila*, Hck. (= *Cassiopea dieuphila*, Péron & Lesueur, = *C. theophila*, Lamk., = *Rhizostoma theophila*, Esch., = *Polyclonia theophila*, L. Ag.), *thamnostoma*, sp. n, p. 567, Indian Ocean,

and *gegenbauri*, sp. n., p. 645, Zweiter Nachtrag, Tropical Zone of Indian Ocean.

Cassiopea ornata, sp. n., p. 570, pl. xxxvii. (= *Bryoclonia ornata*, Hck., 1877, Pr. Syst. Med. M. p. 478, South-west portion of Pacific Ocean, New Guinea, Pelew Islands, Australia), and *depressa*, sp. n., p. 572, South-west portion of Indian Ocean, Madagascar, Querimba Island (Coast of Mozambique).

Sub-fam. Polyrhizidæ, Hck.

Cephea conifera, sp. n., p. 576, pl. xxxvi. figs. 3–6, Tropical Girdle of Pacific Ocean, Caroline Islands, Samoa Islands.

Fam. 30. *Pilemidæ*, Hck. (1877).

Sub-fam. Lychnorhizidæ, Hck.

Toxoclytus tripterus, sp. n., p. 586, West Coast of Tropical Africa, Guinea, Fernando Po.

Lychnorhiza, g. n., p. 587, for *L. lucerna*, sp. n., p. 587, pl. xxxiv., Brazil.

Phyllorhiza trifolium, sp. n., p. 589, Japanese Sea.

Sub-fam. Eupilemidæ, Hck.

Eupilema, g. n., p. 590, for *E. scapulare*, sp. n., *ibid.*, Sunda Archipelago, Sumatra.

Pilema, g. n., p. 591.

Sub-gen. *Eurhizostoma*, for *P. pulmo*, Hck., = *Medusa pulmo*, Linn., = *M. pulmo*, Macri, = *M. octopodea*, Brünnich, = *Pulmo marinus*, Aldrovandi, = *Potta marina*, Aldrovandi, = *Rhizostoma aldrovandi*, Péron & Lesueur, Lesson, & Noshin, = *R. cuvieri*, Eysenhardt, Esch., Milne-Ed., Al. Brandt, & Claus, = *R. pulmo*, L. Ag., = *Cephea aldrovandi*, Lamk., = *Eurhizostoma pulmo*, Hck., 1877; *P. octopus*, Hck., = *Medusa octopus*, Lim. (= Gmelin), and Bosc., = *M. octopedalis*, Borlase, = *M. lunulata*, Pennant, = *M. sepioides*, Tilesius, = *Rhizostoma cuvieri*, Péron. & Les., Blainv., Lesson & Gosse, = *R. cæruleum*, Cuvier, = *R. undulata*, Fleming, = *R. sepioides*, Tilesius, = *R. octopus*, Oken, = *R. pulmo*, Forbes (*nec* Agassiz), = *C. borlasea*, Péron & Les., = *C. lunulata*, Fleming & Esch., = *C. rhizostomoidea*, Tilesius, = *C. anglica*, Tilesius, = *Holigocladodes lunulatus*, L. Ag., = *Cephea rhisostoma*, Lamk., = *Eurhizostoma octopus*, Hck., 1877; *P. corona*, Hck., = *Medusa corona*, Forskal., = ? *M. tetrastyla*, Forsk., = *Rhizostoma corona*, Esch., & L. Ag., = *R. forskali*, Pér. & Les., and Less., = ? *R. tetrastyla*, Less., = ? *R. cuvieri*, Ehrbg. (*nec* Péron), = *Cephea corona*, Lamk., = *Eurhizostoma corona*, Hck.

Sub-gen. *Stylonectes*, L. Ag. (1862).

Pilema stylonectes, Hck., = *S. luteus*, L. Ag., = *S. orithyia*, Hck., 1877, = *Orithyia lutea*, Quoy & G., = *Rhizostoma lutea*, Esch., = *R. luteum*, Grenacher & Noll, = *Pilema orithyia*, Hck., 1878; *P. clavigera*, Hck., sp. n., p. 595, = *Stylonectes clavigera*, Hck., 1877, Chinese Sea, Hongkong.

Rhopilema, g, n., p. 596, for *R. rhopalophora*, sp. n., *ibid.*, Indian Ocean, East of Madagascar.

Sub-fam. Stomolophidæ, Hck.

Brachiolophus, g. n., p. 597, for *B. collaris*, sp. n., *ibid.*, Tropical Girdle of Pacific Ocean, Galapagos Island.

Stomolophus fritillaria, p. 598, pl. xxxv., Atlantic Coast of Tropical S. America, Surinam, and *agaricus*, p. 599, Pacific Coast of Central America, Costa Rica, Puntarenas, spp. nn.

Fam. 31. *Versuridæ*, Hck. (1877).

Sub-fam. Haplorhizidæ, Hck.

Haplorhiza, g. n., p. 604, for *H. simplex*, S. Australia, Bass's Straits, and *punctata*, N. Australia, Arnheim's Land, spp. nn., p. 604.

Cannorhiza, g. n., p. 605, for *C. connexa*, sp. n., *ibid.* pl. xl. figs. 1–8, South Pacific Ocean, near New Zealand.

Sub-fam. Crossostomidæ, Hck.

Versura, g. n., p. 606, for *V. palmata*, ibid. pl. xl. figs. 9–12, Sunda Sea, Java, Cherebon, *pinnata*, p. 607, Indian Ocean, and *vesicata*, p. 645, Zweiter Nachtrag, Australia (N.W. Coast ?), spp. nn.

Sub-fam. Stylorhizidæ, Hck.

Cotylorhiza ambulacrata, sp. n., p. 611, Atlantic Ocean.

Stylorhiza, g. n., p. 612, for *S. octostyla*, Hck., = *Medusa octostyla*, Forskal & Modeer. = *M. cephea*, Niebuhr (*nec* Forskal) & Linné (Gmelin), *Cephea octostyla*, L. Ag., = *C. cyclophora*, Péron & Lesueur, Esch. & Milne-Ed., *S. polystyla*, sp. n., p. 613, Indian Ocean, Singapore.

Fam. 32. Crambessidæ, Hck. (1869).

Sub-fam. Eucrambessidæ, Hck.

Crambessa palmipes, sp. n., p. 620, North Australia, *C. pictonum*, sp. n., p. 621, South Coast of Brittany, Mouth of the Loire, and harbour of Le Croisic.

Mastigias pantherina, sp. n., p. 624, Tropical Pacific Ocean, Samoa.

Eucrambessa, g. n., p. 624, for *E. muelleri*, sp. n., *ibid.*, Indian Ocean, Madagascar.

Cramborhiza, g. n., p. 633, Erster Nachtrag, for *C. flagellata*, sp. n., p. 646, Zweiter Nachtrag, Coast of Brazil, Contingeriba, Pernambuco [? = *C. macronema*, Hck., p. 633, Erster Nachtrag].

Subfam. Himantostomidæ, Hck.

Thysanostoma thysanura, sp. n., p. 625, pl. xxxix., Australia.

Himantostoma flagellata, sp. n., p. 629, N. Pacific Ocean, Sandwich Islands.

Subfam. Leptobrachidæ, L. Ag. (1862).

Leonura, g. n., p. 631, for *L. leptura*, ibid., S. Pacific Ocean, near New Zealand, and *terminalis*, p. 646, Zweiter Nachtrag, Pacific Ocean, spp. nn.

ANTHOZOA.

1. Andres, A. *Edwardsia.* Atti Acc. Rom. (3) Transunti, iv. p. 104.
2. ——. Intorno all' *Edwardsia claparedii.* MT. z. Stat. Neap. ii. pp. 123–142, pl. viii., and Atti Acc. Rom. (3) Mem. Sci. fis. v. pp. 221–236, pl.

This species, referred by Panceri to *Halcampa*, is identified as an *Edwardsia.* It is a free vermiform animal with an anus and eight longi-

tudinal furrows, as in some other species of that genus. There are 16 tentacles alternately long and short. 3 principal varieties, *cornea*, *ornata*, and *simplex*, are recognized.

3. ——. Prodromus neapolitanæ *Actiniarum* Faunæ, addito generalis *Actiniarum* bibliographiæ catalogo. MT. z. Stat. Neap. ii. p. 305.

4. Carter, H. J. On the *Antipatharia* (Milne-Edwards), with reference to *Hydradendrium spinosum*. Ann. N. H. (5) vi. pp. 301 & 395.

The author is of opinion that *Antipathes* should be referred to the *Hydradendriidæ*, but admits that the further examination of fresh specimens is to be desired.

5. D'Achiardi, A. Coralli Giurassici dell Italia Settentrionale. Attí Soc. Tosc. iv. p. 233.

6. Duncan, P. M. Sind Fossil Corals and *Alcyonaria*. Mem. Geol. Surv. India, Fo. (14) i., pt. 2 (in error, 1), 110 pp., 28 pls.

7. Jourdan, E. Recherches zoologiques et histologiques sur les *Zoanthaires* du Golfe de Marseille. Ann. Sci. Nat. (6) x. Art. i., 154 pp., 17 pls. [abstract in J. R. Micr. Soc., Feb. 1881].

Contains a description of the histology of *Anemonia sulcata* and *Actinia equina*. There is a deep fibrillated layer beneath the ectoderm, from which may be separated granular, nucleated, "epithelio-muscular" cells, provided with a singly or doubly pointed basal fibril. In the tentacles they are much more distinct, club-shaped, and connected with the fibril, which is here very short, by a peduncle. The author regards them as having both epithelial and sensory functions, and as sometimes giving rise to muscular fibres. The longitudinal muscles of the tentacles are composed of extremely long fibres, which, owing to the fact that they possess numerous nucleated prominences on one side, must be looked upon as compound, and as such are termed "pluricellular." The mesoderm has firm walls, and in section resembles hyaline cartilage. There is also an account of the development of some species. Lacaze-Duthiers's conclusions as to the development of the mesenteries are confirmed. The so-called mesoderm is developed from the ectoderm. In *Actinia equina*, the gastrula is formed by invagination, and the alimentary canal by a kind of secondary invagination, the edges of the gastrula mouth being turned inwards and downwards into the cavity, which becomes filled by large vitelline masses.

8. Klunzinger, C. B. Das Wachsthum der Korallen, insbesondere ihre Vermehrung durch Ablager und über Wachsthumstörungen. JH. schles. Ges. xxxvi. p. 62.

Contains an account of the different kinds of gemmation occurring in corals. In *Madrepora*, increase takes place by what the author terms a patriarchal growth. In other forms, simple division occurs. The growth is, as in a tree, though not perpetual, unlimited.

9. Koch, G. von. Notizen über Korallen. Morph. JB. vi. p. 355, pl. xvi.

10. [Koch, G. von.] P. Z. S. 1880, p. 24.

Koch completes the anatomy of *Cerianthus* previously described by Heider and Hertwig. In the middle of the inner side of each tentacle, there is a longitudinal, elliptical, bright green spot, between two dark rings. These spots are split, and communicate with the cavity of the tentacle. The author also describes the septa and mesenteries of 3 other forms, namely, *Caryophyllia cyathus* (an aporose coral), *Madrepora variabilis*, and *Zoanthus axinellæ*. In *Caryophyllia*, the mesenteries and their muscles behave as in the ordinary *Actinia*. Of the stony septa, the older lie in the chambers, the younger are interlocular. In the *Madrepora*, the terminal calyces have six septa with the six principal chambers, and six smaller interlocular septa; these last are absent as a rule in the lateral corallites. *Zoanthus axinellæ* exhibits the same orientation of the muscles.

11. Kölliker, A. Von. Report on the Scientific Results of the Voyage of H.M.S. 'Challenger' during the years 1873–76. I. Part ii. Report on the *Pennatulida*, 41 pp., 11 pls.

The collection consists of at least 38 species and 19 genera, including 7 new genera and 20 new species. The author proposes a new systematic arrangement of the *Pennatulida*, in which he divides the Order into (1) those in which the rachis has a bilateral arrangement of its polyps, and (2) those in which the rachis has a radiating arrangement of its polyps; the former division includes 11 families, and the latter 2. As regards horizontal geographical distribution, it seems that the deeper portions of the Pacific and Atlantic Oceans and the South Polar Sea contain none at all, or only a few at a certain distance from the shore. Of the genera, *Umbellula* has the widest distribution. The simpler forms, especially those with sessile polyps, inhabit great depths.

12. Leconte, J. Coral Reefs and Islands. Nature, xxii. p. 558.

The author calls attention to the fact that in 1857 he showed that the theory of Darwin, although so beautifully explaining the phenomena of Pacific reefs, wholly fails to explain those of the Florida coast, because there is no evidence to show that any subsidence has taken place in those parts. According to his view, they are formed by (1) the Gulf Stream building up and extending a submarine bank within its loop; (2) corals building successive barriers as the latter was pushed farther and farther southward; (3) waves beating the reefs into lines of islands; (4) débris from the reefs and keys on the one side and the already formed mainland on the other filling up the successive channels, and converting them first into swamps and then into dry land.

13. Martin, K. Die Tertiarschichten auf Java. Leiden: 1881. *Corallia*, pp. 130–150, pls. xxiv.–xxvi.

14. Merejkowsky, M. C. Sur la structure de quelques Corallaires. C. R. xc. pp. 1086–1088; Ann. N. H. (5) v. p. 502.

The ectoderm cells of *Astroides* differ from those of the *Actiniæ*, as described by Heider, in being elongated and dilated at the superior extre-

mity, and each cell is constantly furnished with a single cilium. In the mesoderm ganglia are found in which the ectoderm fibrillæ terminate.

15. Moseley, H. N. On Koch's researches on the Corals. P. Z. S. 1880, p. 24, and Q. J. Micr. Sci. xx. p. 245.

A short account of Koch's method of studying the anatomy and histology of corals. The corals are first hardened in absolute alcohol, and then placed in a solution of Canada balsam in ether, gum sandarach in alcohol, or copal in chloroform. They are then cut into fine sections with a saw, and rubbed down on a whetstone. Mosoley says that he has himself used this method with success.

16. ——. Description of a New Species of simple Coral, *Desmophyllium lamprotichum*. P. Z. S. 1880, p. 41.

17. Murray, John. The Structure and Origin of Coral Reefs and Islands. Nature, xx. pp. 23 & 351. [Abstract of a paper read before R. Soc. Edinb.]

Semper some time ago found difficulties in applying Darwin's view in the case of the Pelew group. Murray now shows that—(1) other agencies are at work in tropical oceanic regions, by which submarine elevations can be built up from very great depths; (2) all the chief features of coral reefs and islands can be accounted for without calling in the aid of great and general subsidences. These views do away with the great and general subsidences required by Darwin's theory, and are in harmony with Dana's view of the great antiquity and permanence of the ocean basin, which all recent deep sea researches appear to support. The foundations have been prepared for barrier reefs and atolls by the disintegration of volcanic islands and the building up of submarine volcanoes. Atolls are formed by building up from submarine banks. The author's views have the advantage that all the causes appealed to are relatively well known, and continuous in their action.

18. Pourtales, L. F. Reports on the results of dredging in the Caribbean Sea, 1878–79, by United States Coast Survey Steamer 'Blake,' Commander J. R. Bartlett, U.S.N. vi. Reports on the *Corals* and *Antipatharia*. Bull. Mus. C. Z. vi. No. 4, p. 95.

19. Richiardi, S. Alcionari del Mare di Toscana, in Catalogo della Sezione Italiana dell' Esposizione internazionale di pesca in Berlino, 1880, p. 155.

[Not seen by the Recorder.]

20. Schlüter, C. *Zoantharia rugosa* aus dem rheinischen Mittel- und Ober-Devon. SB. Nat. Fr. 1880, p. 49.

[Not seen by the Recorder.]

21. Studer, T. Ueber Knospung und Theilung bei Madreporarien. MT. Ges. Bern. 1880 (Separatdruck).

In the formation of the side buds of *Madreporaria*, a part of the calcareous wall of the polype is absorbed, in order that the endoderm at that part may thrive. The buds are at first sub-marginal, then marginal. It may be inferred, moreover, from the fact that on growing branches

side calyces are found growing close together on the edge of the larger terminal calyces, that new calyces are only derived from out-buddings of the edge of the calyx of the terminal calyx.

22. Verrill, A. E. Notice of recent additions to the Marine Invertebrata of the North-eastern Coast of America, with descriptions of new genera and species, and critical remarks on others. *Anthozoa.* P. U. S. Nat. Mus. 1880, pp. 198–201.

23. Young, J. The spiral character of *Cœlenterata* development. Ann. N. H. (5) v. p. 212.

The partition of the Cœlenterates is explained by analogy of the process in the floral axis of phænogamous plants.

New genera and species:—

HEXACTINIÆ.

Actiniidæ.

Edwardsia pallida, Verrill, (22) p. 198, Princetown.
Sagartia penoti, Jourdan, (7) p. 33.
Palythoa marion, id. *l. c.* p. 43.
Ilyanthus mazeli, id. *l. c.* p. 41.
Bolocera multicornis, Verrill, (22) p. 198, Cape Cod, 45 fath.
Anthotela, g. n., proposed for *Briareum grandiflorum* and allied species, Verrill, (22) p. 199.

Turbinolidæ.

Caryophyllia compressa, p. 17, *feddeni*, p. 18, Jakhmari, *indica*, p. 17, Barkinala, *gajensis*, p. 82, Sita Nai, Duncan, (6).

Trochocyathus lakii, p. 18, Jakhmari, *corbicula*, p. 27, Lynyan, *nummuliticus*, p. 59, Gagar Hill, *nummiformis*, p. 70, West of Bhagathoro Hill, *nariensis*, p. 71, Raduk, *gajensis*, p. 82, Sita Nai, *id. l. c.*

Blanfordia, g. n. There is a pellicular epitheca binding the costæ to the discoid base, and the calyx is Cyclolitoid in shape, the axial space is elliptical, and the whole corallum nearly circular. The septa are numerous and close, with small pali on all except those of the last order, and there is a frequent union of two septa with an intermediate one, giving a Deltocyalline appearance. *B. nummiformis*, West of Bhagathoro Hill, Duncan, (6) p. 73.

Placocyathus striatus, Duncan, (6) p. 28, Lynyan.

Leptocyathus epithecata, id. *l. c.* p. 60, Gagar Hill.

Paracyathus laxus, Pourtales, (18) p. 104, Montserrat, Martinique, Grenada, 88–164 fath.

Tropidocyathus affinis, p. 132, *nudus*, p. 133, Martin, (13), Java.

Smilotrochus jakhmari [*-rianus*], p. 19, Jakhmari, *blanfordi*, p. 20, Bárah, Duncan, (6).

Blagrovia, g. n. Has close structural resemblances to *Smilotrochus*,

from which it differs in possession of an epitheca and peduncle of attachment. *B. simplex*, West of Lynyan, Duncan, (6) p. 28.

Stylophora confusa, minuta (var.), Duncan, (6) p. 73, Dumb.

Desmophyllium lamprotichum, Moseley, (16) p. 41, locality unknown.

Astræidæ.

Trochosmilia medlicotti, p. 27, Jhirk, *oldhami*, p. 74, West of Bhagathoro Hill, *dharanensis*, p. 75, South-west of Dharan Pass, Duncan, (6).

Dasmosmilia, g. n. Corallum turbinate, with very thin wall, false palli, and columella formed by lobes of the septa, rudimentary endotheca. It receives two species hitherto called *Parasmilia lymani* and *P. variegata*. Pourtales, (18) p. 108.

Thecosmilia spadæ, Meneghini, (5) p. 267, Mentone.

Stylina reussi, p. 30, Jhirk, *tertiaria*, p. 61, Maliri, Duncan, (6); *S. nicœnsis*, p. 270, Mentone, *irradiens*, p. 288, *stipata*, p. 290, *arborea*, p. 290, *digitiformis*, p. 302, Monte Cavallo, D'Achiardi, (5).

Stylocœnia maxima, p. 30, Jhirk, *ranikoti*, p. 33, Lynyan, Duncan, (6).

Stephanocœnia micro-tuberculata, p. 40, Jhirk, *maxima*, p. 83, Dumb, *id. l. c.*

Diplocœnia profunda, D'Achiardi, (6) p. 241, Monte Pastello.

Diplocœniastræa, g. n. Allied to *Diplocœnia*, differing from it in its sides being dentate and its column spongy. *D. italica*, Mentone, D'Achiardi, (5) p. 273.

Cryptocœnia incerta, p. 275, Mentone, *sub-brevis*, p. 296, *colturensis*, p. 297, *incerta*, p. 298, Monte Cavallo, D'Achiardi, (5).

Astrocœnia blanfordi, p. 41, West of Lynyan, *cellulata*, p. 42, *gibbosa*, p. 43, Jhirk, Duncan, (6).

Montiraultia lynyani[*-ana*], p. 35, 3 miles West of Lynyan, *ranikoti*, p. 35, Jhirk, *indica*, p. 61, North of Maliri, Duncan, (6) : *M.* ? *cavalli*, Monte Pastello, D'Achiardi, (5).

Feddenia, g. n. Corallum simple, free, with an irregular-shaped base which has enclosed a foreign body. The epitheca is granular, and occasionally like broken mosaic. The costæ may or may not be universally visible, and are continued to the base but not invariably to the peduncle. The calice, usually constricted, is crowded with uniting septa ending in paliform lobes. It is without a columella. The endotheca is scanty, but the granules of the septa unite here and there as false synapticulæ. *F. typica*, 2 varieties, p. 36, West of Lynyan, *cristata*, p. 37, *elongata*, p. 37, East of Kandaira, Duncan, (6).

Isastræa punctata, p. 44, Ranikot group, *irregularis*, p. 65, Maliri, Duncan, (6); *I. montipastelli*, p. 246, Monte Pastello, *italica*, p. 292, Monte Cavallo, D'Achiardi, (5).

Pironastræa indica, South-west of Jhirk, Duncan, (6) p. 45.

Prionastræa gajensis, pp. 78 & 94, Magar Pir, *fungiformis*, p. 95, Unahar, *insignis*, p. 78, South-west of Dharan Pass, *tenuiseptata*, p. 78, West of Bhagathoro Hill, Duncan, (6).

Reussastræa grandis, id. *l. c.* p. 45, South-west of Jhirk.

Thamnastræa balli, Duncan, *l. c.* p. 55, South-west of Jhirk.

Pterastræa mirabilis, id. *l. c.* p. 65, Maliri.

Plesiastræa eocenica, p. 66, North end of Watward range, *decipiens*, p. 91, Sita Nai, *costata*, p. 91, Naigh Nai, *pedunculata*, p. 92, Bill, Duncan, (6).

Monticulastræa, g. n. This genus is a *Hydnophora*, with a columella and non-continuous septa. *M. insignis*, p. 87, Magar Pir, *solidior*, p. 88, Sita Nai, *inæqualis*, p. 88, Unahar, *elongata*, p. 88, Bill, Duncan, (6).

Heliastræa sindiana, p. 89, Magar Pir, *digitata*, p. 89, *anomala*, p. 90, Bill, Duncan, (6); *H. tabulata*, p. 140, *irregularis*, p. 141, Java, Martin, (14).

Septastræa colturensis, D'Achiardi, (5) p. 284, Monte Cavallo.

Phyllastræa forojuliensis, p. 286, *dubia*, p. 287, D'Achiardi, (5), Monte Cavallo.

Acanthastræa ? *polygonalis*, Martin, (13) p. 142, Java.

Hydnophora maliriensis, Duncan, (6) p. 63, Maliri; *H. crassa* and *astræoides*, Martin, (13) p. 138, Java.

Calamophyllia indica, p. 62, Hindi Hill, *elongata*, p. 86, Nari Nai, Duncan, (6); *C. substokesi* [!], p. 281, Monte Cavallo, *mentonensis*, p. 266, Mentone, Meneghini, (5).

Rhabdophyllia nariensis, p. 77, West of Bhagathoro Hill, *barkii*, p. 22, Barki Nala, Duncan, (6).

Brachyphyllia indica, Duncan, (6) p. 90, Dumb.

Cladophyllia mentonensis, D'Achiardi, (5) p. 268, Mentone.

Trachyphyllia crassa, Martin, (13) p. 136, Java.

Plocophyllia sindiana, Duncan, (6) p. 38, Jhirk; *P. elegans*, D'Achiardi, (5) p. 239, Monte Pastello.

Leptoria hydnophoroidea, p. 39, East of Lynyan, *concentrica*, pp. 77 & 87, South-west of Tong and West of Bhagathoro Hill, Duncan, (6).

Latimeandra insignis, p. 62, Maliri, *parvula*, p. 93, Magar Pir, *reussi*, p. 39, Bill, *gajensis*, p. 94, Magar Pir, Duncan, (6); *L. multiseptata*, p. 247, *faramellii*, p. 249, *cavalli*, p. 250, Monte Pastello, *L.* ? *qualiformis*, p. 258, Roverè di Velo, D'Achiardi, (5).

D'Achiardia, g. n. Corallum massive. Corallites small, slightly exserted above the thick, solid, common, upper, exothecal, intercorralite cœnenchyma, or are imbedded in it. They are long and slightly costulate. The calices are shallow, and there is a columella, and some pali are also seen. Fissiparity rarely occurs. *D. densa*, Duncan, (6) p. 92, Nari Nai, *lobata*, Bill.

Favia maliriensis, p. 63, *pedunculata*, p. 64, Maliri, Duncan, (6).

Antillia plana, Dumb, *indica*, Karachi, Duncan, (6) p. 84.

Leptomusa rugosa, Duncan, (6) p. 85, Karachi.

Meandrina medlicotti, Duncan, (6) p. 77, Baran river.

Cœloria singularis and *arborescens*, Martin, (13) p. 137, Java.

Pachygyra costata, Meneghini, (5) p. 269, Mentone.

Cyathophora pironæ, D'Achiardi, (5) p. 298, Monte Cavallo.

Echinopora miocenica, South-east of Bill, *maxima*, South of Magar Pir, Duncan, (6) p. 96.

Fungiidæ.

Cyathoseris orientalis, Duncan, (6) p. 47, Jhirk.

Elliptoseris, g. n. Corallum simple, conical, compressed, with a largely open elliptical calice. There are costæ, but no epitheca ; there is no columella, but an elongate and deep axial space. The septa are numerous, and the smaller join those between them near the axial space. There are pali before the joined septa. Synapticulæ are numerous in the calice. *E. aperta*, Duncan, (6) p. 48, Jhirk.

Turbinoseris ranikoti, p. 49, East of Lynyan, *epithecata*, p. 49, *haimei*, p. 50, *indica*, p. 50, 3 miles West of Lynyan, Duncan (6).

Cycloseris decipiens, Martin, (13) p. 143, Java.

Pachyseris curvata, *cristata*, p. 145, *laticollis*, p. 146, Java, Martin, (14). *P. affinis*, p. 96, Maki Mai, *exarata*, p. 97, Gáj River, Duncan, (6).

Comoseris amplistellata, D'Achiardi, (5) p. 251, Monte Pastello.

Oroseris ? *sulcata*, id. *l. c.* p. 258, Roverè di Velo.

Cyclolites ranikoti (var.), p. 52, 3 miles West of Lynyan, *crenulata*, p. 52, East of Lynyan, *anomala*, p. 54, Jhirk, *superba*, p. 54, *haimei*, p. 54, 3 miles West of Lynyan, *striata*, p. 55, Jhirk, *orientalis*, p. 79, Lundi Hill, Duncan, (6).

Pavonia folium, Martin, (13) p. 144, Java.

Agaricia danæ, Duncan, (6) p. 98, South of Magar Pir.

Madreporidæ.

Stephanophyllia balli, South-west of Jhirk, *indica*, Duncan, (6) p. 56.

Dendrophyllia alternatus[*-ta*], Pourtales, (18) p. 111, 150–189 fath. off Guadaloupe, Martinique, and St. Lucia.

Turbinaria sitaensis, Duncan, (6) p. 99, Sita Nai.

Astræopora hemisphærica, id. *ibid.*, Naigh Nai.

Poritidæ.

Porites superposita, p. 57, Jhirk, *indica*, p. 67, Maliri, *gajensis*, p. 99, Naigh Nai, Duncan, (6). *P. strata*, Martin, (13) p. 147, Java.

Litharæa epithecata, p. 23, Jakhmari, and var. *hemisphærica*, p. 24, Barkinala, *grandis*, p. 57, South-west of Lynyan, *nodulosa*, p. 80, Raduk, Duncan, (6). *L. astræoides*, Martin, (13) p. 148, Java.

Antipatharia.

Antipathes thyoides, 124 fath., St. Vincent, p. 115, *picea*, 291 fath. off Grenada, p. 115, *tenacetum*, 88–110 fath. off Santa Cruz, Montserrat, Dominica, Martinique, the Grenadines, and Grenada, p. 116, *salix*, 83 fath. off Guadaloupe, p. 117, *rigida*, 103 fath., Barbadoes, p. 1171, Pourtales, (22).

OCTACTINIÆ.

Alcyoniidæ.

Alcyonium multiflorum, 220 fath., 44° N. lat., 52° W. long., *luetkeni*, 52 fath. off Halifax, Verrill, (22) p. 200.

Pennatulida.

Kölliker, (11), describes the following new genera and species :—

Pennatula naresi, p. 2, South of Yeddo, Japan, *pearceyi*, p. 4, South of Japan, *murrayi*, p. 5, South-east of Ceram, West of New Guinea, *moseleyi*, p. 6, off Sydney, *sulcata*, p. 8, Zebu, Philippines.

Virgularia bromleyi, p. 9, South of Japan, *gracillima*, p. 10, Queen Charlotte Sound, New Zealand.

Scytalium tentaculatum, p. 10, Philippines.

Stachyptilum, g. n. Small pens without leaves, polyps with cells in small rows of four on both sides, and on the dorsal axis of the rachis; cells without stronger spines at their openings, zooids ventral, lateral, and dorsal on all free surfaces of the rachis; all of one kind; stalk with a small zone of papillæ at the upper end; axis pretty strong, round; calcareous corpuscles of different forms, needles on the cells and zooids: lenticular bodies in the stalk, cylindrical corpuscles with three alternating ridges on each end in the tentacles of the polyps. *S. macleari*, South-east of Ceram, p. 11, pl. vii.

Anthoptilum, g. n. Polypidom without leaves, of the general appearance of *Funiculina*; polyps in many short rows on the sides of the rachis, large without cells; at the lower end of the rachis no prolonged streak of undeveloped polyps; zooids lateral, ventral, and dorsal, all of one kind, small, wart-like; axis round; no calcareous corpuscles except at the end of the stalk. *A. thomsoni*, p. 13, Atlantic Ocean, South of Buenos Aires, *murrayi*, p. 14, South of Halifax, *simplex*, p. 15, South Atlantic, West of Tristan d'Acunha, pls. iv., v., & vi.

Cophobelemnon ferrugineum, South of Yeddo, Japan, p. 16.

Umbellula durissima, p. 16, South of Yeddo, *guntheri*, p. 18, Atlantic Ocean, 1° 47′ N. lat., 26° 46′ W. long., *thomsoni*, p. 19, North Atlantic Ocean between Portugal and Madeira, *leptocaulis*, p. 20, South-east of New Guinea, *simplex*, p. 20, North Pacific Ocean between San Francisco and Yeddo, *huxleyi*, p. 21, South of Yeddo, *carpenteri*, p. 23, South Polar Sea, South-west of Australia, *magniflora*, p. 24, South Sea, East of Kerguelen Island.

Protocaulon, g. n. Polyps sessile, without cells, disposed on each side of the rachis in one single row; no calcareous corpuscles. *P. molle*, North-east of New Zealand, p. 26, pl. vii. fig. 23.

Microptilum, g. n. Belongs to the family *Protoptilidæ*. Polyps with cells, sessile, disposed alternately on each side of the rachis in one single row; cells triangular, with one strong spine on their ventral side; zooids small, one single individual at the base of each cell on its ventral side; axis round; calcareous corpuscles in the rachis, the stalk, the cells, and

the tentacles of the polyps. *M. willemoesi*, South of Yeddo, p. 26, pl. vii. fig. 27.

Leptoptilum, g. n., also belonging to the *Protoptilidæ*. Polyps with cells, sessile, disposed alternately in one single row on each side of the rachis; cells cylindrical, with eight long spines; no real zooids, but a certain number of rudimentary polyps between each pair of the full-grown individuals; axis round, pointed, and straight at both ends; calcareous corpuscles in the stalk, rachis, the cells, and the tentacles of the polyps. *L. gracile*, North-east of New Zealand, p. 27, pl. vii. fig. 28.

Proptilum aberrans, p. 28, North Atlantic South of New York.

Trichoptilum, g. n., also belonging to the *Protoptilidæ*. Polyps with cells, sessile, disposed alternately in one single row on each side of the rachis; cells cylindrical, with eight strong spines; zooids dorsal, one to three between the polyps, small, without spines; axis quadrangular; calcareous bodies numerous in the cells and tentacles of the polyps, very scarce in the sarcosoma of the rachis, abundant in that of the stalk. *T. brunneum*, South-east of Ceram, p. 29, pl. viii. fig. 31.

Scleroptilum, g. n., also belonging to the *Protoptilidæ*. Polyps without cells, sessile, with broad bases, disposed on each side of the rachis in a single row; zooids dorsal, apparently in one row; axis round; calcareous corpuscles of large size, abundant in the polyps and their tentacles and in the sarcosoma of the rachis, those of the stalk numerous, but smaller. *S. grandiflorum*, p. 30, pl. vii. fig. 29, East of Japan, *durissimum*, p. 31, South of Yeddo.

Gorgoniidæ.

Isis dancæ and var., p. 108, Naigh Nai, *elongata*, p. 108, *compressa*, p. 109. Tandra Ráhim Khán, Duncan, (6).

Tubipora reptans, Carter, (4) p. 152, Gulf of Manaar.

Favositidæ.

Beaumontia ? *zignoi*, D'Achiardi, (5) p. 261, Monte Alba.

SPONGIIDA.

BY

Stuart O. Ridley, M.A., F.L.S., F.R.M.S.

Chief Works on Recent Sponges.

1. Carter, H. J. Report on Specimens dredged up from the Gulf of Manaar, and presented to the Liverpool Free Museum by Capt. W. H. Cawne Warren. *Spongiida.* Ann. N. H. (5) vi. p. 35, pls. iv.–vi. Abbreviated Report in P. Liverp. Soc. xxxiv. p. 273.

   The references given below are to the main Report.

2. Czerniavsky, V. Littoral Sponges of the Black and Caspian Seas. Bull. Mosc. liv. pt. ii. pp. 88 & 228.

   In Russian, with Latin diagnoses. Completes the short account given in the paper No. 5 of Zool. Rec. xv., adding the systematic descriptions of the genera and species there mentioned, and those of some new genera as well (*vide infrà*). To the names of some of the new varieties are appended the words "fere bona species." References will be given below to those species which are not mentioned in the former paper. A bibliography is added by the author to the descriptive portion, together with a chapter on the distribution, mutual relations, and spicules of the genera noticed.

3. Duncan, P. M. On a Parasitic Sponge of the Order *Calcarea.* J. R. Micr. Soc. iii. p. 377, pl. x.

4. Dybowsky, W. Studien über die Spongien des Russischen Reiches, mit besonderer Berüchsichtigung der Spongien-fauna des Baikal-Sees. Mém. Pétersb. xxvii. No. 6, 4 pls.

5. Keller, C. Neue Cœlenteraten aus dem Golf von Neapel. Arch. mikr. Anat. xviii. p. 271, pls. xiii. & xiv.

6. Kent, W. S. Manual of the *Infusoria*: including a description of all known Flagellate, Ciliate, and Tentaculiferous *Protozoa*, British and Foreign, and an account of the organization of the Sponges. London: 1880, 4to, parts 1–3, pls. (not yet completed).

   Pp. 143–194, pls. vii.–x., are devoted specially to the Sponges, which

are, besides, included with the *Infusoria* in the classification proposed in the work.

7. Marshall, W. Untersuchungen über Dysideiden und Phoriospongien. Z. wiss. Zool. xxxv. p. 88, pls. vi.–viii. & woodcut.

8. Merejkowsky, C. de. Reproduction des Éponges par bourgeonnement extérieur. Arch. Z. expér. viii. p. 117, pl. xxxi., to which the references below refer. Reported and figures reproduced in J. R. Micr. Soc. iii. p. 970, pl. xxi.

9. Schmidt, O. Die Spongien des Meerbusen von Mexico (und des Caraibischen Meeres). Zweites (Schluss-) Heft. (p. 33, pls. v.–x.) Jena: 1880, 4to.

Conclusion of the work noticed in Zool. Rec. xvi.; comprises the *Hexactinellida*, *Tetractinellida*, *Monactinellida*, and a supplement to the *Lithistiidæ* of Part i.

10. Schulze, F. E. On the Structure and Arrangement of the Soft Parts in *Euplectella aspergillum*. Tr. R. Soc. Edinb. xxix. p. 661, pl. xvii.

11. ——. Untersuchungen über den Bau und die Entwickelung der Spongien. IXte Mittheilungen. Die Plakiniden. Z. wiss. Zool. xxxiv. p. 407, pls. xx.–xxii.

12. Sollas, W. J. The Sponge-Fauna of Norway: a Report on the Rev. A. M. Norman's Collection of Sponges from the Norwegian Coast. Ann. N. H. (5) v. pp. 130, 241, & 396, pls. vi., vii., x.–xii., & xvii.

13. Vosmaer, G. C. J. The Sponges of the Leyden Museum. I. The Family of the *Desmacidinæ*. Notes Leyd. Mus. ii. p. 99.

A provisional descriptive revision of the genera and species of this family as limited by Schmidt in 1870, with the addition of *Clathria*. A set of symbols is introduced to represent the various modifications of the spicular forms, and is employed in the descriptions.

A. Hyatt. Guides for Science-teaching. No. III. Commercial and other Sponges. Boston, U. S.: 1879, 18mo. A short account, in 43 pp., of the chief points in the anatomy, physiology, and distribution of Sponges, accompanied by 27 semi-diagrammatic figures, illustrating the structure, &c.

A. E. Verrill. Notice of Recent Additions to the Marine *Invertebrata* of the North-eastern coast of America, with descriptions of new genera and species, and critical remarks on others. P. U. S. Nat. Mus. ii. p. 165, pt. i. *Cladorrhiza grandis*, sp. n., is the only sponge mentioned.

Classifications.

Czerniavsky (2) arranges the Sponges described by him under the divisions—

Order I. MONAXIDÆ, Schmidt.

A. SILICISPONGIÆ. Fam. 1. *Renierinæ*, Schmidt. Fam. 2. *Chalinecæ*, Schmidt. Fam. 3. *Mecznikowinæ*, Czerniavsky. Fam. 4. *Suberitidinæ*, Schmidt. Fam. 5. *Clionidæ*, Gray. Fam. 6. *Desmacidinidæ*, Schmidt.

B. SPONGIÆ GELATINOSÆ. Fam. 7. *Halisarcinæ*. Fam. 8. *Ceraospongiæ*, Schmidt.

Order II. SPONGIÆ ANCHORATÆ. Fam. 9. *Geodinidæ*, Schmidt.

The Sponges are included among the Flagellate *Infusoria* by KENT, (6) p. 36, as *Protozoa*, of the Section *Discostomata*, Class *Flagellata*, following the *Choano-Flagellata* or Collared *Flagellata* (which are termed also *Discostomata-Gymnozoida*), under the title of Order *Spongida*, vel *Discostomata-Cryptozoida*. This view of the systematic position of the Sponges is supported by arguments taken from the agreement in structure between the "collar cells" of Sponges and the zooids of the *Choano-Flagellata*, especially the "collar" common to both, and between the different parts of the general Sponge-mass and those of the colonial forms *Ophrydium* and *Phalansterium*,; also from the agreement in the phenomena of nutrition. A connecting form, *Protospongia*, is especially noticed, p. 168.

C. S. MINOT, Am. Nat. xiv. p. 479, in "A Sketch of Comparative Anatomy. IV. The Embryology of Sponges," sums up the main facts known on this subject, concluding by adopting the view that the Sponges constitute a distinct Sub-kingdom, to be called *Porifera*.

FAUNÆ.

Short notes on the abyssal Sponge-fauna as made known by the 'Challenger' Expedition, by C. WYVILLE-THOMSON, in Report on the Scientific Results of the Voyage of H.M.S. 'Challenger,' Zoology, vol. i. London, &c., 1880, pp. 35, 43, & 44. Figures are given of *Asconema setubalense*, *Hyalonema sieboldi*, *Rossella velata*, pp. 34, 35 & 38.

List of 14 species of Sponges dredged at Falmouth, given by H. J. CARTER, Tr. Birmingham Soc. 1880, p. 59, with notes.

Three species, including the type of a new genus, are described by SOLLAS (12), from 15 miles on each side of Bergen, north and south.

A notice of the chief Sponges obtained by the recent French exploring expedition of 'Le Travailleur' in the Bay of Biscay, given by A. M. NORMAN, Ann. N. H. (5) vi. p. 436, and Rep. Brit. Ass. 1880, p. 389; they included *Thenea*, *Holtenia*, *Asconema*, *Hyalonema*, *Farrea*, and *Lefroyella*.

A. MILNE-EDWARDS reports on the expedition to the same effect; C. R. xci. p. 360.

P. DESZO. A Magyar tengerpart Szivacsfaunája. I. Közlemény (The Sponge-fauna of the Hungarian littoral. Part i.). In Ectezezesck a Természettudomanyok Köréből, x. Kotet, xiii. Szam: 1880. [In Hungarian. Lists of the marine Sponges, including some new species, e.g., *Vioa* sp., &c., which are, however, not described.]

H. J. CARTER & W. S. M. D'URBAN, on the Zoology of the Barents

Sea (Ann. N. H. 5, vi. p. 253), record 4 spp. of Holorrhaphidote Sponges, *Halichondria hyndmani*, Bowerb., *Isodictya* sp., and 2 spp. nn.

According to DYBOWSKY (4), the Baikal fauna consists of 1 endemic genus, *Lubomirskia*, containing 4 species. 41 Russian Sponges are known to the author; their distribution is given.

The *Hexactinellida* identified by Schmidt (9) from the Gulf of Mexico number 32 species; 14 new genera are described. The 16 species of *Tetractinellida* include 1 new genus. There are apparently 24 species of *Monactinellida*, with 2 new genera. 5 species and a new genus of *Lithistida* are added to those of 1879. The genera *Halisarca*, *Luffaria*, *Sycortis*, *Sycandra* and *Leucandra* have been identified, besides those mentioned below.

The same author states, *l. c.* p. 76, that in the Mexican and West Indian area *Chalineæ* were abundant between 200 and 300 fathoms, but never occurred deeper.

55 species, of which 40, including the type of a new genus, are given as new, are described by CARTER (1), from the Gulf of Manaar, between Ceylon and Hindostan, besides 1 from another locality.

CZERNIAVSKY (2) believes that constant interchanges have occurred between the Sponge-faunæ of the Black and Caspian Seas.

GENERA, SPECIES, &c., REFERRED TO.

CARNOSA (Carter).

Halisarca dujardini, (6) pl. ix. figs. 1–12, 18–21; *H. lobularis*, l. c. pl. ix. fig. 40.

PSAMMONEMATA (Carter).

Dysideidæ, (7) p. 92. Taken by Marshall to include *Dysidea*, Johnston, and *Psammascus*, *Psammoclema*, and *Psammopemma*, gg. nn., and characterized as having a smooth surface, separable dermis, and foreign bodies in all the fibres.

Dysidea, (7) p. 98. Limited to *D. fragilis*, Hyatt, and *coriacea*, Bowerbank, and 2 spp. nn.

Spongelia incrustans, Schmidt, (2) p. 275. A "forma adriatica" and "forma suchumensis" described.

Spongia pluma, Lamarck, (7) p. 118, = *Cacospongia*; *S. turgida*, id. l. c., = *Stellispongia*.

RHAPHIDONEMATA (Carter).

Chalinula oculata from Holland; Vosmaer, Tijdschr. Nederl. Dierk. Ver. v. p. xxv.

Cacochalina, (2) p. 229, characterized.

Siphonochalina densa, *Cribrochalina infundibularis*, (9) pp. 76 & 77, from Mexican Gulf region.

Pachychalina compressa, Schmidt, (4) p. 44, pl. iii. fig. 3, pl. iv. fig. 8, includes *Veluspa polymorpha* var. *arctica*, Mikl.-Maclay.

ECHINONEMATA (Carter).

Clathria, Schmidt, (13) p. 149. Added to the *Desmacidinæ* by Vosmaer, who finds anchorate and bihamate spicules in several of the

species. Character emended so as to comprise all forms with smooth or spined linear echinating spicules and minute equianchorates. *Tenacia clathrata*, Schmidt, and other species are added to the genus.

To his group *Microcionina*, Carter, (1) p. 39, now adds the genus *Hymedesmia*, s. str.

Microciona atro-sanguinea and *M. armata*, Bowerbank; (1) p. 40, Gulf of Manaar.

Hymerrhaphia vermiculata, Bowerbank, var. *erecta*, and *H. clavata*, id.; (1) p. 46, Gulf of Manaar.

Phacellia, (9) p. 81. Represented in the Caribbean Sea district; it appears to be there connected with *Axinella* by a species which comes near *A. cannabina*; probably *Hymerrhaphia vermiculata* and *Axinella rugosa* form part of a series continuous with it.

Baculifera: Carter, (1) p. 47, records fragments of Sponge belonging to this group, from the Gulf of Manaar.

HOLORRHAPHIDOTA (Carter).

Species of *Renierinæ* and *Suberites*, *Vioa*, and *Polymastia*, obtained from Gulf of Mexico and Caribbean Sea, (9) p. 77, but mostly left undetermined.

Amorphina, (2) p. 89, *A. caspia*, Grimm, p. 92, *Schmidtia*, l. c. p. 104, *Pellina*, p. 109, *Reniera*, s. str. p. 114, *R. inflata*, p. 119, with *taurica*, var. n.

Reniera, (1) p. 48. Three species, yellow, white, and dark brown in colour respectively, described without names, from the Gulf of Manaar, by Carter, pl. v. figs. 16–18. Schmidt's diagnosis of the genus, published in 1870, is justified by Dybowsky, (4) p. 45; he finds two distinct types in it, viz.: (1) based on *R. alba*, with the spicules united into a network by their points only; (2) on *R. fortior*, with the horny substance spreading out into membranes and fibres, but not forming true fibres. *R.* sp., *l. c.* p. 50, pl. ii. fig. 3, pl. iv. fig. 2, Artielnij Gulf, Black Sea, described without name.

Reniera fibulata, Schmidt, (1) p. 48, Gulf of Manaar.

Reniera gracilis, Dybowsky, (4) p. 47, pl. iii. fig. 3, pl. iv. fig. 16, = *Veluspa polymorpha*, var. *gracilis*, Miklucho-Maclay.

Halichondria panicea, (6) pl. viii. figs. 18–31 & 42, soft parts figured.

Metschnikowia, Grimm, (4) p. 50. Defined afresh. It is nearly related to *Reniera*, and distinguished from all other Halichondroid genera by the scanty amount of its horny substance, and by the peculiarities of its spicules. *M. tuberculata*, l. c. p. 54, pl. i. fig. 9, pl. iii. fig. 6, pl. iv. fig. 15; a variation of ·156 to ·183 mm. in the length, and ·012 to ·015 mm. in the breadth of the skeleton spicules was observed in a series of 6 examples. *M. flava*, l. c. p. 57, pl. i. fig. 8, pl. iii. fig. 5, pl. iv. fig. 12; the skeleton spicules, which are spined, range from ·159 to ·186 mm. in length, and from ·006 to ·12 in thickness in different specimens.

Pellinula, Czerniavsky, (2) [*cf.* Zool. Rec. xv.]. Intermediate between *Amorphina*, *Tedania*, and part of *Esperia*. Differs in spiculation from *Tedania* by sometimes having cylindrical instead of acuate spicules, and sometimes also bihamates and anchorates.

Mecznikowiinæ (= *Metschnikowinæ* of 1878), (2) p. 232. A Family placed midway between the higher *Renierinæ* and the *Desmacidinæ*.

Mecznikowia [*Metschn.* of 1878], Grimm, and *M. tuberculata* and *M. intermedia*, Grimm, characterized; (2) p. 233.

Protoschmidtia, Czerniavsky [*cf.* Zool. Rec. xv.], (2) p. 95. Intermediate between *Amorphina* and *Schmidtia*.

Tedaniella, Czerniavsky [*cf.* Zool. Rec. xv.], (2) p. 124.* Has four kinds of spicules, viz.: simple acerate, simple acuate, short cylindrical rounded at both ends, and a slender form blunt at both ends.

Protoesperia, Czerniavsky [*cf.* Zool. Rec. xv.], (2) p. 248. Between *Pellinula* and *Esperia*, with irregular internal skeleton, and sub-fibrous reticulate dermal skeleton. Spicules chiefly acerate. Bihamates and anchorates as in *Esperia*. Form various.

Desmacidinæ, Schmidt, emended by Vosmaer, (13) p. 104, so as to comprise Monactinellid Sponges with bianchorate spicules, either accompanied or replaced by bows or [and] bihamate spicules; smooth and spined linear spicules, varying in shape, always present.

Desmacidon and *Esperia*, (9) p. 81. Schmidt declines to name new species from the West Indian region, owing to the variability of the spicules and soft parts of these genera.

Desmacidon jeffreysi, Bowerbank, (1) p. 37. Found without the bihamates in Gulf of Manaar. Carter is inclined to place it among the *Cavochalinida*, as type of a new group.

Esperia, Nardo, revised by Vosmaer, (13) p. 139, *Isodictya robusta*, Bowerbank, and many other species being added to it. See also, (2) p. 256.

Esperia, sp. Section figured by Kent, (6) pl. vii. fig. 2, showing the minute structure of the soft parts.

Esperia tunicata, Schmidt, (1) p. 49, Gulf of Manaar.

Desmacodes, Schmidt, (13) p. 104. Revised by Vosmaer, numerous species of Carter & Bowerbank being added to those of Schmidt.

Desmacella, Schmidt, (13) p. 109. Revised; *Halichondria falcula*, Bowerbank, added to the genus.

Myxilla, Schmidt, revised, (13) p. 123; *Microciona fictitia*, Bowerbank, and numerous other species are added to it.

Desmacidon, Bowerbank, revised, (13) pp. 130 & 159; *Esperia villosa*, Carter, *Halichondria incrustans*, Bk., and *Rhaphidoplus cratitius*, Ehlers, and 2 spp. nn. added to it.

Sclerilla, Schmidt, *Cribrella*, Schmidt, *Chondrocladia*, Wyville-Thomson, *Cladorrhiza*, M. Sars, *Sceptrella*, Schmidt, (13) pp. 122 & 136, &c.

Hymeniacidon macilenta, Bowerbank, = young state of *Rhaphiodesma sordida*, Bowerbank: J. G. Waller, J. Quek. Club, 1880, p. 98, pl. v. fig. 1.

Rhaphiodesma, relations of British species; *id. ibid.*

Bursalina muta, var., (9) p. 79, pl. x. fig. 4.

Polymastia stipitata, Carter, (9) p. 79, pl. x. fig. 5, from Caribbean Sea; = *Stylorrhiza*, Schmidt, g. n., *vide infrà*.

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* *Tedaniella cylindrifera* of 1878 is here given as *cylindrigera*.

Guitarra fimbriata, Carter: Schmidt, (9) p. 85, pl. ix. fig. 7, Gulf of Mexico; Carter's interpretation of the structure of its characteristic spicule criticised.

Melonanchora elliptica, Carter: (9) p. 85, Caribbean Sea. Schmidt criticises Carter's interpretation of the structure and affinities of the characteristic melon-like spicule. He states incidentally that the anchorates of the *Desmacidinæ* do not grow.

Suberites claviger, lobatus, paludum, (9) p. 80, pl. ix. fig. 1, from Mediterranean, cited to prove modification of form under change of circumstances.

Suberites domuncula, Schmidt, (2) p. 236, Black Sea.

Tethya norvegica, Bowerbank, from White Sea, (4) pl. xxxi. figs. 1–11. Produces numerous buds, which remain for some time attached to the parent by long pedicles, which are composed of bundles of long spicula, covered with connective tissue, containing stellate spicules. Buds of the second and third order may occur, by the gemmation of a bud while still attached. Such colonies are, however, remarkable for their want of symmetry. The bud commences as a cylindrical aggregation of connective tissue, surrounding a bundle of long spicules. The species, which differs little from *T. lyncurium*, may be distinguished from it, among other characters, by the constancy with which it produces buds. *T. lyncurium*, l. c. p. 425, pl. xxxi. figs. 12 & 13.

Cometella, Schmidt, (9) p. 79. Runs into new generic forms under the influence of change of circumstances.

Cometella stellata, Schmidt, = *Tethya caudata*, Schmidt *apud* Deszo, renamed *T. cometes*, by Schmidt, (9) p. 78; Gulf of Mexico, 84–329 fath.

Cometella pyrula, Carter, cannot be a *Cometella*; Vosmaer, (13) p. 156.

Trichostemma hemisphæricum, Sars, = *Radiella sol*, Schmidt, (9) p. 77. *Radiella* probably should be suppressed in favour of *Halicnemia*.

Group *Eccælonida*, (1) p. 56; *Samus*, Gray, is now to be included in it as a boring Sponge; its characters are given, p. 59, as if a new genus. *S. anonymus*, Gray, common in Melobesian nodules from Gulf of Manaar.

Cliona, Grant, (2) p. 243. A subgenus, *Archæocliona*, is formed within it, based on *C. labyrinthica*, Hancock, which is considered the fundamental form of the *Clionidæ*; *C. nodosa*, id. is also referred to it.

Cliona typica, Nardo, *l. c.* p. 246, Black Sea, and a *Cliona* without name, *l. c.*, from Sukhum Bay.

Cliona, found by P. M. Duncan in cavities of *Carpenteria*; J. R. Micr. Soc. iii. p. 381.

Axos cliftoni, Gray, (1) p. 285, pl. xxvi. figs. 5–7.

Group *Geodina*, (1) p. 129. Its different spicules enumerated and described, and its composition discussed by Sollas, (12) pp. 241 & 396.

Geodia, Lamarck, (2) p. 278. A sub-genus, *Stellogeodia*, formed within it [*vide infrà*].

Geodiæ, (9) p. 74. Schmidt admits that his genus *Pyxitis* is identical with *Geodia*, s. str. He considers all described *Geodiæ* to be varieties of one species.

Geodia perarmata, Bowerbank, (1) p. 131, pl. vi. figs. 32–35, from Gulf

of Manaar. Redescribed; has a remarkably distinct dermal sarcodic layer.

Geodia barretti, Bowerbank : Sollas, (12) p. 247, pls. x.-xii., Kors Fiord, Norway. Bowerbank's description corrected. It has a non-cellular cuticle. The main excretory tube is connected with its tributaries by openings provided with sphincters. Sphincters also occur between the intermarginal cavities—here termed chones—and the subcortical crypts. Canal system described in detail. Beneath the epidermis lies a tissue resembling vegetable parenchymatous tissue, and termed "vacuolated connective tissue," or "dermis." The central substance, or "mark," is formed of very indistinct globular cells. Sheath of long spicules described. Development of globate spicules traced from groups of trichites. The adult globates probably wander from the mark into the cortex.

Caminus and *Placospongia* are perhaps *Monactinellida* which have developed *Geodia*-balls, according to Schmidt, (9) p. 75. Both occur in the district reviewed by the writer.

Placospongia melobesioides, Gray, (1) p. 53. Redescribed. It is more nearly allied to the *Suberitida* than to the *Geodina*; it is now recorded from the Gulf of Manaar. A var. possessing a spinispirular spicule occurs in Central America, &c.

Tetilla polyura, *euplocamus*, *radiata*, referred by Schmidt, (9) p. 73, to his new genus *Fangophilina*.

Stelletta, a classified list of described species given (12) p. 143. *S. agariciformis*, Schmidt, = *Thenea wallichi*, Wright. *S. evastrum*, *geodina*, *intermedia*, referred with probability to *Geodia*.

Stelletta evastrum, Schmidt, (1) p. 135, pl. vii. figs. 41 & 42, Gulf of Manaar and Freemantle, Australia. From structure of disk, it appears more nearly allied to *Geodia* than to *Stelletta*; *S. discophora* and *S. mamillaris*, Schmidt, also belong to group *Geodina*, not *Stellettina*.

Pach[*y*]*astrella*, Schmidt, (1) p. 60, should, perhaps, be grouped with *Samus*, Gray.

Pach[*y*]*astrella parasitica*, Carter, (1) p. 60; from Gulf of Manaar: = *Samus*.

Pach[*y*]*astrella connectens*, var. Without naviculoid and small tuberculated fusiform spicules, Schmidt, (9) p. 68; Grenada.

Corticium, Schmidt, (9) p. 68, pl. ix. fig. 4. *Ancorina*, *l. c.* p. 69. *Stelletta*, p. 70. *Tisiphonia*, p. 71. *Tetilla* and *Craniella*, p. 72.

Plakinidæ [*Plac-*], (11) p. 447. New family of *Tetractinellida*. Its place is in or next to the family *Pach*[*y*]*astrellidæ*, Carter, and includes the three new genera *Plakina*, *Plakortis*, and *Plakinastrella*, formed by Schulze, and distinguished by the possession of spicules derived from a quadri-radiate type, not united by horny matter; the bi-radiate or uni-axial forms are twisted or roughened in the middle. In stating his reasons for grouping the members of this Family together, Schulze, *l. c.* p. 440, says that *Plakortis*, though not possessing the Tetractinellid type of spicule, may, nevertheless, be safely inferred to come next to *Plakina* in the series, its canal system and its spiculation being deducible from those of that genus. He calls attention to the important principle that family

likeness is not to be sought exclusively in the actual present resemblance between forms of spicules, but in the possibility of the two sets of spicules being derived from a common stock. Further, the peculiar forms assumed by spicules are due not to crystallization, but to conditions connected with the intimate organization of the soft tissues. In this Family, bi-, tri-, and quadri-radiate spicules are seen to form but a single develop mental series. The earliest siliceous Sponge-spicules were probably many-rayed forms, so that bi-radiate or linear forms are the latest, having come through a quadri-radiate stage.

The *Lithistiidæ* are the nearest of all the *Tetractinellidæ* to the Anchorate Sponges ; (9) p. 87.

Lithistiina. Modes of growth of Gulf of Manaar species, (1) p. 142; individuals abundant there.

Collectella avita, Schmidt, (9) p. 86, pl. v. fig. 1, described as new from Gulf of Mexico [*cf.* Zool. Rec. xvi.].

Dactylocalyx pratti, Bowerbank, = *Theonella swinhoei*, Gray ; (1) p. 147.

Discodermida, (1) p. 145. Growth takes place by transformation of surface disks into the complicated spicules of the interior.

Spongia baicalensis, Pallas, (4) p. 12, pl. i. fig. 1, pl. ii. fig. 5, pl. iii. fig. 1, = *Lubomirskia*, g. n. The length of the skeleton spicules varies in different specimens, from ·168 to ·243 mm., the maximum diameter from ·009 to ·024 mm. ; the young form of the Sponge is encrusting. Four varieties, α, β, γ, & δ, are distinguished, pls. i. ii. & iv. figs., differing either in the spination or the proportions of the skeleton spicules.

Veluspa polymorpha, Miklucho-Maclay, (4) p. 36. Is broken up by Dybowsky. Var. *gracilis* = *Reniera*; var. *baicalensis* = *Lubomirskia*, g. n. ; var. *arctica* = *Pachychalina compressa*, Schmidt ; the remaining 8 varieties, pl. ii. fig. 4, pl. iv. figs. 5, 6, & 10, are described and retained to represent the old species; var. *flabelliformis* is the typical form. The genus *Veluspa*, as limited by Dybowsky, *l. c.*, is nearly related to *Trachya* and *Clathria*.

Lubomirskia, Dybowsky, (4) p. 11. Characterized as a new genus, but see Zool. Rec. xv. The new species of 1878 are fully characterized, viz., *L. bacillifera*, id. p. 22, pl. ii. fig. 1, pl. iv. fig. 2 *a*, Lake Baikal, chiefly the south-west coast ; 3 varieties distinguished, α, β, γ, pls. i. & iv. various figs. ; *L. intermedia*, id. p. 28, pl. iv. fig. 3, at mouths of rivers flowing into Lake Baikal ; one variety, α, distinguished ; *L. papyracea*, id. p. 33, pl. i. fig. 7, pl. iii. fig. 2, pl. iv. fig. 4, southern end of Lake Baikal, at slight depths.

Spongilla. Results of observations on the physiology ; J. Fullagar, Sci. Gos. xvi. pp. 3, 11, & 64, figs. 1–3, 65–69.

Spongilla. A species shortly described from a stream near Philadelphia by Potts, P. Ac. Philad. 1880, p. 330, without name ; also *S. fragilis*, Leidy, and a sp. n. [*infrâ*] by the same author. *Spongilla stagnalis*, Dawson ?, Adirondack Lakes, N. America, and another species from a lake, nearly allied to *S. lacustris* ; *S. fragilis*, var. n. *minuta*, from a cellar in Pennsylvania, *tom. cit.* p. 357.

Spongilla baileyi ?, and another doubtful *Spongilla* described from Niagara River, in Am. J. Micr. v. p. 132.

Spongilla jordanensis, Vejdovsky, found at Rakonitz in Bohemia; Kusta, Verh. z.-b. Wien, xxix. p. 40.

HEXACTINELLIDA.

Schmidt, (9) p. 33, supports Carter's views that siliceous bars, where found extending in this Order between the primitive skeleton spicules, are formed by silicification of extensions of protoplasm; polyhedric skeleton-meshes may occur as constant modifications of the hexahedral type; the scopiform, or broom-like spicules are modified sex-radiate forms, connected with the "fir-trees."

Farrea, (9) p. 43. Schmidt does not consider the presence or absence of scopiform spicules a specific character; many varieties occur in the Mexican and Caribbean Seas, but *Farrea facunda*, Schmidt, is the only good species existing there; it includes *F. fistulata* and *lævis*, Bowerbank. Further remarks are made on Bowerbank's species of *Farrea*.

Eurete farreopsis, Carter, (9) p. 44, = *Aulodictyon intermedium* = *Farrea*.

Aphrocallistes, (9) p. 48. Structure and growth discussed; *A. bocagii*, l. c. pl. vii. fig. 5, 164–400 fath., Caribbean Sea, is perhaps identical with *A. beatrix*.

Myliusia zitteli, Marshall, (9) p. 51. pl. iii. figs. 11 & 12, pl. iv. fig. 5, pl. vi. fig. 4, Caribbean Sea, 100–150 fath. and perhaps deeper. *M. callocyathes*, Gray, *l. c.* p. 54, pl. viii. figs. 1–3, Caribbean Sea, 116–292 fath., = *Dactylocalyx*.

Dactylocalyx pumiceus, (9) p. 53, pl. vi. fig. 5, *subglobosus*, l. c. pl. iv. fig. 8, Caribbean Sea.

Dactylocalyx crispus, Schmidt, (9) p. 47, is a mere growth-form, not a distinct species.

Hyalonema, *Pheronema annæ*, and *Liobolidium*, from various localities in the Caribbean Sea, (9) pp. 64 & 65.

Sponge-balls formed of masses of *Euplectella* spicules supposed to have been ejected by a Cetacean animal; T. Higgin, P. Liverp. Soc. xxxiii. p. lvii.

Euplectella aspergillum, (10) p. 663, pl. xvii. From carefully preserved specimens from H.M.S. 'Challenger' it was discovered that the soft parts are scanty in amount; the wall of the sponge is traversed by permanent openings, besides those in the plate at the top constituting the true vents; the excretory tubes have smaller or larger openings within special areæ on the inner surface; the outer surface is covered by a skin which is pierced by dermal pores leading into a very irregular system of lacunar and canal-like subdermal spaces opening into cylindrical ciliated chambers about $\frac{1}{10}$ mm. by $\frac{3}{10}$ mm. in size; these have an outer closed rounded end and a wide circular opening, and are grouped around short digitate excretory cœca which open either directly or by the intervention of large canals into the internal cavity of the sponge. Three tissue layers are distinguishable: the ectoderm, probably cellular, clothes the whole exterior and interior wall and the inhalent canals; the endoderm lines the ciliated chambers and the exhalent canals; the intermediate tissue, which is reticulate, and contains the generative products,

is the mesoderm. In the cells of the ciliated chambers no collars have as yet been observed, but they are connected together in spiral rows by cords of tissue so as to form rhomboidal meshes. The mesoderm is gelatinous and granular, and contains nuclei and refractive bodies of reserve nutriment, and spermatic balls about $\frac{1}{20}$ mm. in diameter. The soft parts are often inhabited by a tubicolous gymnoblastic Hydroid, to be named *Amphibrachium euplectellæ*.

CALCAREA.

Ascetta primordialis. Various conditions of its cells figured by Kent, (6) pl. viii. figs. 32–40.

Leucosolenia coriacea. Portions of soft parts figured, *l. c.* pl. viii. fig. 41, pl. x. figs. 1–7. *L. botryoides*, similarly, *l. c.* pl. x. figs. 14 & 15.

Grantia compressa. Soft parts figured, *l. c.* pl. vii. figs. 3 & 4, pl. viii. figs. 1–17, pl. ix. figs. 22–29 & 32. *G. ciliata*, embryo figured, *l. c.* pl. ix. fig. 30; at some stages the planula is partly covered with collared embryo monads.

NEW GENERA AND SPECIES.

CERATINA (Carter).

Aplysina purpurea, Carter, (1) p. 36, Gulf of Manaar and Trincomalee. *A. fusca*, id. *ibid.*, Gulf of Manaar.

PSAMMONEMATA (Carter).

Hircinia arundinacea and *H. fusca*, Carter, provisional spp. nn., (1) p. 36, Gulf of Manaar.

Psammascus, Marshall, (7) p. 92. Differs from *Spongelia* by the presence of foreign bodies in the syncytium or connective tissue layer. It is perhaps an aberrant *Spongelia*-form. The single species, *P. decipiens*, id. *ibid.* pl. vi. figs. 1–5, from Australia ?, is funnel-shaped, with three kinds of fibres, distinguished as primary (running along cloacal cavity), secondary (at right angles to surface), and tertiary (connecting the latter); the last-named are those usually known as secondary. No laminæ were observed in the fibres. Of the different kinds of foreign bodies contained in the sponge, fragments of shells constitute 49 per cent., sand 29 per cent., *Foraminifera* 11 per cent., sponge-spicules 9 per cent., and fragments of other animal remains 2 per cent.

Dysidea favosa, Marshall, (7). p. 98, pl. vi. figs. 6–11, Bass's Strait. Three sets of skeleton fibres, and a cloacal cavity. The proportions of the different kinds of foreign bodies to each other are quite different in the dermis and the main skeleton; the arrangement of the different foreign bodies in the sponge is explicable by no mechanical principles. The cloacal cavity is lined by a fibrillated layer which is in continuation with the dermis, and contains a certain amount of foreign material.

Dysidea callosa, Marshall, (7), p. 104, pl. vi. fig. 12, pl. vii. figs. 1–5, hab. ?. The skeleton consists of irregular tracts running outwards and consisting of little else but foreign bodies; connecting or secondary fibres appear to be scarce.

Dysidea argentea, Marshall, (7) p. 107, pl. vii. figs. 6–11, Australia.

Psammoclema, Marshall, (7) p. 109. Branching, with many oscula.

Surface smooth, with separable dermis. Foreign bodies in simple tracts which run outwards from interior of sponge; no connecting or secondary fibres. Foreign bodies also found free in syncytium or connective tissue. *P. ramosum*, id. *ibid.* p. 109, pl. vii. figs. 12–15, pl. viii. figs. 1–5, Bass's Strait. Proportion of foreign bodies to tissues is as 3 to 1. All the specimens contained an *Oscillaria*.

Psammopemma, Marshall, (7) p. 113. Firm, cake-shaped masses of sand penetrated by very fine canals; no oscula or cloacal cavity; protoplasm scanty; dermis cellular, slight, transparent, and homogeneous. *P. densum*, id. *l. c.* p. 113, pl. viii. figs. 6–11, Tasmania and Cape of Good Hope; no trace of fibres in the arrangement of the foreign bodies.

Rhaphidonemata (Carter).

Chalina fangophila, Schmidt, (9) p. 80, pl. ix. fig. 2, Gulf of Marseilles. A rooted species, intermediate between *Chalina* and *Reniera*.

Siphonochalina viridescens, Schmidt, (9) p. 76, Barbadoes, 100 fath.

Rhizochalina amphirrhiza, Schmidt, (9) p. 76, pl. vi. fig. 12, Caribbean Sea ?, 40 fath. *R.* ? *fibulata*, id. *ibid.*, Barbadoes, 288 fath.

Echinonemata (Carter).

Microciona affinis, Carter, (1) p. 41, pl. iv. fig, 15. *M. bulbo-retorta*, id. *ibid.* p. 41, pl. iv. fig. 3. *M. quadriradiata*, id. *ibid.* p. 42, pl. iv. fig. 4, identical with a species already recorded from W. Indies. *M. quinqueradiata*, id. *ibid.* p. 43, pl. iv. fig. 5. *M. curvispiculifera*, id. *ibid.* p. 43, pl. iv. fig. 6. *M. fasciculispiculifera*, id. *ibid.* p. 44, pl. iv. fig. 7, all from Gulf of Manaar.

Hymerrhaphia unispiculum, Carter, (1) p. 45, pl. iv. fig. 8, *H. eruca*, id. *ibid.* p. 46, pl. iv. fig. 9, Gulf of Manaar.

Pachychalinopsis, Schmidt, (9) p. 80. Based on an unnamed species, said to bear the same relation to *Chalinopsis* as *Pachychalina* does to *Chalina*.

Siphonochalinopsis, Schmidt, (9) p. 80. Formed for a tubular species of *Chalinopsis*, to which no specific name is assigned.

Dictyocylindrus manaarensis, Carter, (1) p. 37, pl. iv. fig. 1, and *D. sessilis*, id. *ibid.* p. 38, pl. iv. fig. 2, Gulf of Manaar.

Phacellia plicata, O. Schmidt, Arch. mikr. Anat. xviii. p. 282, Gulf of Naples, very slightly described.

Holorrhaphidota (Carter).

Halichondria acerato-spiculum, Carter, (1) p. 49, pl. v. fig. 19, Gulf of Manaar. Near *H. incrustans*.

Hymedesmia stellivarians, Carter, (1) p. 50, pl. iv. fig. 10, *H. moorii*, id. *ibid.* p. 50, pl. iv. fig. 11. *H. spinato-stellifera*, id. *ibid.* p. 51, pl. iv. fig. 13, *H. capitato-stellifera*, id. *ibid.* p. 51, pl. iv. fig. 12, *H. trigono-stellata*, id. *ibid.* p. 52, pl. iv. fig. 14, all from Gulf of Manaar.

Rhaphiodesma minima, Waller, J. Quek. Club, 1880, p. 103, pl. v. figs. 2–7, Torquay.

Amphilectus, Vosmaer, (13) p. 109. *Desmacidinæ* with linear spicules, smooth or spined; anchorates bi- or tri- dentate, or palmato-dentate, with similar or dissimilar ends. Neither true "keratode fibre" as in *Desmacidon*, nor total absence of it as in *Myxilla*. It constitutes a central group

standing in the midst of *Esperia*, *Desmacidon*, and *Myxilla*. Includes *Isodictya gracilis, dubia*, *Halichondria compressa*, &c., Bowerbank, *Desmacidon neptuni*, Schmidt, and 37 other old species, and the new species, *D. papillatus*, Vosmaer, *l. c.* p. 22, Cape of Good Hope.

Myxilla thela, Vosmaer, (13) p. 124, Trieste.

Desmacidon lentus, French Coast, *elastica*, Cape of Good Hope, Vosmaer, (13) pp. 132 & 133.

Crambe, Vosmaer, (13) p. 135. Desmacidine; contains irregular, branched spicules, smooth or spined linear spicules. Anchorates equi-anchorate. Formed for *Suberites crambe* and *fruticosus*, Schmidt, which Vosmaer unites under the name of *harpago*, Vosmaer.

Hastatus, Vosmaer, (13) p. 136. Desmacidine; contains acerate spicules with hastate ends, also simple acerates and smooth or spined acuates. Anchorates equi-anchorate. Formed for *Isodictya lurida* and *Halichondria dickiei*, Bowerbank.

Vomerula, Schmidt, (9) p. 82. Based on *Hymedesmia johnsoni* and *Halichondria falcula*, Bowerbank, and the new species, *V. tenda*, Schmidt, *l. c.* pl. x. fig. 6, Caribbean Sea, and *V. tibicen*, id. *ibid.*, Grenada, 170 fath.

Cladorrhiza concrescens, Schmidt, (9) p. 83, pl. x. figs. 8 & 9, Gulf of Mexico, Frederikstadt, and Grenada, 481–860 fath.

Crino [*r*] *rhiza*, Schmidt, (9) p. 83. Based on *C. amphactis*, id. *ibid.* pl. x. fig. 10, Barbadoes, 288 fath. Agrees outwardly with *Cometella*, has acerate, anchorate, and bihamate spicules.

Esperia serrato-hamata, Carter, (1) p. 49, pl. v. fig. 20. Has a peculiar barbed bihamate spicule.

Cladorrhiza grandis, Verrill, P. U. S. Nat. Mus. ii. p. 204, off Nova Scotia, 180 fath., &c. Stem stout, with elongated clavate body.

Plicatella villosa, Schmidt, Arch. mikr. Anat. xviii. p. 283, merely mentioned by name; Gulf of Naples.

Cribrella labiata, Keller, (5) p. 275, pl. xiii. figs. 4–6, Gulf of Naples Pore-areas and interior coloured bright yellow by a pigment contained in mesodermic cells; the colour becomes dark on exposure to air. Spicules spinulate.

Tuberella, Keller, (5) p. 276. Differs from *Tethya* in the almost entire absence of dermis, and the absence of stellate spicules. Spicules acerate only. *T. tethyoides*, id. *ibid.* p. 277, pl. xiv. figs. 7–9, *T. papillata*, id. *ibid.* p. 279, pl. xiv. fig. 10, both from Gulf of Naples.

Clathria lobata, Cape of Good Hope, *ulmus*, Hab. ?, *reinwardti*, Moluccas, *elegans*, North America; Vosmaer, (13) pp. 151 & 152. [For removal of the genus to the *Holorrhaphidota*, vide *suprà*, p. 4.]

Tenacia arcifera, Schmidt, (9) p. 81, pl. x., Gulf of Mexico, 17 fath.

Suberites vestigium, Carter, (1) p. 52, pl. v. fig. 21, *S. fistulatus*, id. *ibid.* p. 53, pl. v. fig. 22, Gulf of Manaar.

Suberites montalbidus and *S. montiniger*, id. Ann. N. H. (5) vi. p. 256, Barents Sea, south-west of Novaya Zemlya, 62 fath.

Suberites prototypus, Czerniavsky, (2) p. 236, Sukhum Bay, Black Sea.

Rhizaxinella, Keller, (5) p. 272. Based on *R. clavigera*, id. *ibid.* pl. xiii.

figs. 1–3, Gulf of Naples. Has a horny and spicular axis, like that of *Axinella polypoides*, but with a stalk and tuft of root fibres. Spicules spinulate, the points of the outer ones projecting through the dermis. [Apparently a Suberitid, and therefore not placed with the *Echinonemata*.] According to Schmidt, Arch. mikr. Anat. xviii. p. 282, what is apparently a variety of this has been obtained at Marseilles; the species probably belongs to the *Suberitidæ*.

Tethyophœna, Schmidt, Arch. mikr. Anat. xviii. p. 281. Based on *T. silifica*, id. *ibid.*, Gulf of Naples. Shape, blunted conical. In internal structure like *Tethya*, with bundles of acerates; but there are, besides, irregular tubular or nodular siliceous masses.

Archæocliona, Czerniavsky, (2) p. 243. New subgenus of *Cliona* [mentioned in Zool. Rec. xv.], based on *C. labyrinthica*, Hancock, &c. [*suprà*, p. 7]. Characterized by its simple fusiform acerate or doubly-blunt spicules.

Thoosa socialis, Carter, (1) p. 57. As minute growths with other Sponges, in excavations in Melobesian nodules; Gulf of Manaar.

Dotona, Carter, (1) p. 57. Based on *D. pulchella*, id. *ibid.* pl. v. fig. 24, from excavations in Melobesian nodules; Gulf of Manaar. Forms a mass charged with 3 kinds of spicules; the first, cylindrical, curved, and verticillately micro-spined; the second, hair-like, acerate; the third, minute cylindrical, spined at centre and ends.

Alectona higgini, Carter, (1) p. 58, pl. v. fig. 25. In excavations in Melobesian nodules; Gulf of Manaar.

Samus simplex, Carter, (1) p. 60, pl. v. fig. 26. In excavations in Melobesian nodules; Gulf of Manaar. *S. complicatus*, id. *ibid.* p. 61, pl. v. fig. 27; from base of *Euplectella cucumer*, off the Seychelle Islands.

Phoriospongia, Marshall, (7) p. 122. Spicules acerate, spinulate, and bihamate; a separable dermis; the sponges penetrate and surround masses of sand; sometimes found on shells; apparently belong to the *Clionidæ*. *P. solida*, id. *ibid.* p. 122, pl. viii. figs. 12–17, Bass's Straits. The dermis contained some irregularly mulberry-shaped siliceous bodies, similar to those described by Grant & Hancock from *Vioa*, and apparently of foreign origin. *P. reticulum*, id. *ibid.* p. 124, pl. viii. figs. 18 & 19, Tasmania. The foreign bodies form the chief part of the Sponge, and show no trace of arrangement into fibres. The canals are lined by a fibrous membrane, which contains bihamates and foreign bodies.

Stylor[r]hiza, Schmidt, (9) p. 79. Founded for *Hyalonema boreale* and *longissimum*, &c.

Fangophilina, Schmidt, (9) p. 72. Embraces species of *Tetilla* altered by growth on muddy bottom; they possess special root tufts, and apparatus for the protection of the openings of the water-canals. Includes *T. polyura*, *euplocamus*, and *radiata*, and *F. submersa*, sp. n., *id. l. c.* p. 73, pl. x. fig. 3, Caribbean Sea.

Tisiphonia fenestrata, Schmidt, (9) p. 71, pl. x. fig. 2. Form various; Caribbean Sea and Florida Channel, 955–1591 fath.

Tisiphonia nana, Carter, (1) p. 138, pl. vii. fig. 43, *T. annulata*, id. *l. c.* p. 140, pl. v. fig. 28, *T. penetrans*, id. *l. c.* p. 141, all from Gulf of Manaar, the last occurs in excavations. The author describes them as provisional new species, stating his belief that they are all varieties.

Geodia areolata, G. ramo-digitata, G. globo-stellifera, Carter, (1) pp. 133 & 134, pl. vi. figs. 31 & 36–38, Gulf of Manaar. The last species has globo-stellate spicules mixed with the balls of the crust.

Stellogeodia, Czerniavsky, (2) p. 280. A new subgenus of *Geodia*, based on *Geodia stellosa*, sp. n., *id. ibid.*, Black Sea. This subgenus stands midway between *Stelletta* and the typical *Geodiæ*; the cortex and outer membrane contain numerous small short-rayed stellate spicules; the parenchyma contains numerous short-rayed stellates besides the balls.

Isops, Sollas, (12) p. 396. Differs from *Geodia*, s. str., *Cydonium*, and *Pachymatisma*, in having the incurrent and excurrent orifices similar and placed at the ends of simple cylindrical tubes. *I. phlegræi*, id. *l. c.* p. 397, pl. xvii., Kors Fiord, Norway, 180 fath. Has a subcortical layer, fibrous externally, internally formed of gelatinous connective tissue, containing fusiform cells. The mark exhibits no cells, and therefore is a syncytium. Sheath of long spicules tri-laminar, consisting of fusiform cells, hyaline fibres, and in places gelatinous connective tissue. Development of globate spicules traced from "Trichites." "Chones" [*infrà*, p. 20] and canal-system described at length. Ciliated chambers occur on all the incurrent canals.

Stellettinopsis annulata, Schmidt, (9) p. 75, pl. ix. fig. 6, habitat unknown, *evastrum*, id. *ibid.* p. 77, Grenada, 170 fath.

Stelletta normani, Sollas, (12) p. 132, pls. vi. & vii., Kors Fiord, Norway, 180 fath. A central mark-substance is distinguished from the cortical substance; it consists of finely granular protoplasm, becoming striated towards the canals; a muscular layer underlies the superficial spicular layers, and is lined internally by some large cells, and by a nucleated epithelial membrane. The chone or intermarginal cavity is divided horizontally by a sphincter into an ectochone and endochone. The bundles of trichites are probably homologous with the globate-spicules of *Geodia*; a nucleus lies at the end of each bundle.

Stelletta tethyopsis, Carter, (1) p. 137, pl. vi. figs. 39 & 40, Gulf of Manaar.

Stelletta carbonaria, Schmidt, Arch. mikr. Anat. xviii. p. 280, Gulf of Naples. Spicules chiefly acerate and acuate; also some scattered forked anchors, delicate stellates and spiral stellates. *S. fibulifera*, id. *ibid.*, Gulf of Naples; six kinds of spicules.

Stelletta profunditatis, Schmidt, (9) p. 70, Gulf of Mexico, 1920 fath. *S. pygmæorum*, id. *ibid.* pl. ix. fig. 9, St. Vincent, West Indies, 95 fath. *S. mastoidea*, id. *ibid.* pl. x. fig. 1, Grenada, 262 fath. Many "persons are united into one "stock."

Pachastrella lithistina, Schmidt, (9) p. 68, pl. ix. fig. 3, Gulf of Mexico or Caribbean Sea. Besides its stellates, it contains irregular tuberculated masses in its dermis.

Corticium versatile, Schmidt, (9) p. 69, pl. ix. fig. 5, St. Vincent's, West Indies, 95 fath.

Plakina [*Plac-*], F. E. Schulze, (11) p. 448. Growth sessile, encrusting; surface bearing one or more projecting oscular tubes; besides the three forms of spicules distributed irregularly over the tissues, there is a single peripheral layer of candelabrum-like quadri-radiates, whose chief rays

break up into secondary rays. The ciliated chambers form what is essentially a single layer between the dermis and the basal lacunæ, much as in *Halisarca lobularis*. *P. monolopha* id. *ibid.* pp. 407 & 448, pl. xx. figs. 1–7, pl. xxii. figs. 22–29, Trieste, Lesina, and Naples. Consists essentially of a sac with smooth proximal and deeply folded free sides; ciliated chambers globular, opening directly, or by short canals, into the cloacal cavity; the pores open by short branched tubes directly into the ciliated chambers; a ciliated pavement epithelium may be readily found on all surfaces except those of the ciliated chambers. The middle embryonic layer is slightly developed. The tri- and quadri-radiate spicules vary in the proportions of their different rays and angles. No central canal was observed in any of the spicules. Colonies hermaphrodite. The spermatozoa occur in balls, closely resembling the ciliated chambers. The ova commence as large amœboid cells in the gelatinous basis of the middle layer; segmentation is dichotomous, and results in the formation of a hollow unilaminar blastula. After fixation two layers of cells appear, the outer a flattened epithelium, the inner consisting of irregularly polyhedric cells. A cleft lined with cylindrical cells then appears in the wall. The oscula originate at the edge of the crust, and are probably produced mechanically by the distension and consequent bursting through of the walls at one or more points. Young spicules are found each closely connected with a connective tissue cell, whose nucleus lies over its centre. *P. dilopha*, id. *ibid.* pp. 422 & 448, pl. xx. figs. 10 & 11, pl. xxii. fig. 30, Trieste. Has the connective tissue more developed subdermally and more compact than in *P. monolopha*. Cilia appear to be absent from the surface. The candelabroid spicula have two of their rays branched, and are distributed around the excretory canals as well as in the surface layer; the histology agrees on the whole with that of *P. monolopha*. The larva showed a stage which appears to represent the formation of a gastrula. *P. trilopha*, id. *ibid.* pp. 427 & 449, pl. xxi. figs. 1–3, Naples. Individuals hermaphrodite. The canal system is somewhat more complicated than in the other species, having subdermal cavities connected by canals with the pores; at least three rays of the candelabroid spicula break up into branches. In all three species the spicules are variable, the variations taking chiefly the form of production of spines or rudimentary additional radii.

Plakortis [*Plac-*], F. E. Schulze, (11) p. 449. Based on *P. simplex*, id. *l. c.* pp. 430 & 449. pl. xxi. figs. 14–16, Naples. Encrusting; a distinct dermal layer, overlying a network of subdermal cavities; no basal lamina or basal lacunar system; excretory canal system arborescent; a dense deposit of granular matter around the canal system and ciliated chambers. Spicules few, consisting of bi- and tri-radiates only, chiefly lying parallel to surface, agreeing in general character with those of *Plakina*. The points of divergence from *Plakina* in the histology are but few; the ciliated chambers are rather larger and fewer than in that genus. Probably no cilia occur on the pavement epithelium. Certain large round inflated cells occur in some parts of the connective tissue layer. The biradiate spicula are never truly acerate, but always present some irregularity at the middle; they lie chiefly parallel to the surface.

Plakinastrella [*Plac-*], F. E. Schulze, (11) p. 449. Based on *P. copiosa*, id. *l. c.*, pp. 433. & 449, pl. xxi. figs. 17–21, Naples. Dome-shaped, with single osculum. Subdermal cavities fairly developed, marking off a dermis containing biradiate spicula set at right angles to surface. No basal lacunæ. Exhalant and inhalant canal-system arborescent and well-developed. Spicula of three sizes, viz., large quadri-, tri-, and bi-radiate, the two former anchor-shaped when in the dermis. Those of the middle size are only quadri- and tri-radiate; the smallest, chiefly dermal, belong to all three forms. The largest alone have visible axial canals. The biradiates resemble those of *Plakina*. Ciliated chambers surrounded by granules.

Corallistes aculeata, Carter, (1) p. 143, pl. vii. fig. 45, Gulf of Manaar and off South of Japan. *C. verrucosa* and *C. elegantissima*, id. *l. c.* p. 144, pl. vii. figs. 46 & 47, Gulf of Manaar.

Discodermia dissoluta, Schmidt, (9) p. 87, pl. v. fig. 2, Barbadoes, 56 fath.

Discodermia papillata, Carter, (1) p. 146, pl. viii. fig. 48; *D. aspera*, id. *l. c.* p. 147, pl. viii. fig. 49; *D. spinispirulifera*, id. *l. c.* p 148, pl. viii. fig. 50; *D. lævidiscus*, id. *l. c.* p. 149, pl. viii. fig. 51: all from Gulf of Manaar.

Neopelta, Schmidt, (9) p. 88. Tetracladine. Characterized by the possession of uni-axial discs; these appear to be developed from uni-axial surface spicules which have assumed this form owing to their position. Irregular branching but uni-axial spicules, small fusiform, longer acerate, and cylindrical spicules are also present. *N. imperfecta*, id. *ibid.* pl. ix. fig. 11, Barbadoes, 103 fath.; *N. perfecta*, id. *ibid.* pl. v. fig. 3.

Azorica cribrophora, Schmidt, (9) p. 89, pl. v. fig. 4, Barbadoes, 200 fath.

Spongilla tentasperma, Potts, P. Ac. Philad. 1880, p. 330, stream near Philadelphia. Walls of foramen of gemmule prolonged into tendril-like processes. Name altered by the author, *tom. cit.* p. 357, to *tenosperma*.

Spongilla aspinosa, id. *tom. cit.* p. 357, swamp, New Jersey, *S. argyrosperma*, *repens*, *astrosperma*, id. *ibid.*, cellar in Pennsylvania.

HEXACTINELLIDA.

Cystispongia superstes, Schmidt, (9) p. 50, pl. iii. fig. 10, pl. iv. fig. 4, pl. vii. fig. 6, Yucatan, Martinique, Morro Light, 20–292 fath. Referred to Römer's Cretaceous genus.

Dactylocalyx potatorum, Schmidt, (9) p. 53, St. Lucia Island, 151 fath.

Margaritella, Schmidt, (9) p. 54. Based on *M. cœloptychoides*, id. *ibid.* pl. vii. fig. 7, Havannah, 150 fath. Intermediate between *Dactylocalyx* and *Cœloptychium*; no lantern-nodes.

Joannella, Schmidt, (9) p. 55. Based on *J. compressa*, id. *ibid.* pl. iv. fig. 11, Gulf of Mexico, off Cuba, 287 fath. Shaped like an open cup, skeleton very solid, meshes very narrow; two forms of rosette, one, being a new form, to be called "knob-rosette."

Scleroplegma, Schmidt, (9) p. 56. Cylindrical or conical, with body-cavity; meshes wide, varying from cubical to polyhedric form. *S.*

lanterna, id. *ibid.* pl. iii. fig. 17, pl. v. fig. 6, Morro Light and another doubtful locality, 292–320 fath., has lantern-like nodes; *S. conicum*, id. *l. c.* p. 57, pl. viii. fig. 4, Morro Light, 292 fath.; *S. seriatum*, id. *ibid.* pl. viii. fig. 5, Morro Castle, 200–300 fath.; *S. herculeum*, id. *ibid.* Santa Cruz, 580 fath.

Diplacodium, Schmidt, (9) p. 57. Based on *D. mixtum*, id. *ibid.* pl. iii. fig. 16, pl. iv. fig. 7, Morro Light and Gulf of Mexico, off Cuba, 101–292 fath. Consists of bilaminar plates, has lantern-nodes, delicate sex-radiate spicules and two kinds of rosettes.

Volvulina, Schmidt, (9) p. 58. Based on *V. sigsbeei*, id. *ibid.* pl. iii. figs. 14 & 15, pl. iv. fig. 6, pl. vi. fig. 6, Caribbean Sea and Gulf of Mexico, 100–292 fath.

Pach[*y*]*aulidium*, Schmidt, (9) p. 59. Tubular, tube angular in outline; meshes polyhedric; nodes approximated. No specific name given. Locality, Santa Cruz, 580 fath.

Regadrella, Schmidt, (9) p. 61. Based on *R. phœnix*, id. *ibid.* pl. viii., Caribbean Sea, 221–248 fath. Euplectellid in affinities, with a firm instead of a fibrous rooting basis.

Hertwigia, Schmidt, (9) p. 62. Based on *H. falcifera*, id. *ibid.* pl. vi. figs. 8 & 9, pl. viii. fig. 8, Dominica, 611 fath. Between *Dictyonina* and *Lyssacina*. Form irregular, with labyrinthic cavities; six varieties of free spicules, including the *Euplectella*-rosette and a rosette with long hooked rays.

Rhabdoplectella, Schmidt, (9) p. 62. Based on *R. tintinnus*, id. *ibid.* pl. vi. fig. 10, pl. viii. figs. 9 & 10; Grenada and South of Cuba, 291 & 994 fath. Form various; the skeleton sex-radiates have strongly developed main axis; six varieties of flesh spicules.

Rhabdostauridium, Schmidt, (9) p. 59. Based on *R. retortula*, id. *ibid.* pl. vii. fig. 8, Gulf of Mexico, 804 fath. Retort-shaped, intermediate between *Dictyonina* and *Lyssacina*. Formed of long fibres united by siliceous matter, no free spicules observed.

Euplectella jovis, Schmidt, (9) p. 60, pl. vi. fig. 7, Caribbean Sea, 416–423 fath.

Asconema kenti, Schmidt, (9) p. 65, pl. v. fig. 10, Caribbean Sea, 338–1507 fath. May possibly be referable to a new genus.

Diaretula, Schmidt, (9) p. 45. *Dictyonina* with meshes of cubical character, but more irregular than those of *Farrea*. The wall grows by increase in thickness, not extent; no free spicules. *D. cornu*, id. *ibid.* pl. iv. fig. 3, pl. iii. fig. 9, *murella*, id. *l. c.* p. 46, Gulf of Mexico, 805 fath.

Cyathella, Schmidt, (9) p. 46. Based on *C. lutea*, id. *ibid.* pl. vii. fig. 2. Shaped like a champagne-glass; skeleton irregular, inclining to the cubical type, Caribbean Sea, 1591 fath.

Rhabdodictyon [*-um*], Schmidt, (9) p. 46. Based on *R. delicatum*, id. *ibid.* pl. vi. fig. 1, pl. vii. fig. 3. Tube- or cup-shaped; skeleton a mixture of Dictyonine and Lyssacine tissue; a fine rosette spicule. Caribbean Sea, 1591 fath.

Syringidium, Schmidt, (9) p. 46. Based on *S. zitteli*, id. *ibid.* pl. iv. figs. 9 & 10, pl. vii. fig. 4. [The author states that it is most probably

identical with *Lefroyella decora*, Wyville Thomson.] Various localities in Caribbean Sea, 116–878 fath.

CALCAREA.

Mœbiusispongia[*Mœbiisp-*], Duncan, (3) p. 378. Based on *M. parasitica*, id. *l. c.* p. 377, pl. x. Found within chambers of the Foraminifer *Carpenteria rhaphidodendrum*, from Mauritius, and described as parasitic there; probably a composite *Ascon* form; exists in a sac-like form; a triradiate and other spicules were observed in connection with it.

General Anatomy and Physiology.

O. SCHMIDT, in "Die Absonderung und die Auslese im Kampf ums Dasein," Kosmos, iv. p. 329, discusses the genealogy of the *Lithistiidæ*, deriving the *Rhizomorina* from the *Tetracladina*, and finding, in the mutual relationship of genera in this group, in the adaptation of the rooting apparatus of many Sponges to the nature of the bottom on which they grow, and in the readiness with which spicular forms, especially in the *Hexactinellida*, can be referred to common types, good arguments for the Darwinian hypothesis.

F. M. BALFOUR, Q. J. Micr. Sci. xx. p. 247, "On the Structure and Homologies of the Germinal Layers of the Embryo," discusses the relations of Sponges, among the other groups of the Animal Kingdom, to the germ-layer theory. *Cf.* also *id. tom. cit.* p. 381, "Larval Forms: their Nature, Origin, and Affinities."

SCHMIDT considers that the terms 'individual' or 'person,' as applied to Sponges, are inadequate and meaningless: (9) p. 89.

According to the same author, a radiate structure, as described by Selenka, is no new thing in Sponges, but it has no special importance: (9) p. 90.

The ciliated larvæ of Sponges are interpreted by KENT, (6) p. 177, as being sponge-*gemmules*, and as consisting, in the later planular stages—at least in *Grantia compressa*—of oval aggregations of collared monads, with their mouths directed outwards, a view which he considers to receive unintentional support from Barrois & Häckel's observations. The so-called ova are retrograde collar-bearing zooids, and form the gemmules by fusion with other similar zooids. The ciliated chambers are produced by segmentation of a primitive amœboid zooid. A comparison is set up between the Sponges and the *Myxomycetes* in their various stages and structures; *l. c.* p. 192. A Choano-Flagellate Infusorian, allied to *Phalansterium*, appears to approach the Sponges very closely.

F. E. SCHULZE, (11) p. 437, has been led to the belief that both the collar-cells of the ciliated chambers, and all the flat-celled ciliated epithelial coverings of the internal cavities and canals of that stage of Sponges which follows the sac-like embryo, are derived from the larval endoderm. In *Placina monolopha* (vide *suprà*), the pavement epithelium of the outer surface is ectodermic up to the edges of the pores and vents; the tissues included between the endoderm and ectoderm are mesodermic. The adult Sponge in all stony and siliceous Sponges hitherto investigated by him may be referred to a simple sac-like form, in which the ciliated

chambers constitute a unilaminar zone between the exhalant and inhalant canals; thus the outer surface of the Sponge and the surface of the exhalant canals represent the outside of such a sac, while the ciliated chambers and the inhalant canals represent its inner wall.

KENT, (6) p. 167, pl. viii. figs. 19–21, finds that the detached collar-cells of Sponges, when again brought into contact with the Sponge, throw out a film of cytoblastema around them.

Structures resembling those which other authors have termed sperm capsules and spermatozoa are figured by KENT, (6) pl. x. figs. 12, 13, & 16–18, as spore-like bodies and sporocysts in *Halichondria* and *Hymeniacidon*; similar bodies are also described as spores, &c., from *Leucosolenia coriacea* and other calcareous as well as silicious Sponges, *l. c.* p. 173. They are stated to be derived in some cases from the splitting up of collar-cells, and to develop into collar-cells again; their spermatic nature is denied.

MARSHALL, (7) p. 117, concludes that the arrangement of the skeleton of all Sponges is regulated by the course of its water-canals, and discusses this method of its production, p. 96. It is doubtful whether all horny fibres have an outer coat.

'Trichites,' term applied by SOLLAS, (12) p. 133, to sheaves of hair-like spicules in *Stelletta normani*; 'Chones,' 'Chonæ,' or 'cortical funnels,' terms applied to the intermarginal cavities of Bowerbank by the same author, *l. c.* p. 135, &c. *Cf.* also under *Stelletta normani*, sp. n., and *Geodia barretti*, suprà. The synonymy of the names of the different structures of the dermal layer also given, *l. c.* p. 141.

Essential difference between vesicular incurrent canals in *Geodina* and the racemose type of excurrent canals in the *Leucones*, maintained by the same author, *l. c.* p. 406.

The Sponges *Psammascus*, *Dysidea*, *Psammoclema*, according to MARSHALL, (7) p. 121, appear to take a passive, *Psammopemma* an active, part in the process of appropriation of foreign bodies.

S. O. RIDLEY, J. L. S. xv. p. 149, gives an account of two cases in which the spicules of a recognizable species of siliceous Sponge had been incorporated with the skeletons of other species of siliceous Sponges which had grown near it.

Proportions of the different kinds of foreign bodies in various Psammonematous Sponges given by MARSHALL (7).

For pathological changes in Sponges produced by presence of foreign organisms, see SOLLAS, (12) pp. 253 & 407.

FOSSIL SPONGES, CHIEF WORKS ON.

14. CARTER, H. J. On Fossil Sponge-spicules from the Carboniferous Strata of Ben Bulben, near Sligo. Ann. N. H. (5) vi. p. 209, pl. xiv.B, figs. 1–17.

15. HINDE, G. J. Fossil Sponge-spicules from the Upper Chalk. Munich: 1880, 8vo, 5 pls.

An account of the sponge-spicules contained in the interior of a single

flint-stone, about a foot in diameter, from Norfolk. The author considers that the 160 figured forms are assignable to 32 genera and 38 species of Sponges, viz., 4 species to the *Monactinellidæ*, 20 to the *Tetractinellidæ*, 6 to the *Lithistiidæ*, 8 to the *Hexactinellidæ*.

16. Seguenza, G. Le formazioni terziarie nella provincia di Reggio (Calabria). Atti Ac. Rom. (3) Mem. sci. fis. vi. pls. iv.–xvii.

Embraces a whole volume, and refers to Sponges among the other Animal groups; a stratiographical arrangement is adopted.

17. Sollas, W. J. On the Flint Nodules of the Trimmingham Chalk. Ann. N. H. (5) vi. pp. 384 & 437, pls. xix. & xx.; *cf.* Rep. Brit. Ass. 1880, p. 586.

Describes (p. 386) a number of new species (*vide infrà*) based on spicules from this Norfolk deposit, and discusses very fully (p. 437) the origin and relations of flints.

Martin, K. Untersuchungen über die Organisation von *Astylospongia*, Ferd. Roem., und Bemerkungen über die Natur der Wallsteine. Arch. Ver. Mecklenb. xxxi., pl.; also separately, Neubrandenburg: 1877.

[Not seen by the Recorder.]

Reniera spp., spicules figured from flint; (15) pp. 21–23, pl. i. figs. 16–19 & 22. *Scoliorrhaphis*? ; p. 23, pl. i. fig. 5.

Tethya ? spp, spicules from flint ; (15) pp. 36–38, pl. iii. figs.

Vioa sp. recorded from tertiary sand in East Galicia, by V. Hilber, Verh. geol. Reichsanst. 1880, p. 240.

Cliona falunica, Fischer, (16), pp. 56, 63, 88, & 135, and *C.* sp. ?, *l. c.* p. 44, Miocene of Calabria.

Cliona tubulosa, sp. n., Seguenza, (16) pp. 89 & 135, pl. xii. fig. 29; *C. vermicularis, micropora, oostoma*, spp. nn., *id. l. c.* p. 135, pl. xii. figs. 30–32, Miocene of Calabria.

Holastrella wrighti, Carter, (14) p. 211, pl. xiv. B, fig. 2. Based on a stellate spicule very abundant in Carboniferous strata, Ben Bulben, Sligo.

Rhopaloconus tuberculatus, Sollas, g. & sp. nn., (17), p. 392, pl. xx. fig. 46, Chalk flint, Norfolk. Based on large conical spicule, tuberculated.

Pach[*y*]*æna hindi*, Sollas, g. & sp. nn., (17) p. 392, pl. xx. figs. 44, 52, 56, 64 & 69, Chalk flint, Norfolk. Perhaps allied to *Geodia*.

Pach[*y*]*astrellites fusifer* and *globiger*, Sollas, g. & spp. nn., (17) p. 390, pl. xx. figs. 28 & 39, respectively, Chalk flints, Norfolk. Allied to recent species of *Pachastrella*.

Tethya newberyi, McCoy, sp. n., Prodromus of the Palæontology of Victoria, Decade v. p. 31, pl. xlviii. Irregularly lobate. Miocene, Gippsland, Victoria.

Tethylites cretaceus, Sollas, g. & sp. nn., (17) p. 390, pl. xx. fig. 42, Chalk flint, Norfolk. Very closely allied to *Tethya lyncurium*.

Triphyllactis elegans, Sollas, g. & sp. nn., (17) p. xx. fig. 42. Probably a Pachastrellid.

Dercitites haldonensis, Carter, (17) p. 391, pl. xx. figs. 41 & 47, Chalk flint, Norfolk. The affinity with *Dercitus* is doubtful.

Geodites cretaceus, Sollas, sp. n., (17) p. 391, pl. xx. fig. 34, Chalk flint, Norfolk, and Greensand, Haldon, Exeter.

Geodia, &c., spicules from flint, (15) pp. 27, 35–38, pl. i. figs. 1–3, 20, 21, 25–27, pl. ii. figs. 17–19. *Geodia*, ? spp., spicules, *l. c.* pp. 34–36, pls. ii. & iii. figs. *Geodia* ? *clavata*, Hinde, *ibid.* p. 29, pl. i. fig. 4, pl. ii. figs. 1–5, *G.* ? *coronata*, id. *ibid.* p. 31, pl. ii. figs. 6–8, *G.* ? *wrighti*, id. *ibid.* p. 31, pl. ii. fig. 12, spp. nn., all from flint from Upper Chalk, Norfolk.

Caminus, ? sp., spicules from flint, (15) p. 48, pl. iii. fig. 26.

Stelletta ? spp., spicules from flint, (15) pp. 33–40, pl. i. figs. 23, 24 & 28, pl. ii. figs. 9–11 *a*.

Pachyastrella, spicules from flint, (15) p. 45, pl. iii. figs. 24 & 25.

Pachyastrella primæva, Zittel ?, *l. c.* p. 46, pl. iii. figs. 28, 32-34. *Pachyastrella* ? sp., p. 48, pl. iii. fig. 27.

Pachyastrella carteri, Hinde, sp. n., (15) p. 46, pl. iii. figs. 29–31, flint from Upper Chalk, Norfolk.

Tisiphonia, ?, spicules from flint, (15) p. 43, pl. iii. figs. 16–23.

Lyidium zitteli, Hinde, sp. n., (15) p. 51, pl. iv. figs. 1–9. *L. cretacea*[*-eum*], id. *ibid.* p. 54, pl. iv. figs. 10–13, flint from Upper Chalk, Norfolk.

Carterella, sp., spicules from flint, (15) pl. iv. figs. 14–23.

Plinthosella squamosa, flint, (15) pl. iv. figs. 35–46.

Rayadinia annulata, Hinde, sp. n., (15) p. 58, pl. iv. figs. 24–30, pl. v. figs. 1–4, flint from Upper Chalk, Norfolk.

Rhacodiscula, &c., spicules from flint, (15) p. 60, pl. iv. figs. 31–34.

The following *Lithistiidæ* are described and figured by Sollas, (17) pp. 386–393, pl. xix., from spicules found in the Trimmingham Chalk flints, Norfolk:—

I. Tetracladina.—*Discodermites cretaceus*, g. & sp. nn., near *Discodermia*. *Rhagadinia zitteli*, sp. n. *Eurydiscites irregularis*, g. & sp. nn.; the arms of dermal spicules unite to form an irregularly lobate disc. *Manodiscites parvus*, g. & sp. nn.: dermal spicule dwarfed. *Compsaspis cretacea*, g. & sp. nn.; near *Kali* [*Calli-*] *aspis cidaris*.

II. Megamorina.—*Podaspis cretacea* and *P. parva*, g. & spp. nn.; near *Lyidium torquilla*, ends of skeleton spiculo-rays foot-shaped.

III. Rhizomorina.—*Corallistes cretaceus*, sp. n. *Macandrewites vicaryi*, g. & sp. nn., like *Macandrewia*. *Corallistites*, g. n. ?.

Leptophragma, *Craticularia*, *Cystispongia*, *Coscinopora*, *Ventriculites*, spp., (15) pp. 65–69, pl. v. figs., spicules from flint.

Stauractinella cretacea, Hinde, (15) p. 70, pl. v. figs. 9–11, flint from Upper Chalk, Norfolk.

Hyalostelia fusiformis, Hinde, (15) p. 71, pl. v. figs. 12–16, flint from Upper Chalk, Norfolk.

Protospongia, Salter, is based on a Lyssacine Hexactinellid, according to W. J. Sollas, J. G. Soc. xxxvi. p. 362, figs. 1 & 2.

Hexactinellid, Lithistid, and probably either Pachyastrellid or Pachytragid sponges represented by spicules in Carboniferous strata, Ben

Bulben ; described and figured by Carter, (14) p. 212, pl. xiv. B, figs. 8, 9, 10–13 & 17. Other doubtful spicules also found, figs. 14–16.

Sollas, (17) p. 393, assigns various spicules and fragments of fibre from Chalk flints, Norfolk, to Hexactinellid sponges of the *Dictyonina* group.

Hexactinellid anchoring spicules, in flint, (15) p. 72, pl. i. figs. 31–36, pl. v. fig. 27.

Spicules from flint with borings produced by some living organisms, (15) p. 73, pl. v. figs. 28 & 29.

G. W. Gümbel, Verh. geol. Reichsanst. 1880, p. 213, states that he has found specimens of Flysch rock from various localities to consist chiefly of sponge-spicules ; sandstone, limestone, and marl alike contained them ; agglomerated globular forms occurred among others; some shaly Neocomian rocks are similarly constituted, also the black Lias shales of the Southern Alps.

G. C. Wallich, "A Contribution to the Physical History of the Cretaceous Flints," J. G. Soc. xxxvi. p. 68, concludes that sponges supplied the obviously large amount of protoplasm and organic silex which occurred at the sea bottom in the Chalk period.

PROTOZOA.

BY

STUART O. RIDLEY, M.A., F.L.S., F.R.M.S.

THE GENERAL SUBJECT.

CHIEF WORKS ON.

1. KENT, W. S. Manual of the *Infusoria*, including a description of all known Flagellate, Ciliated, and Tentaculiferous *Protozoa*, British and Foreign, and an account of the Organization and Affinities of the Sponges. London: 1880, 4to, pts. 1–3, pp. 1–432, pls. i.–xxiv.

Deals with the history of the subject; with the *Protozoa* as a whole; and with the physiology, affinities, distribution, methods of preservation and investigation of the *Infusoria* in particular. The theories of spontaneous generation and the nature and affinities of the Sponges are discussed. The latter are considered as *Protozoa*, allied to those *Flagellata* provided with cup-like disks or collars. Classifications are given, followed by the commencement of a systematic description of the *Infusoria*. It must be noted that the term *Infusoria* is here used *sensu latiori*; *vide* Classification.

GRASSI, B. Dei Protozoi parassiti, e specialmente de quelli che sono nel Uomo. Gazz. med. Italo-Lomb. xxxix. p. 445.

A preliminary paper, enumerating 27 species (1 sp. n. of Infusorians, 2 of Rhizopods, and 8 of Monads).

GRUBER, A. Kleine Beiträge zur Kenntniss der Protozoen. Ber. Ges. Freiburg, vii. p. 4.

MAGGI, L. Esame protistologico delle acque di alcuni laghi italiani. Boll. scient. ii. p. 33.

PARONA, C. Prime ricerche intorno ai Protisti del Lago d'Orta, con cenno della loro corologia italiana. *Tom. cit.* p. 17.

[Not seen by the Recorder.]

FAUNÆ.

List of *Protozoa* from three English localities; M. C. COOKE, J. Quek. Club, 1880, pp. 105 & 106.

W. S. Kent. Notes on Marine *Infusoria* from Falmouth. Tr. Birmingham Soc. 1880, p. 7, pl. iv. Nine *Protozoa* described and figured, *vide infrà*.

H. N. Moseley, in a lecture entitled "Deep-sea Dredging and Life in the Deep Sea," Nature, xxi. pp. 543, 569 & 591, gives an account of the leading forms obtained in the deep sea, and among them figures pelagic spined *Globigerinæ*, p. 569, fig. 10.

Short notes on abyssal Protozoan fauna given by C. W. Thomson in Report on the scientific results of the voyage of H.M.S. 'Challenger,' Zoology, Vol. i. London: 1880, 4to, pp. 41–44.

Classification.

Eyferth, B. Die einfachsten Lebensformen. Translated in Am. Micr. J. i. pp. 10, 34, 68, 93, 115, 133, 154, & 196, as "The Simplest Forms of Life."

The outlines are now given from the English translation:—

Rhizopoda divided into—

Fam. 1. *Actinophryina.* Genera, *Actinophrys*, *Trichodiscus*, *Plagiophrys*, *Euglypha*, *Cyphoderia*, *Trinema*, *Gromia*, *Pleurophrys*, *Clathrulina*.

Fam. 2. *Amœbina.* *Amœba*, *Podostoma*, *Petalopus*, *Pseudochlamys*, *Arcella*, *Difflugia*, *Echinopyxis*.

Order *Flagellata.* Divided into the families *Monadina*, *Astasiæa*, *Cryptomonadina*, *Volvocina*, *Hydromorina*, *Dinobryina*, *Peridinia*.

Kent, (1) p. 34, classifies the *Protozoa* by the structure and arrangements of their oral arrangements; he recognizes four classes, viz.:—

Class I. Rhizopoda. Order 1. *Amœbina*, (2) *Gregarinida*, (3) *Arcellinida*, (4) *Foraminifera*, (5) *Labyrinthulida*, (6) *Radiolaria*.

Class II. Flagellata. Order 7. *Mycetozoa* (*Æthalium*, *Didymium*), (8) *Trypanosomata*, (9) *Rhizo-Flagellata* (*Mastigamœba*, *Podostoma*), (10) *Radio-Flagellata* (*Actinomonas*, &c.), (11), *Flagellata-Pantostomata* (*Anthophysa*, &c.), (12) *Choano-Flagellata* vel *Discostomata-Gymnozoida* (*Codosiga*, &c.), (13) *Spongida* vel *Discostomata-Cryptozoida*, (14) *Flagellata-Eustomata* (*Euglena*, *Noctiluca*), (15) *Cilio-Flagellata* (*Peridinium*, *Heteromastix*).

Class III. Ciliata. Order 16. *Holotricha*, (17) *Heterotricha*, (18) *Hypotricha*, (19) *Peritricha*.

Class IV. Tentaculifera. (Order 20) *Actinaria* (*Ephelota*), (21) *Suctoria*.

24 new families are established, viz.:—*Pleuromonadidæ*, *Cercomonadidæ*, *Codonœcidæ*, *Amphimonadidæ*, *Heteromitidæ*, *Trepomonadidæ*, *Polytomidæ*, *Pseudosporidæ*, *Spumellidæ*, *Trimastigidæ*, *Tetramitidæ*, *Hexamitidæ*, *Lophomonadidæ*, *Catallactidæ*, *Codonosigidæ*, *Salpingœcidæ*, *Phalansteriidæ*, *Paramonadidæ*, *Astasiidæ*, *Noctilucidæ*, *Chrysomonadidæ*, *Zygoselmidæ*, *Chilomonadidæ*, *Anisonemidæ*.

Two cross classifications are also given, by which :—

(i.)—Legion INFUSORIA embraces Orders 8–21 of the above series.

(ii.)—Section A. PANTOSTOMATA. Ingestive area diffuse. Includes orders 1–11 of the above arrangement.

Section B. DISCOSTOMATA. Ingestive area discoidal, not constituting a distinct mouth. Includes Orders 12 & 13.

Section C. EUSTOMATA. Ingestive area taking the form of a single distinct mouth. Includes Orders 14–19.

Section D. POLYSTOMATA. Ingestive areas distinct and multiple. Includes the Class TENTACULIFERA (Orders 20 & 21).

GENERAL ANATOMY AND PHYSIOLOGY.

The chief modifications of the nucleus and nucleolus (here termed endoplast and endoplastule) in the *Infusoria, s. lat.*, figured by KENT, (1) pl. xlix. General homologies inferred to exist between the individual Infusorian and the individual Metazoan cell. The *Opalinidæ* represent the Morula stage. Analogies are pointed out as existing between various *Infusoria* and members of the *Metazoa*.

In experiments relating to spontaneous generation the same author, (1) p. 137, finds that some minute germs resist the wetting action of water for some time. *Monas lens* was seen to develope from minute germs into *Heteromita*, and to undergo other physiological changes.

Flagellata and other *Infusoria*, and *Amœba*, &c., found abundantly on wet grass in London, by the same author, (1) p. 140.

A. CERTES, Sur la glycogénèse chez les Infusoires. C. R. xc. p. 77. Reported in J. R. Micr. Soc. iii. p. 285. The author has determined, by means of treatment with iodized serum, the presence of glycogen in the extended parts of the sarcode, and in them only, of the *Infusoria*; the particles, which are usually rendered reddish-brown, have the form of granules of greater or lesser size and closeness of aggregation. In *Amœba* and other *Rhizopoda*, the reaction succeeds less constantly; it always avoids the nucleus and contractile vacuole. *Infusoria* in conjugation, or about to divide, become much more strongly coloured than at other times. Some Monads and *Flagellata* are also coloured by iodine.

W. S. KENT, Pop. Sci. Rev. iv. p. 293, pls. vii. & viii., on "*Infusoria* as Parasites," mentions and figures some of the most striking instances of parasitism in the Ciliate and Flagellate *Infusoria*; vide *infrà*.

Their use of organized food-materials, their purposive locomotion, and presence in them of a contractile vacuole are given by the same author, (1) p. 46, as the main points distinguishing the *Protozoa* from the Vegetable Kingdom.

INFUSORIA.

2. ENGELMANN, T. W. Zur Anatomie und Physiologie der Flimmerzellen. Arch. ges. Phys. xxiii. p. 505, pl. v.

An account of the author's striking discoveries as to the minute struc-

ture of cilia and ciliated cells, some *Infusoria* being cited as examples; *vide infrà*, General Anatomy and Physiology.

Maggi, L. Intorno alle *Cothurnie* parassite della branchie die Gamberi nostrali. Rend. Ist. Lomb. (2) xii.; and Studj fatti nel Laborat. Pavia, 1879.

Mereschkowsky, K. S. [Materials for an Infusorian Fauna of the Black Sea.] St. Petersburg: 1880.

[In Russian. Not seen by the Recorder.]

Genera, Species, &c., referred to.

Tintinnus subulatus, *Zoothamnium alternans*, *Z. dichotomum*, *Follicularia ampulla*, *Podophrya gemmipara*, *Ophryodendrum pedicellatum*, *O. multicapitatum*, figured and described by W. S. Kent, Tr. Birmingh. Soc. 1880, pp. 9–14, pl. iv. figs.

Carchesium polypinum. Cf. General Anatomy and Physiology.

Vorticella convallaria, P. Liverp. Soc. xxxiv. p 323, pl. iii. fig. 10 *a*.

Vorticella nebulifera, development; W. G. Cocks, Sci. Gos. xvi. p. 155, fig. 92.

Epistylis, sp. ?, W. G. Cocks, Sci. Gos. xvi. p. 156, figs. 80 & 92.

The so-called *Acineta* stage of *Epistylis* is simply an *Acineta* which becomes attached to the stem of *Podophyra quadripartita*, according to J. Badcock, J. R. Micr. Soc. iii. p. 561, pl. xiv. fig. 7.

Trichodina pediculus, in the gills and urinary bladder of the fish *Necturus*; R. R. Wright, Am. Nat. xiv. p. 133.

Chætospira muelleri, and var.; F. W. Phillips, Tr. Hertf. Soc. i. p. 168, Hoddesdon, Hertfordshire.

Oxytricha pellionella in leaf-cell of *Anacharis alsinastrum*; W. H. Dallinger, P. Liverp. Soc. xxxiv. p. 324, pl. iv. fig. 13.

Stylonychia mytilus. Cf. General Anatomy and Physiology.

Freia producta, Wright, Am. Nat. xiv. p. 810; found in Chesapeake Bay, and described by J. A. Ryder.

Stentor cæruleus, instance of germs being developed within body of a Tardigrade; G. F. Chantrell & W. H. Dallinger, P. Liverp. Soc. xxxiv. p. 328, pl. iv. fig. 15.

Trichonympha agilis, Leidy, Pop. Sci. Rev. iv. p. 300; according to Kent, is perhaps a *Hexamita*.

Amphileptus anser enveloping *Vorticella convallaria*, and becoming encysted on its stalk; process described by W. H. Dallinger, P. Liverp. Soc. xxxiv. p. 323, pl. iii. fig. 11; normal form, fig. 10.

Trachelocerca olor, fission in; J. Fullagar, Sci. Gos. xvi. p. 181, fig. 100.

Coleps hirtus, feeding on *Amœba*, and *vice versâ*; J. Fullagar, Sci. Gos. xvi. p. 204, figs. 121 & 122; fission, fig. 133.

Balantidium coli, Lösch., (13 : vide *Gregarinida*) p. 321, figs. 127 & 130, described by Leuckart; also by Grassi (*anteà*, p. 1), with 5 other Infusorian parasites.

Haptophrya gigantea, Maupas, Bull. Soc. Zool. iv. p. 240, pl. xii.,

studied by A. Certes. The genus should not be classed among the mouthless *Opalinæ*, but near *Balantidium*.

Dendrosoma radians. Habits and physiology, testes, spermatozoa, ovaries, and ova described; it produces free internal ciliated embryoes. J. Levick, Tr. Birmingh. Soc. 1880, p. 1, pls. i. & ii.

Trichophrya epistylidis, Claparède & Lachmann, J. R. Micr. Soc. iii. p. 561, pl. xiv. fig. 1. According to Badcock's observations, *l. c.*, this species is only an early stage of *Podophrya quadripartita*, pl. xiv. figs. 2–5; *Megatricha partita* is probably of a similar nature, for a form corresponding to it in structure developes into *P. quadripartita*.

Acinetæ, W. G. Cocks on stages of; Sci. Gos. xvi. pp. 79 & 155, figs. 51 & 52.

Acinetæ attached to *Epistylis* and to *Carchesium polypinum*; id. *tom. cit.* p. 79. They seem to this writer to be more than mere stages of Peritrichous *Infusoria*.

Podophyra fixa, development of; id. *tom. cit.* p. 155, figs. 88–91.

New Species.

Ophrydium adæ, Evarts, Am. Micr. J. i. p. i. figs. 1–5, Philadelphia, U.S. Also found by "D. S. K." in the Niagara River, Buffalo; *tom. cit.* p. 218. Has a long cord-like endoplast.

Stentor amethystinus, Leidy, P. Ac. Philad. 1880, p. 157, Woodbridge, New Jersey.

Haptophrya tritonis, Certes, Bull. Soc. Zool. iv. p. 242, intestine of *Triton alpestre*, Bonn.

Podophrya ? infundibulifera, Hartog, P. Manch. Soc. xix. p. 41. On *Cyclops gigas*. The tentacles are thick, obtuse, and without terminal dilatations.

Anatomy and Physiology.

Engelmann, (2) p. 507, pl. v. fig. 1, finds in *Carchesium polypinum* a circular band of refractive substance, which is closely connected with the ectoplasm, and in which the posterior circle of cilia are implanted; this band is very finely and regularly striated in two different directions by two sets of parallel lines, running, the one at an angle of 60° to the long axis of the animal, the other at an angle of 100° to the first set; by their intersection these lines break up the band into minute roundish areæ or granules, from each of which springs a cilium; these granules represent the small bacillar pedestals in which the cilia of many ciliated cells of *Vertebrata* are implanted.

The same author, *l. c.* p. 522, has searched in Ciliated *Infusoria* for the protoplasmic intra-cellular prolongations of the cilia which he has found in Vertebrate cells, but has found them apparently represented only in *Stylonychia mytilus*. Here each of the stout infero-lateral so-called cilia has a very fine pale line proceeding from its base towards the middle of the body in a direction parallel to the ventral surface. These stout composite so-called cilia have no pedicle like that of ordinary cilia, and their intracellular prolongations differ in like manner from those of ciliated cells.

RHIZOPODA.

Chief Works:—

3. Buetschli, O. *Protozoa*, in H. G. Bronn's Klassen und Ordnungen des Thier-reichs. Leipzig and Heidelberg: 1880, vol. i., 16 pls.

Vol. i. of the edition of 1859, rewritten. Deals with the *Rhizopoda, sensu latiori.*

4. Carter, H. J. Report on Specimens dredged up from the Gulf of Manaar, and presented to the Liverpool Free Museum by Capt. W. H. Cawne Warren. Ann. N. H. (5) v. p. 438, pls. xviii. & xix. Preliminary report in P. Liverp. Soc. xxxiv. p. 273.

The references below are to the main Report.

5. Korotneff, A. Études sur les Rhizopodes. Arch. Z. expér. viii. p. 467, pls. xxxv. & xxxvi. Reported and some of the figures reproduced in J. R. Micr. Soc. (2) i. p. 474, pl. vi.

6. Moebius, K. Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen. Berlin: 1880, 4to, *Foraminifera*, p. 65, pls. i.–xiv.

The work aims at throwing fresh light on the structure of the test, and the arrangement of the canal system, besides describing, with many synonymic notes, the species found.

7. Siddall, J. D. On *Shepheardella*, an undescribed type of Marine *Rhizopoda*; with a few Observations on *Lieberkuehnia*. Q. J. Micr. Sci. xx. p. 130, pls. xv. & xvi.

L. Maggi, "Intorno al *Ceratium furca*, Clpd. & Lachm., e ad una sua varietà," Boll. scient. i. p. 125; and *id.*, "Catalogue of *Rhizopoda* of Valcovia," Rev. Sci. Nat. ii. p. 242; reported, J. R. Micr. Soc. iii. p. 926. F. Vejdovsky, "Ueber die Rhizopoden der Brunnenwässer Praegs," SB. böhm. Ges. 1880. A. Wrzésniowski, "*Bathybius hæckeli*," W. Przyroda i Przemyst, Warsaw, vii. p. 253 [said to be a compilation of the most recent facts on the subject].

[Not seen by the Recorder.]

Distribution.

Distribution of *Foraminifera* in tropical waters, and especially on coral reefs; J. Murray, Nature, xxii. p. 352. The pelagic *Foraminifera* probably live at the surface.

A. R. Wallace, in "Island Life" (London: 1880, pp. 87–94), discusses the distribution of *Globigerina*-ooze and the formation of chalk.

The Catalogue of British Recent *Foraminifera* (Chester: 1879, 8vo), by Brady & Siddall, mentioned in Zool. Rec. xvi., gives a list of 190 species, among them a sp. n. of *Lagena*, without description.

10 species of *Foraminifera* enumerated by A. M. Norman, Ann. N. H. (5) vi. p. 430, as recently obtained by the French exploring ship 'Le

Travailleur' in the Bay of Biscay; they include 8 arenaceous forms and *Bathysiphon filiformis*, G. O. Sars. A. MILNE-EDWARDS, reporting on the same expedition, C. R. xci. p. 360, mentions very large specimens of *Orbitolites tenuissimus* among the Calcareous forms, and among the Arenaceous ones, *Lituola subglobosa*, *Psammosphæra fusca*, *Astorrhiza arenaria*, and *Rhabdammina* sp., as especially important captures.

J. LEIDY, P. Ac. Philad. 1879, p. 162, enumerates 40 species of Rhizopods found together in *Sphagnum* in a swamp in New Jersey, among them 2 new species (*vide infrà*).

By the same author, in "Rhizopods in the Mosses of the Summit of Roan Mountain, North Carolina," *op. cit.* 1880, p. 333, 17 species are mentioned from this locality, which has an altitude of 6,367 feet. Measurements are given of several specimens of some of the species; *vide infrà* for the chief examples.

Foraminifera of Mauritius; 42 species found by MÖBIUS (6), of which 7 are new, including the type of a new genus.

15 species of *Foraminifera* identified by CARTER (4) from the Gulf of Manaar, off Ceylon, including representatives of a new Group and 3 new genera.

CLASSIFICATION.

BÜTSCHLI (3) classifies *Rhizopoda* as follows, enumerating and defining the genera to be adopted in the different groups:—

Division SARKODINA.

Subclass 1. *Rhizopoda.*
„ 2. *Heliozoa.*
„ 3. *Radiolaria.*

Order RHIZOPODA, *s. str.*

Suborder 1. *Amœbœa.*

Fam. i. *Amœbœa lobosa.*

Fam. ii. *Amœbœa reticulosa* (provisionally established for *Gymnophrys*, *Boderia*, *Protomyxa*, *Myxodictyum*, *Protogenes*, which appear to the author to have relations with the *Myxomycetes*; *Bathybius* is inserted as a problematic ally of the *Amœbœa*).

Suborder 2. *Testacea.*

Tribe I. IMPERFORATA.

Fam. 1. *Arcellina* (8 genera, with *Petalopus* and *Arcellina* appended—"Anhang").

Fam. 2. *Euglyphina* (3 genera, with *Campascus* appended).

Fam. 3. *Gromiina* (9 genera, with *Lecythia* and *Squamulina*, M. Schulze, appended).

Fam. 4. *Amphistomina* (*Diplophrys*, *Ditrema*, *Amphitrema*).

Group *Miliolida*, Carpenter, emend.

Fam. 5. *Miliolina* (*Cornuspira*, *Ammodiscus*, *Miliola*, with subgenera *Spiroloculina*, *Quinqueloculina*, *Triloculina*, *Biloculina*; *Uniloculina*, and *Fabularia* appended).

Fam. 6. *Peneroplinida* (*Hauerina, Vertebralina, Peneroplis*, Montf., with subgenera *Peneroplis, s. str.*, and *Dendritina*; *Nubecularia, Placopsilina*, and *Lituola*, emend., appended, with *Haplophragmium* and *Lituola, s. str.* of Rouss & Brady, as subgenera).

Fam. 7. *Orbitolitina* (*Orbiculina, Orbitolites, Alveolina*).

Fam. 8. *Arenacea* (*Jaculella* ?, *Botellina, Hyperammina, Haliphysema, Pelosina, Marsipella, Rhabdammina, Astrorrhiza, Aschemonella, Dendrophrya, Rhizammina, Sagenella, Saccamina, Webbina*, with *Trochammina* appended).

Suborder III. PERFORATA.

Group *Lagenidæ*.

Fam. 1. *Rhabdoina* (*Lagena* and *Nodosarina*, with *Nodosaria, Lingulina, Glandulina, Orthocerina, Dentalina, Vaginulina, Rimulina, Frondicularia, Flabellina, Marginulina, Cristellaria*, as subgenera of *Nodosarina*; and *Conulina, Hormosina, Reophax, Haplostiche, Polyphragma*, appended).

Fam. 2. *Polymorphinina* (*Polymorphina*, subgenus *Dimorphina*; and *Uvigerina* with subgenus *Sagraina*).

Fam. 3. *Globigerininæ*.

Subfam. i. *Globigerinæ* (*Microcometes, Orbulina* ?, *Globigerina*, subgenera *Hastigerina, Candeina, Cymbalopora, Carpenteria*; with *Psammosphæra, Stortosphæra, Thurammina, Sorosphæra*, appended).

Subfam. ii. *Cryptostegia* (*Ellipsoidina, Chilostomella, Allomorphina*).

Subfam. iii. *Textularidæ* (*Textularia*, with "Untergattungen" *Textularia, s. str., Bigenerina, Grammostomum, Verneuilina, Cuneolina, Pavonina, Bulimina*, with "Untergenera" *Bulimina, s. str., Robertina, Virgulina, Bolivina, Valvulina, Chrysalidina, Cassidulina*).

Subfam. iv. *Rotalinæ* (*Discorbina, Planorbula*, with subgenera *Planorbulina, s. str., Truncatulina, Anomalina, Planulina, Pulvinulina, Rotalia, Calcarina*, and *Polytrema, Parkeria* ?; *Patellina* appended).

Fam. 4. *Nummulitinæ*.

Subfam. i. *Involutinæ* (*Involutina, Archæodiscus, Spirillina*).

Subfam. ii. *Pullenininæ* (*Pullenia, Sphæroidina, Rupertia* ?, *Endothyra, Cribrospira, Bradyina, Amphistegina*).

Subfam. iii. *Nummulitidæ* (*Polystomella*, subg. *Nonionina* and *Polystomella, s. str.*; *Cyclammina, Operculina, Nummulites*; subg. *Assilina, Nummulina*; *Bdelloidina* ? appended).

Subfam. iv. *Fusulinidæ* (*Fusulina, Schwagerina, Hemifusulina*; with *Fusulinella, Loftusia* ? appended).

Subfam. v. *Cycloclypidæ*[*-peidæ*] (*Heterostegina*, *Cyclocly-peus*, *Orbitoides*; subg. *Discocyclina*, &c., of Gümbel; *Tinoporus* appended).

Genera, Species, &c., referred to.

Radiolaria.

Euchitonia, *Spongocyclia*, *Spongasteriscus*, referred by Kent, (1) p. 226, to new Order, *Radio-flagellata*, among the Flagellate *Infusoria*.

Dictyocysta cassis, W. S. Kent, Tr. Birmingham Soc. 1880, pl. iv. figs. 1 & 2.

Acanthocystis flava, Greef, Atti Soc. Ital. xxii. p. 46, pl. i. The normal method of reproduction is by spores, which result from the fission of the nucleus.

Acanthocystis viridis, Korotneff, (5) p. 481, pl. xxxv. figs. 10–16. Ovoid bodies with nuclei and contractile vacuoles are developed, as in *A. aculeata*, beneath the surface skeleton, and issue as flagellated embryos.

Actinosphærum eichhorni, Am. Micr. J. i. p. 41, figs. 11 & 12. H. C. Everts figures and describes this Rhizopod. The appearances and behaviour of the axes of the pseudopodia are explicable by supposing them to consist of a dense form of protoplasm.

Actinophrys sol, observations on the physiology; J. Fullagar, Sci. Gos. xvi. p. 206, fig. 130.

Foraminifera.

Polystomella, (6) p. 103. *P. craticulata* separated as g. n. (*Helicoza*), and the genus redefined. *P. crispa*, l. c. p. 101, pl. xi. figs. 4 & 7, pl. xii. A var. *crassa* described from the Adriatic and Mauritius.

Testamœbiformia. New group of *Foraminifera* formed by Carter, (4), to contain the new genera *Holocladina* and *Cysteodictyina*, with the characters "amœbiform, testaceous."

Rotalia spiculotesta, (4) p. 452. Abundant in Gulf of Manaar. Some young specimens have the test apparently almost entirely composed of foreign bodies.

Amphistegina, D'Orbigny, (4), represented by two or three species in the Gulf of Manaar.

Amphistegina lessoni, D'Orb., (6), p. 99, pl. x. figs. 10–14, pl. xi. figs. 1–3. The walls of all chambers after the second from the centre, end laterally in finger-like processes which in younger chambers branch or form networks. The chambers are lined by chitin. Near the centre of the dorsal and ventral faces there are spaces free from pores; the ventral halves of the septa are also devoid of pores. Tests of *Amphistegina* form the chief part of the calcareous sand of the coral reef off the south-east of Mauritius.

Calcarina calcar, (4) p. 453. A new var., *hispida*, described by Carter, from Gulf of Manaar.

Calcarina defrancii, D'Orb., (6) p. 104, pl. xiv. = *Rotalia*, and includes *C. calcar*, D'Orb. Both simple and branched canals distinguishable in walls.

Carpenteria utricularis and *monticularis*, *Polytrema miniaceum*, *Gypsina melobesioides*, &c., (4) Gulf of Manaar.

Gypsina, Carter, (4) p. 444.

Carpenteria, (6) p. 84. Recharacterized as having the pseudopodia thread-like and branching, and the test formed first of sponge spicules and similar foreign bodies, which are overlaid by a delicate chitinous cuticle and a calcareous layer, perforated by pore-canals; it has one or more openings, and is attached by the aboral side. It constitutes a transition from the arenaceous to the calcareous forms.

Polytrema miniaceum, (6) p. 85, pl. vii. The great variation in size illustrated by tables of comparison. The canals and cavities have a chitinous lining; the contained spicules are derived from sponges.

Spirillina vivipara, Ehrb., (6) p. 88, pl. viii. figs. 1 & 2, Mauritius.

Oolina striata and *caudata*, D'Orb., (6) p. 89, united as *Lagena striata*, pl. viii. fig. 3.

Entosolenia lucida, (6) p. 89, pl. viii. fig. 4, *marginata*, *quadrata*, *rudis*, *aspera*, l. c. pp. 90 & 91, pl. viii. figs. 7–12. The two latter were first described as fossils by Reuss.

Pavonina flabelliformis, D'Orb., (6) p. 91, pl. viii. figs. 13–15.

Textilaria folium, (6) p. 92, pl. viii. figs. 16 & 17, *agglutinans*, *ibid.* pl. ix. figs. 1–8.

Bolivina punctata, *thebaica*, *plicata*, (6) pp. 94 & 95, pl. ix. figs. 9–13. Several species, including some under the names *Textularia*, *Grammostomum*, and *Bolivina*, are cited as synonyms of these.

Discorbina concamerata, Mont., includes *Rosalina americana*, D'Orb., and probably *Rotalia veneta*, M. Schulze, &c., (6) p. 96, pl. ix. figs.; *D. globularis* and *D. inæqualis*, D'Orb., *l. c.* pp. 96 & 97, pl. ix. figs. 18 & 19.

Rosalina poeyi, D'Orb., (6) p. 97, pl. x. figs. 1–5, Mauritius, = *Cymbalopora*, which genus is a higher form than *Discorbina* by virtue of the lateral openings of the chambers.

Rosalina bulloides, D'Orb., (6) p. 99, pl. x. figs. 6–9, = *Tretomphalus*, g. n.

Globigerina bulloides, (6) p. 92, Mauritius.

Haliphysema, (6) p. 74. Recharacterized as a Rhizopod. Envelope consisting of a thin chitinous sheath, beset with sponge-spicules or other microscopic foreign bodies; at the free end of the sheath the foreign bodies are aggregated into the form of a head or club, at the fixed end into a disk-like form.

Haliphysema tumanowiczi. E. R. Lankester, Q. J. Micr. Sci. xix. p. 476, pl. xxii., has minutely examined the soft parts of this form, in specimens prepared, sent to him by W. S. Kent from Jersey, and in consequence refers it very decidedly to the Arenaceous *Foraminifera*. Threads of protoplasm containing vesicular nuclei can be detected spreading over the spicules outside the test. The central mass consists of a continuous core of finely granular protoplasm, apparently vacuolated by spaces filled with a less dense substance; it is devoid of cell-structure and cavities; there is no distinct differentiation of a cortical substance; the protoplasm contains large numbers of spherical thick-walled vesicular nuclei, comparable to the similar bodies found in *Orbitolites*, *Labyrinthula* and *Chlamydomyxa*. Anteriorly, the protoplasm is segmented into egg-like germs, which are

larger than the nuclei, and undergo fission. Möbius, (6) p. 72, pl. i. figs. 1–5, pl. ii. fig. 1, confirms the discovery of nuclei in the protoplasm of the stem, and has observed pseudopodia ; occurs at Mauritius.

Rhipidodendrum splendidum, Stein.; J. A. Ryder, Am. Nat. xiv. p. 811, Woodbury, New Jersey.

Cornuspira foliacea, (6) pl. ii. fig. 3, *ornata*, pl. ii. figs. 4–7, Mauritius.

Miliolina oblonga, (6) pl. iii. figs. 1–3, *agglutinans*, pl. iii. figs. 4–8, p. 76, from Mauritius.

Quinqueloculina agglutinans, D'Orb., = *Miliolina*, (6) p. 77, pl. iii. figs. 4–8, Mauritius.

Spiroloculina, D'Orbigny, = *Miliolina*, according to Möbius, (6).

Spiroloculina antillarum, *elongata*, (6) p. 76, pl. iii. figs. 1–3, *Triloculina carinata*, *Quinqueloculina sagra*, D'Orb., p. 78, all referred to *Miliolina*, Mauritius.

Peneroplis pertusus, (6) pl. iii. figs. 9–12.

Alveolina melo, Ficht. & Moll., (6) p. 80, pl. iv. figs. 2 & 3, a distinct species. *A. bosci*, Defr., *l. c.* pl. iii. figs. 13–15, pp. 78 & 79.

Orbitolites complanata, Lamarck, (6) p. 81, pl. iv. figs. 4 & 5, pl. v. figs. 1–5.

Lieberkuehnia wageneri, Claparède & Lachmann, (7) p. 141, pl. xvi. figs. 8–12, North coast of Wales, and off Tenby. Possesses mobile vacuoles, also vesicular nuclei like those of *Haliphysema tumanowiczi*, with which it appears to be allied ; mouth formed by infolding of four integumental lobes; portions of protoplasm accidentally separated are re-absorbed by the main body.

Nebela flabellulum and *collaris*, *Assulina seminulum*, *Euglypha areolata*, *Trinema enchelys*: measurements of series of specimens from North Carolina, J. Leidy, P. Ac. Philad. 1880, pp. 333–339.

Amœba, sp. Observations on the physiology ; J. Fullagar, Sci. Gos. xvi. p. 204, figs. 121–129. It feeds on *Coleps hirtus* and vice versâ. *A. limax*, id. *ibid.* fig. 134.

Amœba cellarum, Joseph. Described by that author as a new species in JB. schles. Ges. lvii. p. 195. [See Zool. Rec. xvi.]

Amœba coli and *dentalis* in Man ; Grassi (*suprà*, p. 1).

New Genera and Species.

Foraminifera.

Helicoza, Möbius, (6) p. 103. Formed to contain *Polystomella craticulata*, Fichtel & Moll.; connects *Polystomella* with the *Nummulinidæ*.

Heterostegina curva, Möbius, (6) p. 106, pl. xiii. The chambers and canals have a chitinous lining. *H. tuberculata*, id. *ibid.* p. 107, pl. xii. figs. 3–7, Mauritius.

Polytrema cylindricum, Carter, (4) p. 441, pl. xviii. fig. 1, and *P. mesentericum*, id. *ibid.* p. 444, pl. xviii. fig. 3. Hab. ?.

Holocladina, Carter, (4) p. 447. Belongs to the new group *Testamæbiformia*, vide *suprà*. Based on *H. pustulifera*, sp. n., *id. ibid.* pl. xviii. fig. 4, Gulf of Manaar. Differs from *Carpenteria* and *Polytrema* in form and in the absence of foreign matter from the interior, and from *Aphrosina* in not being multilocular.

Cysteodictyina, Carter, (4) p. 448. Differs from *Holocladina* only in being lobate and membraniform, not branched, in the thinness of the test and its freedom from roughnesses, and in the large size of the pores. *C. compressa*, id. *ibid.* pl. xviii. fig. 5.

Ceratestina, Carter, (4) p. 448. Characterized as having the test horny, of dark amber colour and translucent. *C. globularis*, id. *ibid.* pl. xix. fig. 6, in cavities of Melobesian nodules, Gulf of Manaar; on *Stylaster sanguineus*, South Pacific. *C. tessellata*, id. *ibid.* p. 450, pl. xix. fig. 7, in cavities of Melobesian nodules, Gulf of Manaar.

Alveolina sinuosa, Carter, (4) p. 454, mentioned as a new species or variety from the Gulf of Manaar and South-west Coast of Australia.

Carpenteria microscopica, Carter, (4) p. 449. Embryonic form of *C. monticularis*, described Ann. N. H. (4) xix. p. 213, pl. xiii. fig. 11.

Carpenteria rhaphidodendrum, Möbius, (6) p. 81, pl. v. figs. 6–10, pl. vi. figs. 1–6; contributes to the building up of coral reefs off Mauritius, also from Marshall Archipelago, Pacific. Observed in the living state: the test is thickened by means by means of the pseudopodial protoplasm; the chambers are not spirally arranged. Originally named by the author [MS.] *Rhaphidodendrum album.*

Entosolenia alata, Möbius, (6) p. 89, pl. viii. fig. 5, *E. perforata*, id. *ibid.* p. 90, pl. viii. fig. 6, Mauritius.

Bolivina ambulacrata, Möbius, (6) p. 95, pl. ix. figs. 14 & 15, Mauritius.

Tretomphalus, Möbius, (6) p. 98. Based on *Rosalina bulloides*, D'Orb.; differs from *Discorbina* in the possession of pores opening on papillæ, as well as the ordinary pores.

Rhaphidohelix, Möbius, (6) p. 76. Based on *R. elegans*, id. *ibid.* pl. ii. fig. 2, Mauritius. Composed of sphæroidal chambers, spirally aggregated; the test of the single specimen consisted chiefly of sponge-spicules; perhaps perforate.

Shepheardella, Siddall [also named in the description of the plates, *Shepheardia*], (7) p. 130. Based on *S. tæni*[*i*]*formis*, sp. n., *id. ibid.* pls. xv. & xvi. figs., sea off Tenby; [also named *Shepheardella tænia*, evidently unintentionally]. Of flat, ribbon-like form, and comparatively large size, provided with a flexible integument, body consisting of yellowish granular protoplasm, with oval nucleus and sometimes with scattered non-contractile vacuoles; the integument is perforated at each end for the egress of two masses of protoplasm, which emit filiform pseudopodia, and from which a coat of protoplasm, also emitting pseudopodia, extends over the exterior of the test. The sarcode circulates rapidly, and the nucleus has the power of independent movement. At certain times, concentration of the body takes place, after which it leaves the test, divides into four pieces; the pieces then reunite; amœboid masses, with lobose pseudopodia, become detached from this mass. A tri-nucleate specimen occurred. The nucleus consists of a lenticular body and two external coats; the inner of these is incomplete at one side, and its edges move alternately to and from each other in life.

Nebela retorta, Leidy, P. Ac. Philad. 1879, p. 162, Swamp, New Jersey, U. S.

Sphenoderia macrolepis, Leidy, P. Ac. Philad. 1879, p. 162, Swamp, New Jersey, U. S.

Cochliopodium echinatum, Korotneff, (5) p. 480, pl. xxxv. fig. 9. Differs in characters from those assigned to the genus by Hertwig, in the absence of internal vacuoles and the presence of spinous processes on the test.

Lithamœba, Lankester, Q. J. Micr. Sci. xix. p. 484. Based on *L. discus*, id. *ibid.* pl. xxiii. Discoid, the outer margin transparent; towards the centre a number of minute subreniform concretions of unknown composition. Nucleus large, block-like, lying within a distinct membrane. A central contractile vacuole. Protoplasm vacuolar; a delicate surface cuticle; pseudopodia lobose, hernia-like, rupturing the cuticle. Allied to *Pelomyxa*. From pond near Birmingham.

Longicauda, Korotneff, (5) p. 470. Based on *L. amœbina*, id. *ibid.* pl. xxxv. figs. 3–6, marsh-water. Not closely allied to any described form. Thin hyaline ectoplasm, reniform nucleus, posterior contractile vacuole; has tail composed of three processes, much branched, of about the same length as the body, with firm investment, tending to become constricted like a necklace; movements rapid.

Trichamœba lieberkuehni, Maggi, Boll. scient. i. p. 108 [not seen by the Recorder].

Amœba muris and *ranarum*, Grassi (*anteà*, p. 1).

General Anatomy and Physiology.

Chemical composition of the Rhizopod test given by Bütschli, (3) p. 21. The organic substance appears to him to be confined to the lining of the surfaces and canals, though this may not hold in all cases. The brown colour of the thin sections of tests of the *Imperforata* is due to the presence of microscopic cavities, not to a contained organic basis. A full discussion of the structure of the test is given, pp. 18–35. The geometrical and morphological relations of the test are treated of at great length, pp. 35–95. The forms are classified as, (*a*) Homaxonal, (*b*) Monaxonal, (*c*) Polythalamous. Structure of soft parts, pp. 95–125. Relation of soft parts to the test, p. 125. The latter probably increases in thickness by additions from the exterior. Great importance is not attached to the influence of external conditions, such as presence of foreign material, on the structure of the test. With regard to the reproductive processes, the production of true ova has not yet been established, but naked or testaceous embryonic forms may be produced in numbers directly from the maternal organism. Simple fission occurs in the marine shelled forms only as an abnormal process.

The repetition of chambers in the *Polythalamia* is not an instance of formation of colonies, as the increase in the number of nuclei does not proceed in a corresponding ratio; it is rather to be compared with the segmentation of the *Metazoa*. Encystation has generally for its object either self-preservation or assimilation of food; in but two cases has it been found accessory to reproduction.

The phenomena of conjugation are probably connected in some cases with reproduction, but fission has in some cases been confused with it;

a sexual form of reproduction is not, however, established as yet. The remains of deep-sea animals of the higher groups probably suffice to supply the necessary nourishment to the deep-sea *Rhizopoda.*

Fossil Rhizopoda.

Chief Works on :—

8. Pantanelli, D. I diaspri della Toscana e i loro fossili. Atti Ac. Rom., Memorie, viii. p. 35, plate.

An account of the *Radiolaria* of the Jaspers of Tuscany.

9. Seguenza, G. Le formazioni tertiarie nella province di Reggio (Calabria). Atti Ac. Rom. (3) Mem. sci. fis. vi. pls. iv.–xvii.

This work, embracing a whole volume, deals with most of the groups of the Animal Kingdom, and is arranged stratigraphically. *Foraminifera* of Nummulitic limestone of Reggio, pp. 29, 37, 217, & 305 ; those of Miocene, pp. 45, 56, 63, 89, 136, 331 ; *Radiolaria* of Miocene, p. 230.

10. Stöhr, E. Die Radiolarienfauna der Tripoli von Grotte Provinz Girgenti in Sicilien. Palæontographica, xxvi. p. 69, pls. xviii.–xxiii. Reprinted in Verh. geol. Reichsanst. 1880, p. 103.

78 spp. nn. ; 15 of the 40 already described were previously only known in the living state.

Terrigi, G. Fauna Vaticana a Foraminiferi delle Sabbie Gialle nel Plioceno Subapennino superiore. Rome : 1880, 4to, 4 pls.

Dunikowski, E. Nowe Foraminifery kredowego marglu lwowskiego (Neue Foraminiferen des Kreide-Mergels von Lemberg). Kosmos, Zeitsch. poln. Naturf.-Ges. Kopernicus. Lemberg: pp. 102 & 122, pl.

Alth, A. O galicyjskich gatunach skamenialych otworinc rodzaju Gyroporella (Ueber die versteinerten galicischen Arten der Foraminiferen-Gattung Gyroporella). Rozprawy i Sprawozdany posieden Wydzialu Matem.-Przyrodn Akad. Umietjetnosu, Cracow. (3 spp. nn.)

Terquem, O. Les Foraminifères et les Entomostraces ostracodes du Pliocène de l'île de Rhodes. 1879: 4to, 14 pls.

[Not seen by the Recorder.]

P. de la Harpe, "Les Nummulites du Comté de Nice, leur espèces et leur distribution stratigraphique, et échelle des Nummulites;" Bull. Soc. Vaud. xvi. p. 201, pl. x. [9 species of Nummulites (1 new), and 2 of *Assilina*] ; the distribution according to strata is given. *Id.*, "Nummulites des Alpes Françaises ; *tom. cit.* p. 409. The same author describes 2 spp. nn. of Nummulites from the Flysch ; *op. cit.* xvii. p. 33, pl. iii. Tables of stratigraphic distribution of the Nummulites, given by the same author ; Verh. St. Gall. Ges. 1878–79, p. 77.

P. M. Duncan, *Syringosphæridæ*; in Scientific Results of the Second Yarkand Mission; Calcutta: 1879, fol. 3 pls. [*Cf.* Zool. Rec. xv., where the main substance of the paper is given from a preliminary report; the fossils are from the Karakorum range, India]. *Vide infrà.*

G. W. Gümbel, Verh. geol. Reichsanst. 1880, p. 214, mentions finding the green granules of the Flysch deposits not uncommonly retaining the outline of the chambers of Foraminiferal shells.

K. Martin, Tertiärschichten auf Java, Leyden, 1879–80, pp. 154–163, pls. xxvii. & xxviii. (reprinted in Niederl. Arch. Zool. v. p. 185, pls. xiii. & xiv.). describes and figures *Cycloclypeus* and *Orbitoides*, 3 spp. nn. each, *vide infrà.*

V. von Möller, Ueber einige Foraminiferenfuhrende Gesteine Persiens, JB. geol. Reichsanst. xxx. p. 573, pls. ix. & x., describes the *Foraminifera* contained in various Persian deposits, and among them *Stacheia grewingki*, sp. n., from Carboniferous Limestone of Central Persia.

New Genera, &c.

Radiolaria.

Polystichia, Pantanelli, g. n., (8) p. 52. Belongs to Fam. *Cyrtidæ*, Häckel. Conical, with parallel perforate septa, divided into from 6 to 8 segments, surface porous, terminal segments open. *P. ehrenbergi*, id. *l. c.* p. 52, figs. 33-36; *P. hœckeli*, p. 53, figs. 37 & 38; *P. muelleri*, p. 53, fig. 39; from Eocene jaspers.

Urocyrtis, Pantanelli, g. n., (8) p. 53. Fam. *Cyrtidæ*, Häckel. Divided into three or four unequal segments, the first large, quadrangular, or subglobose, the apex produced into a strong spine; the base made up of two or three small segments, the surface ornamented with equal cells. *U. emmæ*, *U. amaliæ*, *U. destefanii*, id. *ibid.* pp. 53 & 54, figs. 44–47, Eocene jaspers and erratic fragments.

Adelocyrtis, Pantanelli, g. n., (8) p. 54. Fam. *Cyrtidæ*, Häckel. Subspherical; apex prolonged into a stout spine; capsule cellular, the cells larger towards the base than elsewhere. *A. cometa*, *A. pala*, *A. spinosa*, id. *ibid.* p. 54, figs. 48–50, Eocene or other jaspers, &c.

Doratospis, sp., (8) p. 55, fig. 10, Eocene jaspers, &c. Various doubtful forms are described and figured, *l. c.* pp. 56 & 57, figs. 12, 40, 51, 55, 56, & 58–60.

The following new genera of *Radiolaria* are described by Stöhr, (10), from the Silician Tripoli bed of Girgenti:—

Ommatodiscus, p. 115. Made type of new family, *Ommatodiscidæ*, with habit of *Ommatidæ*, but resembling *Cyrtidæ* in the possession of a basal opening.

Spongospira, p. 120. Differs from *Spongocyclia* in the spiral arrangement of the inner series of chambers.

Distephanus, p. 121. Near *Dictyocha*; entirely closed, being formed of two apposed hat-shaped tests.

Lithocarpium, p. 97. Belongs to *Monocyrtidæ*, next to *Carpocanium*; test ellipsoidal, with tubular process to the opening, which is surrounded by a crown of small teeth.

The following new species are described, and in some cases figured, by Pantanelli, (8), from jaspers of Secondary or Tertiary dates :—

Ethmosphæra minuta, E. vulgaris, E. siphonophorites.

Heliosphæra echinoidites.

Heliodiscus simplex.

Histriastrum ? lurianensis.

Trematodiscus soritoides.

Euchitonia muellerites, E. amœna, E. clathrata, E. crevolensis, E. grandis, E. dubia.

Lithocircus hœckeli, L. truncatus, L. rhombus.

Cornutella pseudo-profunda, C. pseudo-clathrata.

Lithopera ovata, L. elongata, Pantanelli.

Seguenza (9) describes, and in some cases figures, 32 new species of *Radiolaria*, from the Zanclean Miocene of Calabria.

FORAMINIFERA.

Cælotrochium, Schlüter, g. n., Verh. Ver. Rheinl. xxxvii. p. 54, & woodcuts. *C. decheni*, id. *ibid.*, = *Distoma decheni*, id., from Middle Devonian of the Eifel. Placed with *Ovulites*, *Carpenteria*, and *Thalamopora*, in the Family *Globigerinidæ*.

New Order, *Syringosphæridæ*, P. M. Duncan, Scientific Results of the Second Yarkand Mission (Calcutta: 1879). Sphæroidal ; based on the two genera *Syringosphæra* and *Stoliczkaria* [cf. Zool. Rec. xv.]. Tests formed of numbers of radiating series of minute continuous branching and anastomosing tubes, and of an inter-radial reticulation arising from and surrounding them. Tubes minute, opening on the surface upon eminences and in pores, and ramifying upon it. Wall consisting of granular and granulo-spiculate carbonate of lime. No cœnenchyma.

Fusulina granum-avenæ, sp. n., F. Römer, Palæontographica, xxvii. p. 4, pl. i. fig. 2, Carboniferous Limestone, West of Sumatra.

120 new species described by Seguenza, (9), from the Miocene, 2 from the Quaternary deposits of Calabria.

Burseolina, g. n., Seguenza, (9). Near *Pullenia* ; based on *B. calabra*, sp. n., Miocene of Calabria.

Planispirina, g. n., Seguenza, (9). Between *Cornuspira* and *Hauerina*. *P. communis, carinata*, spp. nn., *id. l. c.* pp. 305–310, from Miocene of Calabria.

Capsulina, Seguenza, g. n., (9). Arrangement of chambers like that of *Textularia*, &c., viz., three parallel rows surrounding a common axis ; three apertures at upper end, alternating with three fissures which extend throughout the length of the test, dividing all the chambers. Based on *C. loculicida*, sp. n., *id. l. c.* pl. xvii. fig. 59, Quaternary of Calabria.

The genera *Heliosphæra*, *Tetrapyle*, *Ommatocampe*, *Cromyomma*, *Euchitonia*, *Stylactis*, *Spongodiscus*, *Spongotrochus*, *Dictyocoryne*, *Spongurus*, *Spongocyclia* found fossil for the first time by Stöhr (10), in the Tripoli beds of Girgenti, Sicily.

Cycloclypeus, Carpenter. Recharacterized by K. Martin, Tertiärschichten auf Java, Leyden, 1879–80, p. 150.

Orbitoides, D'Orbigny. Recharacterized; *id. l. c.* p. 158; it is distinct from *Cycloclypeus* in having no intermediate skeleton.

Eozoon. Bütschli (3) gives a summary of the discussion relating to this question, stating that he is adverse to the theory of its organic origin.

Stromatoporida. Bütschli, (3) p. 221, gives a summary of the researches relating to these organisms, stating his opinion that no satisfactory conclusion has yet been arrived at as to their affinities.

Stromatopora and *Syringostroma.* A list of species from Corniferous Limestone of Ohio given by E. Orton, Rep. Geol. Surv. Ohio, iii. pt. 1, p. 620.

Stromatopora laminosa, Meneghini, sp. n., Atti Ac. Rom. (3) Mem. sci. fis. v. p. 217, plate, fig. 8, Silurian of Sardinia.

FLAGELLATA AND MONADS.

11. Vignal, W. Recherches histologiques et physiologiques sur les Noctiluques (*Noctiluca miliaris*, Suriray). Trav. Lab. hist. Coll. France, 1877–78, p. 197, pls. x. & xi.

To a great extent identical with the paper by the same author cited in Zool. Rec. xv.

Eyfferth. Schizophyten und Flagellaten, Supplement-Heft zu der Systemat. Naturgesch. der microscop. Süsswasserbewohner. Brunswick, 1879.

W. Schmankewitsch. Ueber die Beziehungen einiger farbloser Flagellaten zur den Algen und Pilzen. (Odessa: 1879; Neuruss. Naturforscher Ges. vi.) [in Russian; said to be an enlargement of his paper in Zool. Anz. i. p. 91].

L. Maggi. Tassonomia e Corologia dei Cilioflagellati. Boll. scient. ii. p. 7.

[Not seen by the Recorder.]

Systematic descriptions, with synonyms, are given of the Orders, Families, Genera, and Species of the Flagellate *Infusoria* by Kent (1). Many of the species are figured; the new genera and species alone are noticed below; for Classification, *vide suprà*, General Subject.

G. C. Wallich, Pop. Sci. Rev. iv. pl. iv. under the heading, "The Threshold of Evolution," endeavours to disprove the primordial condition attributed by Häckel to the *Monera*, by contesting the homogeneity and other alleged properties of their substance and the simplicity of their structure, from that author's own admissions.

Genera, Species, &c., Referred to.

Radioflagellata, new order, to contain *Euchitonia*, *Spongocyclia*, *Spongasteriscus*, and *Actinomonas*, g. n., hitherto considered as Radiolarians.

Noctiluca miliaris, (11) p. 230, pls. x. & xi. It is essentially a unicellular animal; the common structureless envelope is protective and supporting, and is aided by the intra-cellular liquid, which is almost entirely inorganic. The protoplasmic mass is physiologically equivalent to a white blood-corpuscle, but differs from it in its inability to digest food, and in its luminosity; digestion is effected by special digestive vesicles belonging to the central protoplasmic mass. The flagellum agrees both structurally and physiologically with striated muscle, and is provided with a simple nerve which connects it with the central mass.

.*Noctiluca* and *Leptodiscus*. Kent (1) includes them with the Flagellate *Infusoria*.

Euglena. Perhaps *Protococcus* is a form of it; *E. acus* found on snow in Hertfordshire; R. B. Croft, Tr. Hertf. Soc. i. p. 170.

Hexamita intestinalis, Pop. Sci. Rev. v. p. 299, pl. vii. figs. 18–20; habits described by W. S. Kent.

Asthmates ciliaris, Salisbury, the animalcule of Hay Fever, Pop. Sci. Rev. iv. p. 300, pl. vii. fig. 16, a Eustomatous Flagellate Infusorian, according to W. S. Kent.

Vampyrella lateritia. "A. C. S.," Am. J. Micr. v. p. 105, figs., describes the structure and vital phenomena.

Ceratium fusus, Tr. Birmingh. Soc. 1880, p. 10, pl. iv. fig. 4.

Vacuolaria virescens, Cienkowski, partially encysted; Archer, Q. J. Micr. Sci xx. p. 117.

Pelomyxa palustris, Greef, (5) p. 476, pl. xxxv. figs. 6-23. The shining bodies become converted by invagination into vesicles containing finely granular matter. One specimen was found to contain capsules with refringent walls containing granular matter and shining bodies; in all probability they produce the minute amœbiform bodies which have been seen by Greef and the author to appear suddenly on the surface of the animal; the shining bodies are, therefore, spores which give rise to embryonic forms. This species is noticed by W. G. Lapaam [? Lapham], in Am. J. Micr. v. pp. 197 & 227, figs. 1, 2; a protoplasmic membrane or pseudo-membrane encloses the main mass of protoplasm; buds are produced resembling pseudopodia.

New Genera and Species.

Infusoria Flagellata.

The following are described as new by Kent, (1) pp. 219–432, pls. ii.–xxiv.

Trypanosoma eberthi.

Mastigamœba simplex, *ramulosa*.

Reptomonas, p. 223. Differs from *Mastigamœba* in persistent contour of body and in the pseudopodia being ventral; *R. caudata*, hay infusions, &c.

Rhizomonas, p. 224. Monadiform, adhering to objects by posterior pseudopodia; a single anterior flagellum; *R. verrucosa*, hay infusions, &c.

Actinomonas, p. 226. Differs from *Oikomonas* [*Œco-*] only by the radiating pseudopodia; *A. mirabilis, pusilla*, marine.

Monas dallingeri and *Leptomonas* = *Rhaphimonas*, id.; *L. buetschlii.*

Herpetomonas, p. 245. Based on *Cercomonas muscæ-domesticæ*, Stein., *H. lewisi.*

Ancyromonas, p. 247. Corresponds to the larval stage of *Heteromita* with long trailing flagellum; *A. sigmoides*, marine, among decaying *Fucus.*

Oikomonas [*Œco-*], p. 250. Like *Monas*, but with power of attaching itself by a posterior filament; based on *Monas termo*, James-Clark, &c., *E. mutabilis, obliquus, steini, rostratum, quadratum.*

Cercomonas typicus.

Physomonas, p. 263. Based on *P. socialis*, from pond water, two kinds of flagella, which perhaps = *Bodo socialis*, Ehrenberg.

Cladonema, p. 264. Differs from *Physomonas* in the individuals produced by longitudinal fission remaining attached by pedicles and being arranged dichotomously. Based on *Anthophysa laxa.*

Cephalothamnium cuneatum.

Hedræophysa, p. 274. Differs from *Bicosœca* in absence of a pedicle to the lorica; *H. bulla*, saltwater.

Bicosœca tenuis, pocillum.

Stylobryum epistyloides.

Amphimonas globosa, divaricans.

Deltomonas, p. 283. Differs from *Amphimonas* in absence of pedicle. *D. cyclopum*, pond water.

Rhipidodendrum huxleyi.

Spongomonas sacculus.

Diplomita, p. 289. Based on *Bicosœca socialis*, Kent, but differs from *Bicosœca* in the characters of the flagellum and the body.

Heteromita rostrata.

Dallingeria, p. 309. Based on *D. drysdali*, sp. n., distinguished from *Heteromita* by having two lateral anchoring filaments. The type species was described without name by W. H. Dallinger from animal macerating fluid.

Trimastix, p. 302. Has a lateral membranous border, and three flagella, one directed forward, the others backward. *T. marina*, salt water.

Chloraster agilis.

Monosiga steini, fusiformis, ovata, globosa [? = *globularis*, Zool. Rec. xv.], *longicollis.*

Codosiga steini, assimilis.

Desmarella, p. 341. Free-swimming *Choano-flagellata*, forming colonies by lateral union. Based on *D. moniliformis* [described in Zool. Rec. xv.], from salt water.

Salpingœca steini, cylindrica, infusionum, campanula, boltoni.

Lagenœca, p. 359. Solitary; like *Salpingœca*, but living within sheath. *L. cuspidata*, pond water.

Polyœca, p. 360. Differs from *Salpingœca* in being colonial. *P. dichotoma*, marine; also figured by Kent, Pop. Sci. Rev. ii. pl. iv. fig. 1.

Protospongia, p. 363. Nearly allied to *Phalansterium*; forms colony-stocks, excreting and inhabiting a common mucilaginous matrix. Appears to be nearly related to the *Spongiida*. *P. hæckeli*, fresh water.

Paramonas, p. 370. Based on *Monas globosa*, Fromentel, &c. A distinct anterior mouth, at base of flagellum.

Colacium steinii.

Chloromonas, p. 401. Based on *Cryptoglena pigra*, Ehrb.

Sterromonas [*Sterrho-*], p. 420. Free-swimming, with two flagella, one stiff, the other mobile. *S. formicina*, infusions in salt and fresh water. *S. buetschli*.

Dinomonas, p. 421. Two flagella. Oral aperture very expansile. *D. voraæ*, *tuberculatus*, infusions in salt and fresh water.

Chilomonas amygdalum.

Diplomastix, p. 431. To contain forms intermediate between *Heteronema* and *Anisonema*, e.g., *Bodo caudata*, Stein.

Monosiga gracilis, Kent, woodcut, Ann. N. H. (5) i. p. 6.

Monopodium, Mereschkowsky, Verh. Zool. sect. vi. Versamml. russ. Naturforscher und Aertzte, reported Zool. Anz. iii. p. 139. Based on *M. kowalevskyi*, id. *ibid.*, Naples. A Moneron, consisting of tolerably homogeneous granular protoplasm, and small slightly contractile vacuole; a single long locomotor pseudopodium. Reproduction was observed to be effected by conjugation of two individuals, with subsequent division into two of the joint mass.

Protamœba [name already in use for a similar form, viz., *P. primitiva*, auctt.—RECORDER], Korotneff, (5) p. 467. Based on *P. primordialis*, id. *ibid.* pl. xxxv. figs. 1 & 2. Distinguished from *Amœba primitiva* and *Protogenes* by the nature of its pseudopodia. Protoplasm homogeneous, containing a vacuole.

Dactylamœba, Korotneff, (5) p. 469. Based on *D. elongata*, id. *ibid.* pl. xxxv. figs. 7 & 8. The anterior part of elongated body is transparent, with long conical pseudopodia; the posterior part has a central granular mass containing brown granules, and an exterior hyaline investment, and at the posterior end a group of small and fine attaching processes. A contractile vacuole in each division of the body.

Pelomyxa parvi-[*parv-*]*alveolata*, Korotneff, (5) p. 473, pl. xxxvi. figs. 1–5, marsh-water.

Laguncula piscatoria, J. H. Fisher. A supposed new species, New York; Am. Micr. J. i. p. 167.

The Monads found by Grassi [*suprà*, p. 1] are divided into 2 genera and 6 subgenera, as follows:—

Monocercomonas, with simple tail. Subg. 1, *Monocercomonas*, for *M. hominis* (? = *Cercomonas hominis*, Dav.), *caviæ* (Dav. ?), *coronellæ* (Hand. ?), *anatis*, *batrachorum*, *muris*, *lacertæ*, and *viridis*; 2, *Trichomonas*, for *T. melolonthæ*; 3, *Retortamonas* [*Retortom-*], for *T. grillotalpæ* [*gryll-*]; 4, *Schedoacercomonas*, for *S. gryllotalpæ*, *melolonthæ*, and *caviæ*, and *S. muscæ-domesticæ* (Barn.).

Dicercomonas, with bifid tail. Subg. 1, *Monomorphus*, for *M. ranarum* (Dug.); 2, *Dimorphus*, for *D. muris*.

General Anatomy and Physiology.

W. H. Dallinger, in a paper entitled, "On a Series of Experiments made to determine the Thermal Death-point of known Monad Germs when the Heat is endured in a Fluid," J. R. Micr. Soc. iii. p. 1, pls. i. & ii., shows that all the 6 leading types of Monads referred to in his previous paper on "Life-Histories of Monads" are killed in the adult condition by a temperature of from 138° to 142° Fahr. In the spore condition, the "Calycine" Monad, the largest of the number, died at 212° in fluid, but lived to 250° in dry heat; the "Biflagellate" survived 232° in fluid, 250° in dry heat; the "Cercomonad" died at 238° in fluid, but survived 260° in dry heat; the "Uniflagellate" and "Springing Monad" died in fluid at 288° and 252° respectively, but survived 300° Fahr. dry heat; the "Hooked Monad" died at 150° in fluid, and survived 180° in air.

The contractile vacuole has a lateral chamber in *Urocentrum turbo* and other *Flagellata*; the functions of the organ are excretory and respiratory: Kent, (1) p. 71 *et seq.*

GREGARINIDA.

12. Rehberg, H. Eine neue Gregarine, *Lagenella mobilis*, g. n. et sp. n. Abh. Ver. Brem. vii. p. 69, pl. iv. figs. 9–13.

13. Leuckart, R. Die Parasiten des Menschen und die von ihnen herrührenden Krankheiten. 2nd edn. vol. i. part 1. Leipzig & Heidelberg: 1879. Reported in Zool. JB. Neap. i. p. 117.

This edition is increased by the addition of a full account of the known Protozoan parasites of man.

R. Leuckart (13) introduces the name *Sporozoa* to designate the Class *Gregarinida*, of which he gives a definition at p. 241. Various species and developmental stages are figured, figs. 95–116.

Lagenella, g. n., Rehberg (12). Differs from all other genera of *Gregarinida* by the possession of a contractile vesicle, and by the simplicity of its process of reproduction. Belongs to the *Cystoplasta* of Gabriel, and stands nearest to *Urospora* and *Dufouria*, Schneider, of described genera. *L. mobilis*, id. *ibid.* pl. iv. figs. 9–13, intestine and body cavity of *Cyclops rubens*. Reproduction takes place in different ways—(1) From particles derived from dead specimens, which are devoured by the host; the animal developed from such a particle moves rapidly in water, assumes a globular form, in which it passes through a period of repose; the membrane now enveloping it subsequently bursts, producing a body closely resembling the pre-encystation stage. (2) Fission was apparently, but not with certainty, observed. Young individuals contain fewer granules, in proportion to their ectoplasm, than old ones. Movement is produced by means of a trunk-like protrusion of the body-membrane.

Coccidium, g. n., Leuckart, (13) p. 254. Based on the oval forms of *Psorospermiæ*, inhabiting chiefly the intestine and gall-ducts of Vertebrate animals. In their early stages, they are without envelopes and inhabit epithelial cells; at the close of growth they develop a strong shell; they then abandon their resting-place, and their contents break up into a number of spores, besides granular masses and rod-like embryoes. The spores are roundish or oval, and have a thin envelope. *C. oviforme*, sp. n., *id. l. c.* p. 255, figs. 102, 106 & 107, liver of Rabbit.

Coccidium rivolta, sp. n., Grassi [*suprà*, p. 1].

Cono [*r*] *rhynchus gibbosus*, g. & sp. nn., = *Gregarina echiuri*, Greef; Greef, Verh. L.-C. Ac. ii. pp. 128 & 129, pl. v. figs. 54–61.

Leuckart, (13) p. 285, is unable to recognize as *Psorospermiæ* the bodies described by Lindemann as such from the human hair, and is doubtful about those of the kidney.

Amœboid sarcodic parasites of the urinary bladder of the Pike. B. Gabriel, JB. schles. Ges. lvi. p. 188, criticizes Lieberkühn's interpretation of the Gregarine nature of these organisms. He gives an account of their development, and assigns them to a distinct group, intermediate between the *Gregarinida* and the *Myxomycetes*.

Poincaré, C. R. xci. p. 177, figs. 1–3, figures and describes some elongated organisms, marked by transverse lines, found in muscular fibre at the Paris slaughter-houses, which have some resemblance to *Gregarinida*, but perhaps are stages of one of the Cestode worms.

Psorosperms in the fish *Aphredoderus sayanus*; J. A. Ryder, Am. Nat. xiv. p. 211, figs. 1 & 2.

H. T. Whittell, J. Quek. Club, 1880, p. 47, "On the Association of Bodies resembling Psorospermia with the Degeneration of Hydatid Cysts," concludes that *Psorospermiæ* occur within such cysts, but as they do not occur in the early stages of the Hydatid, their presence affords evidence that degeneration has commenced in the cyst; they are perhaps the cause of this degeneration.

Incertæ sedis.

Dimystax perrieri, g. & sp. nn., P. Van Tieghem, Bull. Soc. Bot. Fr. xxvii. p. 130, Sea-water, Roscoff. A globose mass, a centimetre and upwards in breadth, attached, composed of cells; gelatinous, coloured green by amorphous chlorophyll. Each cell has a delicate investing membrane; no nucleus or vacuole; a tuft of cilia at one point; two flagella, situated at the sides, proceeding from a protoplasmic band which traverses the cell. In development, the cilia are lost, and dichotomous continuous fission takes place, producing a globe which becomes covered with cilia. The author is uncertain to which Kingdom to refer it. [In many points this form recalls *Volvox* and allied organisms.—Recorder.]

INDEX TO

GENERA AND SUBGENERA RECORDED AS NEW IN THIS VOLUME.

INCLUDING NEW NAMES FOR GENERA BEFORE CHARACTERIZED.*

[The symbol ‖ indicates that the name to which it is affixed has been used before in Zoology.]

* The number of new genera and subgenera contained in the present volume is 1008, as against 976 of vol. xvi. (which contained 60 new genera of *Arachnida*, properly belonging to vol. xv., from which that group had been omitted). These are divided as follows :—*Mammalia*, 34; *Aves*, 16; *Reptilia*, 21; *Pisces*, 31; *Mollusca* and *Molluscoida*, 79; *Crustacea*, 80; *Arachnida*, 78; *Myriopoda*, 2; *Insecta*, 438; *Vermes*, 28; *Echinodermata*, 24; *Cœlenterata*, 70; *Spongiida*, 51; and *Protoxoa*, 56. The expediency of publishing the volume before the end of 1881 has necessitated a very superficial examination of the list, as regards prior occupation.—E. C. R.

END OF THE SEVENTEENTH VOLUME.

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