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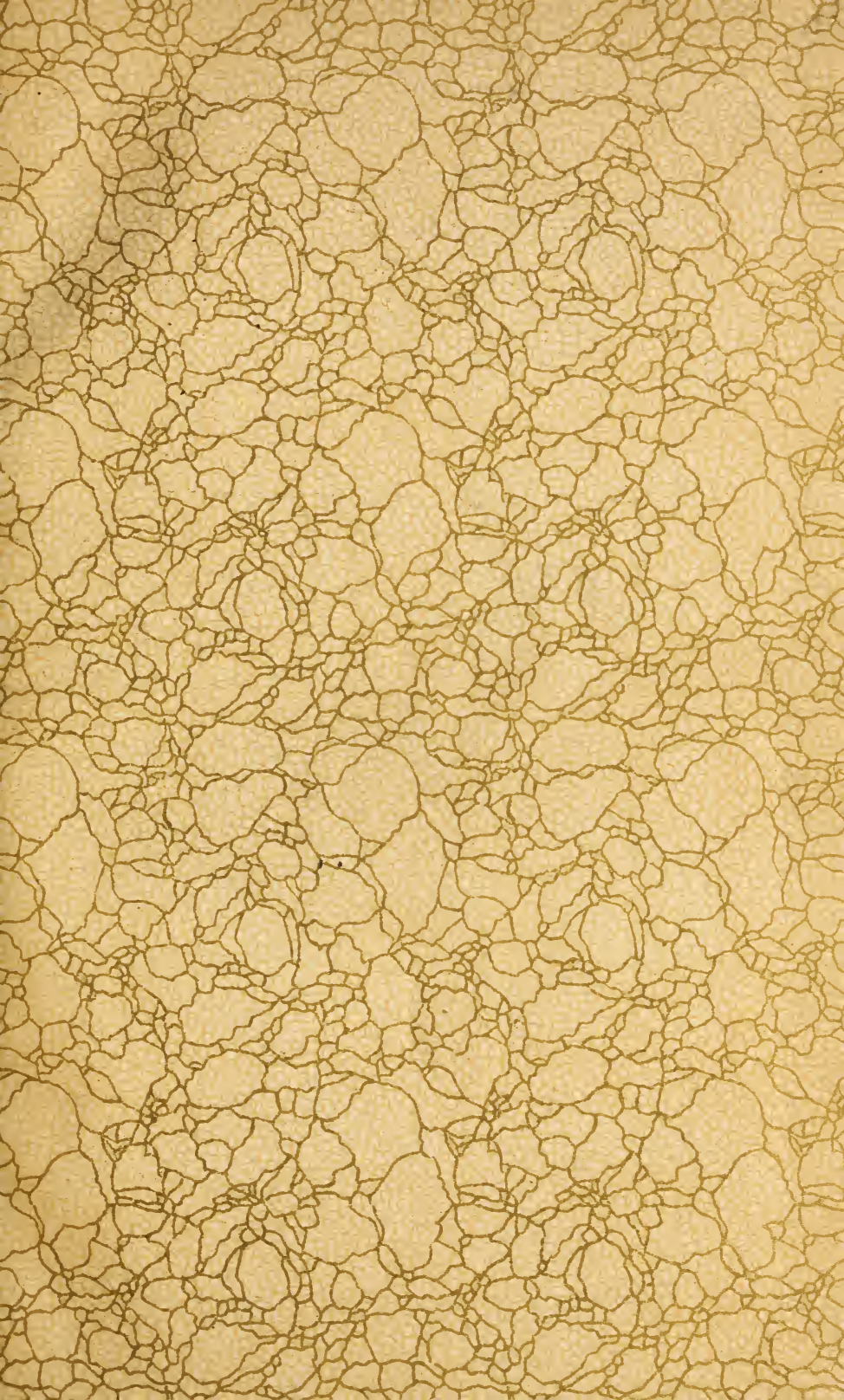
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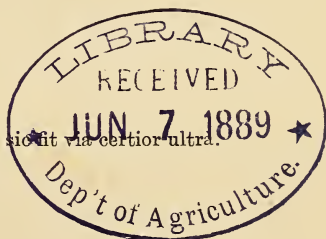
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THE
ZOOLOGICAL RECORD
FOR 1873;

BEING
VOLUME TENTH
OF THE
RECORD OF ZOOLOGICAL LITERATURE.

EDITED BY
EDWARD CALDWELL RYE, F.Z.S.,
LIBRARIAN TO THE ROYAL GEOGRAPHICAL SOCIETY.

Explorate solum : sic fit via certior ultra.



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P R E F A C E.



DEPRIVED in one year of the invaluable assistance afforded by the supervision of Professor NEWTON, and of the co-operation of Dr. GÜNTHER in so many and such important special groups as *Mammalia*, *Reptilia*, and *Pisces*—the record of which it has been absolutely impossible for him again to undertake, owing to the great increase of duties caused by his promotion to the office of Keeper of the Natural History Department of the British Museum—the task of editing the present volume has been no light one. I have, however, been fortunate enough to secure the assistance of Mr. ALSTON in the first of these groups; and of Mr. O'SHAUGHNESSY in the *Reptilia* and *Pisces*—the latter gentleman's work being the more valuable, as he has in its preparation been enabled, from his position in the British Museum, to consult Dr. Günther on various points. To these gentlemen and to Dr. Günther I desire to offer my best thanks, and I have also to thank the other Recorders for their continued co-operation.

Various circumstances have prevented me from bringing out the present volume within a less period than that occupied in the preparation of its predecessors; but I trust to be able to publish the next within a shorter interval.

It is at once a pleasure and a duty for me to acknowledge a further grant of £100 towards the expenses of this volume from the British Association for the Advancement of Science, and of a special contribution for the same purpose of £50 from the Council of the Zoological Society of London (the interest of the Davis Bequest, formerly applied in like manner on more than one occasion, having been appropriated for other Zoological purposes). I have also to acknowledge the grant (for the first time since the publication of this Record) by the Government Grant Committee of the Royal Society, of £100 out of the sum annually voted by Parlia-

ment for the promotion of Science. To that Committee, and to the guarantors of the fund of the Zoological Record Association who have, on the expiration of the original term, renewed their liability for the support of this undertaking, the best thanks of all Zoologists are most justly due.

There remains a great boon to Zoological students to be formally acknowledged—I refer to the publication in 1873, by Count August von Marschall, under the auspices of the Royal Zoological-Botanical Society of Vienna, of a “Nomenclator Zoologicus,” continuing the indispensable work of the same name by L. Agassiz, from the date at which the latter ended (1846) to 1868, inclusively. On the vast labour expended upon the 482 closely printed pages of this volume it would be superfluous to comment; and it may be safely asserted that no work of such general utility has appeared for very many years. Lists of the genera recorded during each year since 1870, inclusively, having been added to the volumes of the Zoological Record from that date, it has occurred to me that a similar table of the genera comprised in the volume (vi.) for 1869 of this publication would not be altogether useless, as connecting the Vienna “Nomenclator” with our own periodical series, and thus completing the record of genera to the present day. I have accordingly compiled such a list, which will be found on the eight pages following these remarks. Many genera can hardly fail to be omitted from such an undertaking; but a basis for a complete work will be by these means afforded.

EDWARD CALDWELL RYE.

Royal Geographical Society,
1, Savile Row, Burlington Gardens, London,
April, 1875.

* * * 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.

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OMITTED FROM LISTS OF NEW GENERA, &c., IN FORMER
VOLUMES OF THE ZOOLOGICAL RECORD.

- Buckleya, *Higgins*, ix. p. 162 [1872, Mollusca].
 Macruronus, *Günther*, viii. p. 103 [1873, Pisces].
 Psalistus, *Gerstäcker*, viii. p. 314 [1871, Coleoptera].
 Pyrrhosticta, *Butler*, ix. p. 339 [1872, Lepidoptera].

ADDENDA TO THE PRESENT VOLUME.

Page 425, in H. Loew's "Review of the North American *Trypetina*," Sm.
 Misc. Coll. No. 256, line 13 from bottom, add:—

Urophora scutellaris, Macq., nec Wied., is re-named *macquarti*, p. 267.

And to the list of new genera, *ibid.*, between lines 11 & 12 from bottom, add:—

Hexacheta, p. 219; type, *Trypeta eximia*, Wied.

Stenopa, p. 234, for [*Trypeta*] *vulnerata* (sp. n.).

Edicarena, provisionally adopted for [*Trypeta*] *tetanops* (sp. n.), p. 247.

Peronyma, p. 250, for *Trypeta sarcinata*, Lw.

Plagiotoma, p. 252: allied to *Acidia*. *Trypeta discolor* and *obliqua*, Say, and
 [*T.*] *biseriata* (sp. n.).

Blepharoneura, p. 272; ? = *Dasyneura*, Saund. Type, [*Trypeta*] *pæcilo-*
gastra (sp. n.).

Eurosta, p. 280, for *Trypeta solidaginis*, Fitch.

LIST OF THE
PRINCIPAL ABBREVIATED TITLES OF JOURNALS
QUOTED IN THIS VOLUME.

- Abh. Ak. Berl.*.—Abhandlungen der k. Akademie der Wissenschaften zu Berlin.
- Abh. bayer. Ak.*.—Abhandlungen der mathematisch-physikalischen Classe der k. bayerischen Akademie der Wissenschaften.
- Abh. Ges. Götting.*.—Abhandlungen der k. Gesellschaft der Wissenschaften zu Göttingen.
- Abh. Ver. Hamb.*.—Abhandlungen herausgegeben von dem naturwissenschaftlichen Verein zu Hamburg.
- Act. Soc. L. Bord.*.—Actes de la Société Linnéenne de Bordeaux.
- Am. J. Conch.*.—American Journal of Conchology.
- Am. J. Sci.* (3).—American Journal of Science and Art. Third series.
- Am. Nat.*.—American Naturalist.
- An. Mus. B. Aires.*.—Anales del Museo publico de Buenos Aires.
- Ann. Ent.*.—Annuaire entomologique (Fauvel).
- Ann. Ent. Belg.*.—Annales de la Société entomologique de Belgique.
- Ann. Lyc. N. York.*.—Annals of the Lyceum of Natural History of New York.
- Ann. Mal. Belg.*.—Annales de la Société malacologique de Belgique.
- Ann. Mus. Genov.*.—Annali del Museo civico di Storia naturale di Genova.
- Ann. N. H.* (4).—Annals and Magazine of Natural History. Fourth series.
- Ann. Sci. Nat.*.—Annales des Sciences Naturelles. 5me série.
- Ann. Soc. Agric. Lyon.*.—Annales de la Société d'Agriculture, Histoire naturelle, &c., de Lyon. 4me série.
- Ann. Soc. Ent. Fr.* (5).—Annales de la Société entomologique de France. 5me série.
- Ann. Soc. L. Lyon (n. s.)*.—Annales de la Société Linnéenne de Lyon. Nouvelle série.
- An. Soc. Esp.*.—Anales de la Sociedad Española de Historia Natural.
- An. Univ. Chil.*.—Anales de la Universidad di Chile.
- Arb. Inst. Würzb.*.—Arbeiten aus dem zoologisch-zootomischen Institut in Würzburg.
- Arch. Anat. Phys.*.—Archiv für pathologische Anatomie und Physiologie.

- Arch. f. Nat.* (2).—Archiv für Naturgeschichte. Neue Folge.
- Arch. ges. Phys.*—Archiv für die gesammte Physiologie des Menschen und der Thiere (Bonn).
- Arch. Landesdurchf. Böhm.*—Archiv für die naturwissenschaftliche Landesdurchforschung von Böhmen.
- Arch. mikr. Anat.*—Archiv für mikroskopische Anatomie.
- Arch. Mus. Lyon.*—Archives du Muséum d'histoire naturelle de Lyon.
- Arch. Nat. Livl.*—Archiv für die Naturkunde Liv- Ehst- und Kurlands.
- Arch. Néerl. (and Arch. sci. nat.)*—Archives Néerlandaises des Sciences exactes et naturelles.
- Arch. Phys.*—Archives de Physiologie normale et pathologique.
- Arch. Ver. Mecklenb.*—Archiv des Vereins der Freunde der Naturgeschichte in Mecklenburg.
- Arch. Z. expér.*—Archives de Zoologie expérimentale et générale.
- Atti Acc. Nap.*—Atti dell' Accademia di Scienze fisiche e mathematiche di Napoli.
- Atti Acc. Rom.*—Atti della R. Accademia dei Lincei.
- Atti Acc. Tor.*—Atti della R. Accademia delle Scienze di Torino.
- Atti Soc. Ital.*—Atti della Società Italiana di Scienze naturali.
- Atti Soc. Pad.*—Atti della Società Veneto-Trentina di Scienze naturali.
- Ber. Ges. Chemn.*—Bericht der naturwissenschaftlichen Gesellschaft zu Chemnitz.
- Ber. oberhess. Ges.*—Sitzungsberichte der oberhessischen Gesellschaft für Natur- und Heilkunde.
- Ber. senck. Ges.*—Bericht der senckenbergischen naturforschenden Gesellschaft.
- Ber. Univ. Warsch.*—Warschauer Universitäts-berichte.
- Ber. Vers. deutsch. Orn. Ges.*—Bericht über die [] Versammlung der deutschen Ornithologen-Gesellschaft.
- Ber. Vers. Natur.*—Amtlich Bericht über die Versammlungen deutschen Naturforscher und Aertze.
- Ber. St. Gal. Ges.*—Bericht über die Thätigkeit der St. Gallischen naturwissenschaftlichen Gesellschaft.
- B. E. Z.*—Berliner entomologische Zeitschrift.
- Bull. Ac. Belg.* (2).—Bulletin de l'Académie Royale des Sciences de Belgique. 2me série.
- Bull. Ass. Nat. Med. Nap.*—Bulletino dell' Associazione dei naturaliste e Medici di Napoli.
- Bull. Buff. Soc.*—Bulletin of the Society of Natural Sciences, Buffalo.
- Bull. Ent. Ital.*—Buletino della Società Entomologica Italiana.
- Bull. Ent. Ross.*—Bulletin Societatis entomologicae Rossicae.
- Bull. Mosc.*—Bulletin de la Société impériale des Naturalistes de Moscou.
- Bull. Mus. C. Z.*—Bulletin of the Museum of Comparative Zoölogy (Cambridge, U. S. A.).
- Bull. Pétersb.*—Bulletin de la classe physico-mathématique de l'Académie impériale des Sciences de St. Pétersbourg.
- Bull. Soc. Acclim.* (2).—Bulletin de la Société d'Acclimatation. 2me série.
- Bull. Soc. Angers.*—Bulletin de la Société d'études scientifiques d'Angers.

- Bull. Soc. Ent. Fr.*—Bulletin des séances de la Société entomologique de France.
- Bull. Soc. Géogr.*—Bulletin de la Société de Géographie.
- Bull. Soc. Hort. Var.*—Bulletin de la Société d'Horticulture et d'acclimatation du Var.
- Bull. Soc. L. N. Fr.*—Bulletin mensuel de la Société Linnéenne du Nord de la France.
- Bull. Soc. Moselle.*—Bulletin de la Société d'histoire naturelle du département de la Moselle.
- Bull. Soc. Neuch.*—Bulletin de la Société des sciences naturelles de Neuchâtel.
- Bull. Soc. Rouen.*—Bulletin de la Société des Amis des Sciences naturelles de Rouen.
- Bull. Soc. Vaud.*—Bulletin de la Société Vaudoise des Sciences Naturelles.
- Bull. Soc. Yonne.*—Bulletin de la Société des Sciences historiques et naturelles de l'Yonne.
- Canad. Ent.*—Canadian Entomologist.
- Canad. J. Sc. (n. s.).*—Canadian Journal of Science, Literature, and History. New series.
- Canad. Nat. (n. s.).*—Canadian Naturalist and Quarterly Journal of Science. New series.
- Cat. Mus. C. Z.*—Illustrated Catalogue of the Museum of Comparative Zoölogy (Cambridge, U. S. A.).
- CB. Ver. Regensb.*—Correspondenz-Blatt des zoologischen-mineralogischen Vereins in Regensburg.
- C. H.*—Coleopterologische Hefte.
- Cist. Ent.*—Cistula Entomologica.
- C. R.*—Comptes rendus hebdomadaires des séances de l'Académie des Sciences.
- CR. Ent. Belg.*—Comptes-rendus des séances de la Société entomologique de Belgique.
- Dan. Selskr. Skr.*—K. Danske Videnskabernes Selskabs Skrifter.
- Denk. Ak. Wien.*—Denkschriften der k. Akademie der Wissenschaften zu Wien.
- Ent.*—The Entomologist.
- Ent. M. M.*—Entomologist's Monthly Magazine.
- Fetschr. nat. Fr.*—Festschrift zur Feier des hundertjährigen Bestehens der Gesellschaft naturforschender Freunde zu Berlin.
- Feuil. Nat.*—Feuilles des jeunes Naturalistes.
- Forh. Selsk. Chr.*—Forhandlingar i Videnskabs-Selskabet i Christiania.
- Gard. Chron.*—The Gardener's Chronicle.
- Geogr. MT.*—Mittheilungen aus Justus Perthes' geographischer Anstalt, &c.
- Geol. Mag.*—Geological Magazine.
- Göteb. Handl.*—K. Vetenskaps och Vitterhets Samhälles Handlingar.
- Hor. Ent. Ross.*—Horæ Societatis Entomologicæ Rossicæ.

Ibis.—The Ibis.

Izvest. Obsh. Iest. Mosk.—Izvestia Imperatorskeio Obshtshestra Ljubiteloi Iestestvasnaniya (Trans. Imp. Soc. Nat. Sci. Moscow).

J. Anat. Phys.—Journal of Anatomy and Physiology.

J. A. S. B.—Journal of the Asiatic Society of Bengal.

JB. f. Mineral.—Neues Jahrbuch für Mineralogie, Palæontologie und Geologie.

J. Bot.—Journal of Botany.

JB. schles. Ges.—Jahresbericht der schlesischen Gesellschaft für vaterländische Cultur.

J. de Conch.—Journal de Conchyliologie.

J. de l'Anat. Phys.—Journal de l'anatomie et de la physiologie.

Jen. Z. Nat.—Jenaische Zeitschrift für Medicin und Naturwissenschaft.

J. f. O.—Journal für Ornithologie.

J. G. Soc.—Quarterly Journal of the Geological Society.

J. Geogr. Soc.—Journal of the Royal Geographical Society.

J. Hort. Soc. (n. s.)—Journal of the Royal Horticultural Society. New series.

J. L. S.—Journal of the Linnean Society.

J. Mus. Goddefr.—Journal des Museum Goddefroy: Geographische, ethnographische und naturwissenschaftliche Mittheilungen.

J. N. China Soc.—Journal of the North-China Branch of the Royal Asiatic Society.

J. Sc. Lisb.—Jornal de Sciencias da Academia de Lisboa.

J. Quek. Club.—Journal of the Quekett Microscopical Club.

J. Zool.—Journal de Zoologie.

L'Ab.—L'Abeille.

Mal. Bl.—Malakozoologische Blätter.

MB. Ak. Berl.—Monatsberichte der k. Akademie der Wissenschaften zu Berlin.

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.

Mem. Acc. Bologn.—Memorie dell' Accademia di Scienze dell' Istituto di Bologna.

Mem. Acc. Torin.—Memorie della R. Accademia delle Scienze di Torino.

Mém. Ac. Dijon (3).—Mémoires de l'Académie des Sciences, Arts, et Belles-lettres de Dijon. 3me série.

Mém. Ac. Lyon.—Mémoires de l'Académie des Sciences, Belle-lettres, et Arts de Lyon.

Mem. Bost. Soc.—Memoirs of the Boston Society of Natural History.

Mém. Liège.—Mémoires de la Société Royale des Sciences de Liège.

Mém. Nat. Mosc.—Mémoires de la Société impériale des Naturalistes de Moscou.

Mém. Pétersb.—Mémoires de l'Académie impériale des Sciences de St.-Pétersbourg.

- Mém. Soc. Bord.*—Mémoires de la Société des sciences physiques et naturelles de Bordeaux.
- Mém. Soc. Cannes.*—Mémoires de la Société des sciences naturelles des Cannes.
- Mém. Soc. Cherb.* (2).—Mémoires de la Société des sciences naturelles de Cherbourg. 2me série.
- Mém. Soc. Hain.* (3).—Mémoires et publications de la Société des Sciences, &c., du Hainaut. 3me série.
- Mém. Soc. L. Norm.*—Mémoires de la Société Linnéenne de Normandie.
- Mém. Soc. Phys. Genève.*—Mémoires de la Société de physique et d'histoire naturelle de Genève.
- M. Micr. J.*—Monthly Microscopical Journal.
- MT. Ges. Ostas.*—Mittheilungen der deutschen Gesellschaft für Natur- und Völkerkunde Ostasiens (Yokohama).
- MT. schw. ent. Ges.*—Mittheilungen der schweizerischen entomologischen Gesellschaft.
- MT. Vorpomm.*—Mittheilungen aus dem naturwissenschaftlichen Verein von Neu-Pommern und Rügen.
- Nachr. Ges. Mosc.*—Nachrichten der k. Gesellschaft der Liebhaber der Naturkunde zu Moscau.
- Nachr. mal. Ges.*—Nachrichtsblatt der deutschen malako-zoologischen Gesellschaft.
- N. Arch. Mus.*—Nouvelles Archives du Muséum d'Histoire Naturelle.
- Nat. Mex.*—La Natureleza.
- Nat. Tids.*—Naturhistorisk Tidsskrift.
- Nature.*—Nature.
- N. Denk. schw. Ges.*—Neue Denkschriften der allgemeinen schweizerischen Gesellschaft für die gesammten Naturwissenschaften.
- Ned. T. D.*—Nederlandsch Tijdschrift voor de Dierkunde.
- Niederl. Arch. Zool.*—Niederländisches Archiv für Zoologie.
- N. Mag. Naturv.*—Nyt Magazin for Naturvidenskaberne.
- Not. Fenn.*—Notiser ur Sällskapetets pro Fauna et Flora Fennica Förhandlingar.
- Nouv. et Faits.*—Nouvelles et Faits divers.
- Nunq. Ot.*—Nunquam Otiosus.
- Œfv. Ak. Förh.*—Œfversigt af K. Vetenskaps Akademiens Förhandlingar.
- Opusc. ent.*—Opuscula entomologica (Lund).
- Overs. Dan. Selsk.*—Oversigt over det K. Danske Videnskabernes Selskabs Forhandlingar.
- P. Ac. Philad.*—Proceedings of the Academy of Natural Sciences of Philadelphia.
- Pal. Soc.*—[Publications of the] Palæontographical Society.
- P. Am. Phil. Soc.*—Proceedings of the American Philosophical Society.
- P. Antiq. Scot.*—Proceedings of the Society of Antiquaries of Scotland.
- P. A. S. B.*—Proceedings of the Asiatic Society of Bengal.
- P. Berw. Club.*—Proceedings of the Berwickshire Naturalists' Field Club.

- P. Bost. Soc.*—Proceedings of the Boston Society of Natural History.
- P. Cal. Ac.*—Proceedings of the California Academy of Sciences.
- P. E. Soc.*—Proceedings of the Entomological Society of London.
- Pet. Nouv.*—Petites Nouvelles Entomologiques.
- Phil. Tr.*—Philosophical Transactions of the Royal Society.
- P. Liverp. Soc.*—Proceedings of the Literary and Philosophical Society and Natural History Society of Liverpool.
- Pop. Sc. Rev.*—Popular Science Review.
- P. R. Inst.*—Proceedings of the Royal Institution of Great Britain.
- P. R. Soc.*—Proceedings of the Royal Society.
- P. R. Soc. Edinb.*—Proceedings of the Royal Society of Edinburgh.
- P. Sc. Ass. Trinid.*—Proceedings of the Scientific Association of Trinidad.
- P.-v. Mal. Belg.*—Procès-verbaux des séances de la Société malacologique de Belgique.
- P. Z. S.*—Proceedings of the Zoological Society.
- P. Z. S. Vict.*—Proceedings of the Zoological and Acclimatization Society of Victoria.
- Q. J. Sc.*—Quarterly Journal of Science.
- Q. J. Micr. Sc.*—Quarterly Journal of Microscopical Science.
- Rec. Am. Ent.*—Record of American Entomology.
- Rend. Acc. Bologn.*—Rendiconto dell' Accademia di scienze dell' Istituto di Bologna.
- Rend. Acc. Nap.*—Rendiconti dell' Accademia di scienze fisiche e matematiche di Napoli.
- Rep. Br. Ass.*—Report of the British Association for the Advancement of Science.
- Rep. Ins. Illin.*—Annual Report on the noxious Insects of the State of Illinois.
- Rep. Ins. Mass.*—Annual Report on the injurious and beneficial Insects of Massachusetts, made to the State Board of Agriculture.
- Rep. Ins. Mo.*—Annual Report on the noxious, beneficial, and other Insects of the State of Missouri, made to the State Board of Agriculture.
- Rep. Ins. N. York.*—Report on the noxious, beneficial, and other Insects of the State of New York.
- Rep. Montrose Soc.*—Report of the Montrose Natural History and Antiquarian Society.
- Rep. Peab. Ac.*—Annual Report of the Trustees of the Peabody Academy of Arts and Sciences.
- Rev. Cours Sc.*—Revue des Cours scientifiques.
- Rev. d'Anthr.*—Revue d'Anthropologie.
- Rev. Montp.*—Revue des Sciences Naturelles (Montpellier).
- R. Z.*—Revue et Magasin de Zoologie pure et appliquée.
- SB. Ak. Wien.*—Sitzungsberichte der mathemat. naturwiss. Klasse der Akademie der Wissenschaften zu Wien.
- SB. Ges. Dorp.*—Sitzungsberichte der Dorpater Naturforscher Gesellschaft.

- SB. Ges. Isis.*—Sitzungsberichte der Naturwissenschaftlichen Gesellschaft 'Isis' zu 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. Niederrhein. Ges.*—Sitzungsberichte der Niederrheinischen Gesellschaft für Natur- und Heilkunde zu Bonn.
- SB. Soc. Erlang.*—Sitzungsberichte der physicalish-medicinischen Societät zu Erlangen.
- SB. Ver. Rheinl.*—Sitzungsberichte des naturhistorischen Vereins der preussischen Rheinlande und Westphalens.
- Schr. Gesch. Bodens.*—Schriften für die Geschichte des Bodensees und seiner Umgebung (Lindau).
- Schr. Ges. Danz.*—Neueste Schriften des naturforschenden Gesellschaft zu Danzig.
- Schr. Ges. Königsb.*—Schriften der k. physikalisch-ökonomischen Gesellschaft in Preussen.
- Schr. Ver. Schlesw. Holst.*—Schriften des naturwissenschaftlichen Vereins für Schleswig-Holstein (Kiel).
- Sci. Goss.*—Science Gossip.
- Scot. Nat.*—The Scottish Naturalist.
- S. E. Z.*—Stettiner entomologische Zeitung.
- Sm. misc. Coll.*—Smithsonian miscellaneous Collections.
- Str. Feath.*—Stray Feathers.
- Sv. Ak. Handl.*—K. Svenska Vetenskaps Akademiens Handlingar.
- Tijdschr. Ent.*—Tijdschrift voor Entomologie.
- Tr. Ac. St. Louis.*—Transactions of the Academy of Sciences of St. Louis.
- Tr. Am. Ent. Soc.*—Transactions of the American Entomological Society.
- Tr. Am. Phil. Soc. (n. s.)*—Transactions of the American Philosophical Society. New series.
- Tr. Conn. Ac.*—Transactions of the Connecticut Academy of Sciences.
- Tr. Ent. Soc. N. S. W.*—Transactions of the Entomological Society of New South Wales.
- Tr. E. Soc.*—Transactions of the Entomological Society of London.
- Tr. L. S.*—Transactions of the Linnean Society.
- Tr. N. H. Soc. Glasgow.*—Transactions of the Glasgow Natural-History Society.
- Tr. North. Dur.*—Natural-History Transactions of Northumberland and Durham.
- Tr. Norw. Soc.*—Transactions of the Norfolk and Norwich Naturalists' Society.
- Tr. N. York Agric. Soc.*—Transactions of the New York State Agricultural Society.
- Tr. N. Z. Inst.*—Transactions and Proceedings of the New-Zealand Institute.
- Tr. Odont. Soc.*—Transactions of the Odontological Society.
- Tr. R. Irish Ac.*—Transactions of the Royal Irish Academy.

- Tr. R. Soc. Edinb.*—Transactions of the Royal Society of Edinburgh.
- Tr. R. Soc. Maur.*—Transactions of the Royal Society of Arts and Sciences of Mauritius.
- Tr. Wiscons. Ac.*—Transactions of the Wisconsin Academy of Sciences.
- Tr. Woolh. Club.*—Transactions of the Woolhope Naturalist's Field-Club.
- Tr. Z. S.*—Transactions of the Zoological Society.
- Verh. geol. Reichsanst.*—Verhandlungen der k. k. geologischen Reichsanstalt (Wien).
- Verh. Ges. Bas.*—Verhandlungen der naturforschenden Gesellschaft in Basel.
- Verh. Ges. Würzb. (2)*—Verhandlungen der physikalisch-medicinischen Gesellschaft in Würzburg. Neue Folge.
- Verh. Ver. Brünn.*—Verhandlungen des naturforschenden Vereins in Brünn.
- Verh. Ver. Regensb.*—Verhandlungen des zoologisch-mineralogischen Vereins in Regensburg.
- Verh. Ver. Rheinl.*—Verhandlungen des naturhistorischen Vereins der preussischen Rheinlande und Westphalens.
- Verh. z.-b. Wien.*—Verhandlungen der zoologisch-botanischen Gesellschaft in Wien.
- Versl. Ak. Amst.*—Verslagen en Mededeelingen der k. Akademie van Wetenschappen (Amsterdam).
- Vid. Medd.*—Videnskabelige Meddelelser fra den Naturhistoriske Forening.
- Viert. Ges. Zürich.*—Vierteljahrsschrift der naturforschenden Gesellschaft in Zürich.
- Würt. nat. JH.*—Württembergische naturwissenschaftliche Jahreshefte.
- Z. E. Vers. schles.*—Zeitschrift für Entomologie des Vereins für schlesische Insektenkunde.
- Z. geol. Ges.*—Zeitschrift der deutschen geologischen Gesellschaft.
- Z. ges. Naturw. (2).*—Zeitschrift für die gesammten Naturwissenschaften. Neue Folge.
- Zool. Gart.*—Der Zoologische Garten.
- Zool. Rec.*—Record of Zoological Literature (and Zoological Record).
- Zool. (s. s.)*—The Zoologist. Second series.
- Z. Parasit.*—Zeitschrift für Parasitenkunde (Jena).
- Z. wiss. Zool.*—Zeitschrift für wissenschaftliche Zoologie.

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ZOOLOGICAL RECORD

FOR 1873.

MAMMALIA

BY

EDWARD RICHARD ALSTON, F.Z.S.

AMONG the results obtained by workers in this department during 1873, those of the most striking importance are probably the discoveries of Leidy, Marsh, and Cope, as to the structure of the fossil animals of the American Eocene formations, which promise to throw much new light on the relationship and descent of the recent Proboscideans and Ungulates (*infra*, pp. 13 & 14).

Turner's researches into the placentation of the Edentates (p. 19), and Ferrier's investigation into the functions of the various parts of the brain (p. 2), are also of the deepest interest to the zoologist. Among faunas, the memoir of Severtzoff on Turkestan (p. 6), and that of Hensel on Southern Brazil (p. 4), may be particularly mentioned. In the several orders, the *Cetacea* and *Edentata* have received much attention, while the *Primates* appear to have been comparatively neglected.

THE GENERAL SUBJECT.

ADAMS, A. LEITH. Field and Forest Rambles, with Notes and Observations on the Natural History of Eastern Canada. London: 1873. 8vo, pp. 333.

Excellent field-notes on the fauna of New Brunswick, similar to the author's previous works on Cashmere, Malta, &c. The natives and the 1873. [VOL. X.]

Mammals are treated of in the first part, and a list of forty-six species is given in the Appendix.

H. ALLEN finds a radiated arrangement in the shoulder and pelvic girdles of all Vertebrates. P. Ac. Philad. 1872, pp. 42-45.

CAMPANA. Essai d'une Détermination, par l'Embryologie Comparative, des parties analogues de l'Intestin, chez les Vertébrés Supérieurs. C. R. lxxvii. pp. 217-220.

CHAMBERLIN, T. C. Suggestions as to a Basis for the Gradation of the Vertebrata. Tr. Wiscons. Ac. 1872, pp. 138-150.

Treats of the systematic value of modifications of the nervous system.

COPE, E. D. On the Homologies and Origin of the Types of Molar Teeth in Mammalia Educabilia. P. Ac. Philad. 1873, pp. 370 & 371.

A short abstract of a paper which is to appear in the J. Ac. Philad. The principal types of teeth recognized are:—1. *Haplodont*, simple, conical, or truncated; 2. *Ptychodont*, with the sides of the crown vertically plicated; 3. *Bunodont*, with the apex of the crown tuberculated; 4. *Lophodont*, with the apex plicated. The genetic relations of these types are discussed, and it is concluded that the theoretical ancestral type of the whole sub-class was a "*Bunodont*."

DAVID, A. Quelques Renseignements sur l'Histoire Naturelle de la Chine Septentrionale et Occidentale. J. N. China Soc. 1873, pp. 205-234.

A list is given (pp. 230-234) of 118 species of Mammals known to the author in China north of the Yangtzekiang. A new species of *Hydropotes* is indicated, but not described.

EATON, A. E. Notes on the Fauna of Spitzbergen. Mammals, Zool. (s.s.) 1873, pp. 3762-3771.

ELLIOTT, H. W. Report on the Prybilov Group, or Seal Islands of Alaska. Washington: 1873. 4to (no pagination), plates.

The Mammals found on the islands are identified as *Vulpes lagopus*, *Phoca vitulina*, *Callorhinus ursinus*, *Eumetopias stelleri*, *Rosmarus arcticus*, and *Myodes obensis*.

ERCOLANI, G. B. His memoir on the structure of the placenta (*cf.* Zool. Rec. ix. p. 2) is published at length. Mem. Ac. Bologn. (3), iii., pp. 263-312, 4 pls.

D. FERRIER has published (W. Riding Lunatic Asylum Medical Reports iii., and J. Anat. Phys. viii. pp. 152-155) a brief abstract of the main results of his important researches on the localization of the function of the

brain in Monkeys, Cats, Dogs, and Rabbits. These experiments show very clearly that the cerebral centres commanding various motions of the muscles are localized in definite regions of the brain. A complete memoir will be communicated to the Royal Society.

FLOWER, W. H. On the Arrangement and Nomenclature of the lobes of the liver in Mammalia. Rep. Br. Ass. 1872, pp. 150 & 151 (*cf.* Zool. Rec. ix. p. 2).

——. Hunterian Lectures on the Osteology and Dentition of Extinct Mammalia (abstract). Nature, vii. pp. 330, 348, 388, 408, 428.

A summary of our knowledge of extinct Mammals, especially as to their place in the general arrangement of the class.

FRENKEL, F. Beiträge zur anatomischen Kenntniss des Kreuzbeines der Säugethiere. Jen. Z. Nat. vii. pp. 391–437, pls. 21 & 22.

—— FRIC, Arch. Landesdurchf. Böhm. ii. pt. 4 (not seen by the Recorder), gives a list of the *Vertebrata* of Bohemia, including fifty-five Mammals.

GAUDRY, A. Animaux Vertébrés Fossiles du Mont Léberon (Vaucluse). Paris: 1873. 4to, pp. 180, pls. 21.

GEGENBAUR, C. Bemerkungen über die Milchdrüsen-Papillen der Säugethiere. Jen. Z. Nat. vii. pp. 204–217.

Two principal types of teats are recognized: one with the lacteal ducts opening on the surface, as in Man; the other, with a central canal, as in the Cow. The teat of the Kangaroo approaches each of these types at different ages.

——. Zur Bildungsgeschichte lumbosacraler Uebergangswirbel. *Op. cit.* pp. 438–440.

GERVAIS, P. Mammifères dont les Ossements accompagnent les Dépôts de chaux phosphatée des Départements de Tarn-et-Garonne et de Lot. 2me mémoire. J. Zool. ii. 1873, pp. 356–380, pls. 14–16.

T. GILL has published the first instalment of his "Arrangement of the Families of Mammals," *Smiths. Misc. Col.* 230 (1872), pp. 98. It is divided into three parts:—I. A list of Families (pp. 1–27); II. A list of authors referred to (pp. 31–41); and III. Synoptical tables of the characters of the sub-divisions of the "Super-order *Educabilia*" (pp. 43–98). The remainder is to follow. The arrangement adopted has already been indicated (*cf.* Zool. Rec. viii. p. 7).

A. GRANDIDIER discusses the fauna of Madagascar and its peculiarities. *Bull. Soc. Géogr.* 1873, p. 373.

GRAY, J. E. Hand-list of Edentate, Thick-skinned and Rumi-

nant Mammals in the British Museum. London: 1873. 8vo, pp. 176, 41 pls.

Similar in plan to the author's previous catalogues. The new species are referred to *infra*.

(GRAY, J. E.) On Mammalia from Concordia, New Granada. Ann. N. H. (4) xi. pp. 468 & 469.

A list of thirteen species, some of which show a more northern range than had previously been known.

——. Notes on some Mammalia from Fantee. *Op. cit.* xii. pp. 65–66.

HENSEL, R. Beiträge zur Kenntniss der Säugethiere Süd-Brasiliens. Abh. Ak. Berl. 1872, pp. 1–130, 3 pls.

A valuable memoir on the Mammals collected by the author in S. Brazil, concerning which he had already published preliminary notes (*cf.* Zool. Rec. vi. p. 7). The number of species is eighty-nine, of which seven are new. Measurements of skulls are given in most instances, with notes on habits and distribution.

M. T. VON HEUGLIN mentions *Ursus marinus*, *Canis lupus*, *C. vulpes*, *C. lagopus*, *Myodes torquatus*, *M. obensis*, *Arvicola obscurus*, and *Cervus tarandus*, as occurring in Nova Zembla. Geogr. MT. 1872, p. 217.

HEIDENHAHN, R. Mikroskopische Beiträge zur Anatomie und Physiologie der Nieren. Arch. Mikr. Anat. x. pp. 1–50, pls. 1 & 2.

HÖNIGSCHMIED, J. Beiträge zur Mikroskopischen Anatomie über die Geschmacks-organe der Säugethiere. Z. wiss. Zool. xxiii. pp. 414–434, pl. 24.

HUMPHRY, J. M. On the Disposition of Muscles in Vertebrate Animals. J. Anat. Phys. vi. (1872) pp. 293–376, pls. 15 & 16.

HUSS, M. Beiträge zur Entwicklungsgeschichte der Milchdrüsen beim Menschen und bei Wiederkäuern. Jen. Z. Nat. vii. (1872), pp. 176–203, pls. 12 & 13.

JOBERT, —. Études sur les Organes du Toucher. Ann. Sc. Nat. (5) xvi. (1872), art. 5, pp. 162, pls. 3–10.

KOLLMANN, J. Zahnbein, Schmelz und Cement, eine vergleichend histologische Studie. Z. wiss. Zool. xxxiii. pp. 354–401, pls. 19–21.

W. LECHE states that between 1866 and 1870 rewards were paid in Sweden for the destruction of 494 Bears, 236 Wolves, 696 Gluttons, and 63,206 Foxes, the latter including both *Canis vulpes* and *C. lagopus*. Zool. Gart. 1873, pp. 257–261.

LEGROS, C., & MAGITOT, E. Origine et Formation du Follicule Dentaire. J. de l'Anat. Phys. ix. pp. 449-503, pls. 15-20.

The first of a series of memoirs on the development of the teeth of Mammals.

LEIDY, JOSEPH. Contributions to the Extinct Vertebrate Fauna of the Western Territories. Rep. U. S. Geol. Survey, I. pt. i. Mammalia, pp. 27-124, 211-223, 227-260, 315-338; plates.

In this important work the remains of seventy-seven species are figured and described, the majority being Ungulates. Thirteen new species and two new genera (*Insectivora* and *Zeuglodontia*) are described.

J. C. G. LUCÆ, in his essay on the Seals and Otters (*infra* p. 10), considers the proportions and especially the longitudinal section of the skull in various orders of Mammalia. Ber. Senck. Ges. viii. (1872), pp. 297-329, pls. 1-14.

MAREY, M. De la locomotion terrestre chez les Bipèdes et les Quadrupèdes. J. de l'Anat. Phys. ix. pp. 42-80.

MIVART, ST. GEORGE. Lesson in Elementary Anatomy. London: 1873. 12mo, pp. 535.

In this valuable handbook man is taken as a type, and the more important modification in the structure of other animals is pointed out.

The same author, in his paper on the *Lemuroidea* (*infra*, p. 7), expresses his opinions on zoological classification in general. He does not believe that it will ever be possible to arrange animals on a purely genetic plan, owing to the way in which similar forms have arisen in mutual independence. But a group may be natural and well defined, whether its sources of origin be few or many.

OLLIER, L. Recherches Expérimentales sur le mode d'Accroissement des Os. Arch. Phys. 1873, pp. 1-42, pls. 1 & 2.

PRITCHARD, N. On the Structure and Functions of the Rods of the Cochlea in Man and other Mammals. M. Micr. J. ix. pp. 150-157, pl. 13.

ROSENBERG, A. Ueber die Entwicklung des Extremitäten-Skeletes bei einigen durch Reductionen ihrer Gliedmassen characterisirten Wirbelthieren. Z. wiss. Zool. xxiii. pp. 116-158.

SABANJEFF gives a list of sixty-seven Mammals found in the Ural, with notes in Russian. Bull. Mosc. xlv. (1872), pp. 210-221.

SABATIER, A. Études sur le Cœur et la Circulation Centrale dans la série des Vertébrés. Paris: 1873, 4to. pp. 462, pls. 16.

SCOTT, A. W. *Mammalia, Recent and Extinct, an elementary Treatise for the Use of the Public Schools of New South Wales. Sect. B, Pinnata.* Sydney: 1873, 8vo, pp. 141.

An account of the recorded species of *Carnivora Pinnipedia, Cetacea,* and *Sirenia*, compiled with care, but hardly suitable as an educational manual.

SEVERTZOFF, N. A. *Turkestanskie Jevotnie [Fauna of Turkestan].* Nachr. Ges. Mosc. viii. pt. 2, 1873.

A German translation may be expected of this important work, which is published in Russian. A list of Mammals is given, pp. 61-62, and further particulars, pp. 79-109, and 149-157. The number of species amounts to eighty-three, of which ten are apparently new.

TROSCHER, F. H. *Bericht über die Leistungen in der Naturgeschichte der Säugethiere während des Jahres 1872.* Arch. f. Nat. 1873.

VROLIK, A. J. *Die Verknöcherung des Schläfenbeins der Säugethiere, mit Rücksicht auf die Huxleyschen Otica.* Niederl. Arch. Zool. i. pp. 291-312, pls. 21 & 22.

VULPIAN, A. *Nouvelles Recherches Physiologiques sur la Corde du Tympan.* C. R. lxxvi. pp. 146-151.

MONODELPHIA.

PRIMATES.

HOMININA.

MIVART, ST. G. *Man and Apes.* Pop. Sc. Rev. 1873, pp. 113-138, 143-164 (also printed separately, London: 1873, 8vo).

After pointing out the resemblances and differences between Man and the various genera of *Simiina*, the author comes to the conclusion that "special and exclusive affinities" to Man are not presented by any one species of ape, and above all not by the Gorilla. Man's relations to the rest of the *Primates* form "a tangled web, the meshes of which no naturalist has yet unravelled by the aid of natural selection."

CHUDZINSKI, T. *Contribution à l'Anatomie du Nègre.* Rev. d'Anth. ii. pp. 398-415, pl. 5.

The myology of a Negro is compared with that of Europeans and of Apes.

SIMIINA.

Dr. MOHNIKE remarks on the distribution of the Monkeys of the Eastern Archipelago, and especially on *Simia satyrus*. Verh. Ver. Rheinl. 1872, pp. 35-39.

C. J. FORSYTH MAJOR precedes his Notes on the Fossil Monkeys of Italy by a review of fossil *Quadrumana* in general. Atti Soc. Ital. xv. pp. 79-95.

Simia satyrus. Prof. Humphrey figures and describes a skull which has depressions in the parietal bones similar to those sometimes found in the human subject; it is also remarkable for having a supernumerary molar in each jaw. J. Anat. Phys. viii. pp. 136-141, pl. 7.

Troglodytes gorilla. The young easily tamed. R. B. N. Walker, P. Z. S., 1873, pp. 684 & 685.

LEMUROIDEA.

MIVART, St. G. On *Lepilemur* and *Cheirogaleus*, and on the zoological rank of the *Lemuroidea*. P. Z. S. 1873, pp. 484-510, pl. 43.

These are supplementary notes to the author's previous papers on the group (*cf.* Zool. Rec. ii. p. 16). Further particulars are given of the osteology of *Lepilemur*, *Hapalemur*, *Cheirogaleus*, and *Galago*. Many of the characters formerly given as separating the *Galaginine* from the *Lemurine* are now abandoned, and the following arrangement of genera is proposed, each being duly characterized:—

I. INDRISINÆ, *Indris*.

II. LEMURINÆ, *Lepilemur*, *Lemur*, and *Hapalemur*.

III. GALAGININÆ, *Cheirogaleus* and *Galago*.

The author then discusses the propriety of raising the *Lemuroidea* to the rank of a distinct order. He points out the peculiarities in which they differ from the rest of the *Primates*, stating (on the authority of a private communication from Prof. Milne-Edwards) that they have no decidua and that their placenta is diffuse, but comes to the conclusion that the order *Primates* is a natural and convenient one, and that it would be at least a questionable step to raise the sub-order *Lemuroidea* to any higher value.

Palæolemur, g. n. (foss.), Delfortrie, Act. Soc. L. Bord. 1873, livr. i. : = *Aphelotherium*, Gerv., = *Adapis*, Cuv.; P. Gervais, J. Zool. ii. pp. 421-426, pl. 17.

Necrolemur, g. n. (foss.), type, *N. antiquus*, sp. n., from the phosphate chalk of Quercy. H. Filhol, *ibid.* p. 476.

Stenops tardigradus and *S. gracilis*. On their habits in confinement, A. E. Brehm, Zool. Gart. 1873, pp. 121-126.

CHIROPTERA.

G. E. DOBSON disputes the accuracy of Darwin's statement that well-developed secondary sexual differences are hardly to be found in this

order, adducing many instances both in the *Pteropidæ* and *Vespertilionidæ*. P. Z. S., 1873, pp. 241-252.

P. J. VAN BENEDEN, in his memoir, "Les Parasites des Chauves-Souris de Belgique," after some observations on the animals, describes their external and internal parasites. Mém. Ac. Belg. xl. pp. 42, 7 pls.

P. MARCHI remarks on the morphology of the hairs of the *Chiroptera*. Atti Soc. Ital. xv. f. 2. pls. 8-11.

TAUBER'S paper on the dentition of the Danish Bats, Nat. Tids. viii. (1872), p. 227, *et seq.* has not been seen by the Recorder (*cf.* Arch. f. Nat. 1873, p. 87).

PTEROPIDÆ. G. E. Dobson has carefully reviewed the species inhabiting India and its islands: he indicates ten species, one of which is new, and proposes a new genus. J. A. S. B. 1873, pp. 194-205, pl. 14.

Pteropus formosus, sp. n., Sclater, is a provisional name for a Fruit-bat from Formosa, probably distinct from *P. dasymallus* of Japan. P. Z. S. 1873, p. 193, pl. 22.

Cynonycteris leschenaulti (Desm.), is distinguished from *C. amplexicaudata* (Geoff.). W. Peters, MB. Ak. Berl. 1873, pp. 485-487.

C. infuscata, said to be from Calcutta, Peters, *l.c.* p. 487; *C. minor*, Dobson, from Java, *l.c.* p. 203, pl. 15: spp. nn.

Eonycteris, g.n., Dobson, *l.c.* p. 204, pl. 14; separated from *Macroglossus* principally by very different attachment of the wing-membrane to the feet and sides: type, *M. spelæus*, Dobs. (*cf.* Zool. Rec. viii. p. 10).

Megaderma cor, Peters (*cf.* Zool. Rec. ix. p. 9), is more nearly allied to *M. frons* than to *M. spasma*, and these species may be separated as a sub-genus, for which the name *Cardioderma* is proposed. Peters, *l.c.* p. 488.

Rhinolophus hippocrepis. A. Redtel gives a minute description of the anatomy of the nasal appendages. Z. wiss. Zool. xxiii. pp. 254-288, pl. 14.

R. ferrumequinum extends to the Himalayas (as do several other European Bats), and=*R. tragatus*, Hodgson. Dobson, P. A. S. B. 1872, p. 208.

Molossus (Nyctinomus) johorensis, sp. n., Dobson, from the Malay Peninsula. *Op. cit.* 1873, p. 22.

Noctilio mastivus (Vahl), which Peters has identified with *N. leporinus*, L. (*cf.* Zool. Rec. ii. p. 25), is regarded as distinct; cranial and dental characters are pointed out. R. Hensel, Abh. Ak. Berl. 1872, p. 23.

Vesperugo leisleri is found in Belgium. A. Dubois, Bull. Ac. Belg. (2), xxxvi. p. 344.

Vespertilio murinoides, N.W. Himalaya, J. A. S. B. 1873, p. 205, pl. 14, and *macropus*, Himalayas, P. A. S. B. 1872, p. 209; Dobson, spp. nn.

Centronycteris, Gray: Peters retains this genus for *V. calcarata* (Wied.), and gives new characters. Arch. f. Nat. 1872, p. 699.

Murina, Gr., and *Harpypiocephalus*, Gr., are united by Dobson under the former name; the skulls and dentition of *M. cyclotis* and *H. harpyia* are described. P. A. S. B. 1873, pp. 107-110.

Murina suillus, Blyth, *nec.* Temm., from the Himalayas, is renamed *cyclotis*. Dobson, *op. cit.* 1872, p. 210.

INSECTIVORA.

TAUBER discusses the dentition of the Danish *Insectivora*. Nat. Tids. viii. (1872), p. 227, *et seq.* (not seen by the Recorder; *cf.* Arch. f. Nat. 1873, p. 87).

Erinaceus europæus. J. Sahlertz adopts the view that the *fourth* tooth in the upper jaw, and the *third* in the lower, are true canines. Vid. Medd. 1871-2, p. 36, and J. Zool. ii. pp. 275-281.

SORICIDÆ. Dr. Anderson publishes notes preliminary to a proposed monograph of the South Asiatic species, and gives dental characters of three species of *Crocidura*, and ten of *Pachyura*. No species of restricted *Sorex* is found in India, but two of *Crossopus* occur in the Himalayas. P. Z. S. 1873, pp. 227-235.

Washakius, g. n. (foss.) Leidy, Rep. U. S. Geol. Surv. i. p. 123, pl. 27, is referred to this order; type, *W. insignis*, sp. n., from the Eocene of Wyoming.

CARNIVORA.

CARNIVORA FISSIPEDIA.

Felis leo. The so-called "claw" at the tip of the Lion's tail is merely the hairless termination of the integument: W. Turner, J. Anat. Phys. vii. pp. 271-273.

F. catus. The domestic Cat is regarded as probably being descended from this species by N. S. Shaler, P. Bost. Soc. xv. pp. 159-162.

F. aurata (Temm.), from West Africa, figured by P. S. Sclater, P. Z. S. 1873, pl. 27.

F. guttula, sp. n., Hensel, Abh. Ak. Berl. 1872, p. 73, S. Brazil.

F. imperialis, sp. n. (foss.), Leidy, Rep. U. S. Geol. Surv. i. p. 228, pl. 31, from quaternary deposits (?) of California.

Machærodus latidens. On the Kent's Hole remains, and on the era in geological time and zoological position of the species: W. Pengelly, Q. J. Sc. 1873, pp. 204-223.

Viverra civetta. On its anatomy: J. Chatin, Ann. Sc. Nat. (5) vii. art. 12, pl. 22.

Arctites binturong. On its anatomy: A. H. Garrod, P. Z. S. 1873, pp. 196-203.

Hyænodon vulpinus, sp. n. (foss.), Gervais, from phosphate chalk of Tarn-et-Garonne, J. Zool. ii. p. 374.

Canis cancrivorus. On its cœcum: A. H. Garrod, P. Z. S. 1873, pp. 748-750.

C. latrans. On its habit: E. Coues, Am. Nat. vii. pp. 385-389.

Ursus leuconyx, sp. n., Severtzoff, Nachr. Ges. Mosc. viii. pl. 2, p. 79, Turkestan.

U. mediterraneus, sp. n. (foss.), Forsyth Major, Atti Soc. Ital. xv. f. 2, from the post-tertiaries of Italy.

Nearctus, g. n., Gray, Ann. N. H. (4) xii. p. 183. Proposed for the reception of *Ursus ornatus*, F. Cuv., from Peru. It differs from *Helarctus* in having the pre-molars $\frac{3}{4}:\frac{3}{4}$ instead of $\frac{1}{2}:\frac{1}{2}$.

Nasua leucorhynchus, Tsch., is distinguished from *N. socialis*, Weid. : R. Hensel, Abh. Ak. Berl. 1872, pp. 65 & 66.

Mustela furo. The Ferret is regarded as specifically distinct from the Polecat (*M. putorius*) : J. von Fischer, Zool. Gart. 1873, pp. 108–112.

Mustela. Albinos and yellow and pied varieties of *M. martes*, *foina*, *putorius*, *erminea*, and *vulgaris* are recorded : B. Farwick, *ib.* pp. 17–18 ; A. J. Jäckel, *ib.* pp. 456–459.

Mustela intermedia, sp. n., Severtzoff, Nachr. Ges. Mosc. viii. pt. 2, p. 80 (intermediate between *M. foina* and *martes*), Turkestan.

Martes, sp. (?). A note on a sub-fossil skull from the Cambridgeshire Fens : J. W. Clark, P. Z. S. 1873, p. 790.

Lutra and *Enhydris*. Dr. Lucae compares their osteology and myology with those of the Seals and other animals : Abh. Senck. Ges. viii. (1872), pp. 279–378, pls. 1–14.

Lutra vulgaris. T. Southwell describes the very remarkable nest of reeds which the Otter forms in the marshes of Norfolk, and gives other details of its habits : Tr. Norw. Soc. 1872–3, pp. 79–90.

L. piscinaria, sp. n. (foss.), Leidy, Rep. U. S. Geol. Surv. i. p. 316, pl. 31, from Pliocene of Idaho.

Sinopa eximia, sp. n. (foss.), *id. l.c.* p. 118, pl. 6, from Eocene of Wyoming.

CARNIVORA PINNIPEDIA.

PHOCIDÆ. Dr. Lucae compares the anatomy of the Seals with that of Otters and other Mammals : Abh. Senck. Ges. viii. (1872), pp. 279–378, pls. 1–14. Dr. Gray remarks on skulls of Japanese Seals : P. Z. S. 1873, pp. 776–779.

Halicyon richardsi, Gray (of which a skeleton has been sent from San Francisco, by Lord Walsingham)—*Phoca vitulina* : J. W. Clark, P. Z. S. 1873, pp. 556 & 557.

Phoca baicalensis, sp. n., Dybowski (Arch. Anat. Phys. 1873, pp. 109–129, pls. 2 & 3), from Lake Baikal, separated from *P. annellata* [= *hispida*] ; the animal and its habits are fully described, and the skull of the adult and young figured.

Cystophora cristata. A second British specimen killed at St. Andrews, Fifeshire, on 22nd July, 1872 : R. Walker, Scot. Nat. ii. pp. 1–8. A third, an adult male, taken in the Mersey, February, 1873 : T. J. Moore, P. Liverp. Soc. xxvii. p. lxiii. ; also T. S. Cobbold, P. Z. S. 1873, p. 741.

Halichoerus gryphus. Professor Turner describes the skull of a half-grown animal in which the teeth, except the canines, were absent, owing to non-development or to premature atrophy. J. Anat. Phys. vii. pp. 273–274.

Rosmarus arcticus. The Walrus of Behring Sea is regarded as specifically distinct from that of Greenland, but no characters are given. H. W. Elliott, Report Prybilov Group (*suprà* p. 2).

OTARIIDÆ. J. E. Gray (P. Z. S. 1873, p. 779) divides the Sea-bears into two groups :—1. Upper grinders, 6·6 ; *Phascoarctus*, *Callirhinus*, *Arctocephalus*, *Eumetopias*, *Gypsophoca*, *Arctophoca*. 2. Upper grinders, 5·5 ; *Zalophus*, *Neophoca*.

Otaria hookeri is from the Auckland Islands, to which it is perhaps confined; the skull of the adult male is figured for the first time. J. W. Clark, P. Z. S. 1873, pp. 750-760.

Callorhinus ursinus. A very full account of its habits and of the manner of hunting it is given, illustrated by many plates, by Elliott, *l. c.*

Arctocephalus eulophus, sp. n., Scott, Mammalia Recent and Extinct, p. 19. The "Top-knot Seal" of Patagonia is described as new, without the author having seen a specimen.

Eumetopias stelleri, is said by natives to have been formerly more abundant on the Prybilov Islands, but to have been intentionally driven away to make room for the next species. Elliott, *l. c.*

E. elongatus, sp. n., Gray, P. Z. S. 1873, p. 776, Japan.

ZEUGLODONTIA.

Pontobasileus, g. n. (foss.), Leidy, is referred to this order. The type is *P. tuberculatus*, sp. n., probably from the Eocene or Miocene of one of the Atlantic States. Rep. U. S. Geol. Surv. i. p. 337, pl. 37.

CETACEA.

T. GILL replies to some criticisms by Professor Brandt (*cf.* Zool. Rec. ix. p. 16) on his views as to the genetic relations of the Cetaceans. Am. Nat. vii. pp. 19-29.

GRAY, J. E. On the Geographical Distribution, etc., of Whales and Dolphins (*Cete*). Ann. N. H. (4) xi. pp. 98-104.

——. On Dolphins from the Cape of Good Hope. *Op. cit.* xii. pp. 427 & 428.

——. Catalogue of the Whales and Dolphins inhabiting or incidentally visiting the seas surrounding the British Islands. Zool. (s.s.) 1873, pp. 3357-3364, 3421-3433.

HECTOR, J. On the Whales and Dolphins of the New Zealand Seas. Tr. N. Z. Inst. v. pp. 154-170, pls. 1-6.

Also reprinted, with remarks by J. E. Gray, Ann. N. H. (4) xi. pp. 104-112. Includes eighteen species, of which two are new (*infra*).

SHALER, N. S. Notes on the Right and Sperm Whales. Am. Nat. vii. pp. 1-4.

On the habits of *Balæna mysticetus* and *Physeter macrocephalus*, principally from the observations of Captain J. Pease.

C. F. LÜTKEN describes the various species of *Cyamus* which infest the skin of different Cetaceans. Dan. Selsk. Skr. x. pp. 231-283, pl. 1-4.

BALÆNIDÆ. J. E. Gray (P. Z. S. 1873, p. 142) divides the Right-Whales into two very distinct groups, the first with a broad scapula and

distinct acromion (*Balæna*, *Macleayi*, etc.) ; the second with an elongated scapula, and merely a ridge in place of the acromion (*Caperea*.)

Balæna etrusca, Capellini. The author gives further particulars of this fossil species (cf. Atti Soc. Ital. 1872), and figures the cervical vertebrae and part of a jaw. He also remarks on the cervical vertebrae of recent *Balæna*. Mem. Acc. Bologn. (3), iii. pp. 313-331, 3 pls.

Halibalæna, g. n., Gray, P. Z. S. 1873, p. 140, characterized by the form of the cervical vertebrae (the only part known) ; type, *Balæna britannica* (Gray).

Caperea antipodarum, Gray, = *Neobalæna marginata*, Gray. J. Hector, Ann. N. H. (4), xi. pp. 104 & 108. This identification is accepted by Dr. Gray, *ibid*.

Macleayi *australiensis*. A skeleton from New Zealand, described by J. E. Gray, P. Z. S. 1873, pp. 129-145. Note on same, Ann. N. H. (4), xi. pp. 75 & 76.

Balenoptera davidsoni, sp. n., C. M. Scammon, P. Cal. Ac. 1872, from West Coast of N. America. [Not seen by the Recorder ; cf. Ann. N. H. (4), x. p. 473.]

Physeter macrocephalus. On the sternum : W. Turner, J. Anat. Phys. vi. 1872, pp. 379 & 380.

Kogia macleayi. Note on two skeletons from Australia : J. E. Gray, Ann. N. H. (4) xii. pp. 184 & 185.

Hyperoodon bidens. Struthers describes rudimentary finger-muscles in this species : J. Anat. Phys. viii. pp. 114-119.

Dolichodon layardi. Hector figures the jaws and teeth : Tr. N. Z. Inst. v. pl. iii.

Epidon chathamensis, sp. n., *id. l. c.* p. 164, pls. 4 & 5, New Zealand. This may prove identical with *E. australis*, Burm. Cf. Ann. N. H. (4) xi. pp. 105 & 106.

Mesoplodon knoxi, sp. n., *id. ibid.*, ear-bone figured, pl. 6, New Zealand.

Berardius. Notes on this genus and its allies : J. E. Gray, Ann. N. H. (4), xi. pp. 17-19.

Monodon monoceros. Note on a bidental skull : W. Turner, J. Anat. Phys. viii. pp. 133 & 134. The *rete mirabile* described : H. S. Wilson, Cambr. Univ. Reporter, 3rd June, 1873. P. Gervais has noticed the additional teeth in the young, already observed by Turner (cf. Zool. Rec. ix. p. 17) : J. Zool. ii. pp. 498-500.

Delphinus heavisidii, Gra = *Orca capensis*, Gray, = *Delphinus hastatus* F. Cuv., and the intermediate name is retained ; a coloured figure identified with this species is reproduced. Van Beneden, Bull. Ac. Belg. (2), xxxvi. pp. 32-40.

Orca gladiator. On a case of dental disease in a Grampus : C. S. Tomes, Tr. Odont. Soc. v. p. 36.

Grampus stearnsi, sp. n., W. H. Dale, P. Cal. Ac. 1873, p. 13, California.

Globicephalus melas. Detailed account of the anatomy of the soft parts, founded on the dissection of a female taken in the Firth of Forth in 1867 [Cf. Zool. Rec. iv. p. 40] : Murie, Tr. Z. S. viii. pp. 235-301, pls. 30-38.

Phocæna communis. Individual with small horny bodies attached to the gum between each tooth described : R. Walker, Scot. Nat. ii. pp. 145–149, pl. 2.

“Om *Phocæna linnæi* eller *Delphinus phocæna*, Linné ;” several individuals are described, and a female and fœtus figured by A. W. Malm, G. Göteb. Handl. 1873, pp. 43–60.

DELPHINIDÆ. Du Bus (J. Zool. ii. pp. 97–112) describes the following fossil Dolphins from the Antwerp Crag :—*Eurhinodelphis longirostris* and *ambiguus*, *Priscodelphinus productus*, *robustus*, *validus*, *crassus*, *teres*, *declivus*, *morckhoviensis*, *elegans*, *pulvinatus* and *cristatus*, *Platydelphis canaliculatus*, *Chamsodelphis scaldensis*, *Phocænopsis scheynensis* and *cornutus*, *Eudelphis mortezelensis*, *Hoplocetus borgerhoutensis*, *Palæodelphis grandis*, *minutus*, *annulatus*, *coronatus*, *arcuatus*, *fusiformis*, *zonatus* and *pachyodon*, and *Scaldicetus antwerpiensis*.

Delphinus fosteri and *Electra clangula* figured : J. Hector, Tr. N. Z. Inst. v. pls. 2 & 3.

D. bairdi, sp. n. W. H. Dale, P. Cal. Ac. 1873, p. 12, California.

Tursiopes gilli, sp. n., *id. l. c.* p. 13, California.

Lagenorhynchus. Van Beneden, Bull. Ac. Belg. (2), xxxvi. pp. 32–40, publishes a coloured figure of a Dolphin from the Cape, which he refers to this genus, and provisionally calls “le *Lagenorhynchus* de Castelnau.”

SIRENIA.

T. GILL discusses the affinities of this order. He believes that the Sirenians and Cetaceans probably sprung from a common stock, and are to be regarded as the extreme specialization in diverse directions from “a generalized gyrencephalic type.” P. Ac. Philad. 1873, p. 262, *et seq.* [The Recorder has only seen a portion of this memoir.]

Manatus inornatus, sp. n. (foss.), J. Leidy, Rep. U. S. Geol. Surv. i. p. 336, pl. 37, from phosphate beds of S. Carolina.

PROBOSCIDEA.

Elephas indicus. M. Watson continues his notes on its anatomy (*cf.* Zool. Rec. ix. p. 14). Part III. treats of the head and throat. J. Anat. Phys. viii. pp. 85–96.

Elephas africanus. Post-pliocene fossils found near Rome are identified with this species. F. Anca, Atti Acc. Rom. xxv. pp. 353–356.

“TINOCERIDÆ,” or “EOBASILEIDÆ.” During 1873 much has been added to our knowledge of this newly discovered group from the Eocene of the Western American States, principally by the labours of Professors Cope, Marsh, and Leidy (the two first mentioned authors having also engaged in controversy as to the claims of their respective papers to priority).

Professor MARSH regards these animals as forming a new order, *Dinocerata*, presenting perissodactyle, artiodactyle, and proboscidean

characters, of which the last were the least developed. The dental formula was inc. $\frac{2}{3}$ can. $\frac{1}{4}$ mol. $\frac{6}{6} \times 2 = 34$. Several points of distinction from *Proboscidea* are pointed out, as the absence of upper incisors, the presence of canines and of three pairs of horns, the elongated nasals, the articulation of the astragalus with both the navicular and cuboid, etc. etc. There was probably no true proboscis. He recognizes *Tinoceras*, Marsh, *Uintatherium*, Leidy, *Dinoceras*, Marsh, and perhaps *Megacerops*, Leidy, as distinct genera. Am. J. Sc. (3), v. pp. 117-122 (2 plates), 300 & 301. Am. Nat. vii. pp. 146-153 (2 pl.), 217 & 218, 306-308 (cf. Gervais, J. Zool. ii. pp. 160-168, and Garrod, J. Anat. Phys. vii. pp. 267-270).

E. D. COPE retains the group among the Proboscideans, which he divides into—I. PROBOSCIDEA VERA; II. EOBASILEIDÆ (= *Dinocerata*), with the genera *Loxolophodon*, Cope, *Eobasileus*, Cope, *Uintatherium*, Leidy, and *Megaceratops*, Leidy; III. PANTODONTA, with *Bathmodon*, Cope, and *Metalophodon*, Cope. The latter divisions certainly approach the Perissodactyles in some points, but more stress is laid on those in which they agree with *Proboscidea*. P. Am. Phil. Soc. 1872; Am. Nat. vii. pp. 157-160, 290-299 (2 plates). [The first named paper has not been seen by the Recorder, but is translated in J. Zool. ii. pp. 168-184, pl. 7.]

J. LEIDY regards all the animals named above as probably belonging to one genus, for which he retains the name of *Uintatherium*, Leidy, 1st August, 1872, as "the first characteristic generic name." He figures *U. robustum* (= *Dinoceras mirabilis*, Marsh). Rep. U.S. Geol. Surv. i. pp. 93, 96, 331, pl. 25-27.

Dinoceras lucaris, sp. n. (foss.), O. C. Marsh, Am. J. Sc. (3) v. p. 408, from the Eocene of Wyoming.

Eobasileus galeatus, sp. n. (foss.), E. D. Cope, Palæont. Bull. No. 17, from the Eocene of the Mauvais Terres.

Bathmodon laticeps, sp. n. (foss.), *id.* P. Am. Phil. Soc. 1873, from the Eocene of Utah. (Cf. J. Zool. ii. p. 183).

UNGULATA.

PERISSODACTYLA.

Brontotherium, g. n. (foss.), O. C. Marsh, Am. J. Sc. (3) v. p. 486; allied to *Titanotherium*, but with only three lower premolars, and interesting as showing affinities with the *Tinocerida*. Type, *B. gigas*, sp. n. from the Miocene of Colorado.

Rhinoceros. A popular account of the living species, with woodcuts: F. C. Noll, Zool. Gart. 1873, pp. 47-55, 81-87, 138-144.

R. unicornis. Note on one in the Moscow Zoological Gardens: S. USSUFF, Preroda, i. pp. 362-379.

R. annectens and *oregonensis*, spp. nn. (foss.), Marsh, Am. J. Sc. (3) v. pp. 409-410, from the Miocene and Pliocene of Oregon.

Ceratorhinus sumatrensis. The anatomy of the soft parts of an adult individual which died in the London Zoological Gardens, confirms the generic distinction of this from the Indian Rhinoceros: A. H. GARROD,

P. Z. S. 1873, pp. 92-104. A young one, born in London, soon died; the period of gestation is probably little over eleven months: A. D. Bartlett, *op. cit.* pp. 104-106.

C. niger. J. E. Gray proposes this name for the Malaccan Rhinoceros above mentioned, which he regards as a new species and distinct from *C. sumatrensis*. He figures the skull: Ann. N. H. (4) xi. pp. 357-359; xii. pp. 252 & 253; Hand-list, p. 43, pl. 19.

C. blythi is a provisional name proposed for a Rhinoceros from Tenasserim, described as a new species, from photographs of two skulls in the Calcutta Museum, figured by Blyth (J. A. S. B. xxxi. t. iii.) as *R. sumatranus*. J. E. Gray, Ann. N. H. (4) xi. pp. 360 & 361.

Cadurcotherium, g. n. (foss.), Gervais, J. Zool. ii. p. 362. Type, *Rhinoceros cayluxi*, Gervais.

Colonaceras, g. n. (foss.), Marsh, Ann. J. S. (3), v. p. 407, allied to *Hyrachyus* and *Helaletes*, but with a pair of dermal horns on the nasal bones. Type, *C. agrestis*, sp. n., from the Eocene of Wyoming.

Anchitherium agreste and *A.* (?) *australe*, spp. nn. (foss.), Leidy, Rep. U. S. Geol. Surv. i. pp. 250 & 251, pls. 7, 20, from Tertiaries of Montana and Texas.

Tapirus. A Tapir from Paraguay differs in some respects from *T. terrestris* of Brazil, and may prove distinct: P. S. Sclater, P. Z. S. 1873, pp. 193 & 194.

Tapirus bairdi. P. Gervais figures its skull, and compares it with those of the other known species. J. Zool. ii. pp. 22-26, pl. 1.

Tillotherium, g. n. (foss.), Marsh, Am. J. Sc. (3), v. p. 485, perhaps allied to *Anchippodus*. Type, *T. hyracoides*, sp. n. from the Miocene of Wyoming.

Anchitherium aurelianense. On its skeleton and the palæontological history of the Horse: W. Kowalewski, Mém. Pétersb. (7) xx. No. 5, 3 pls. [not seen by the Recorder; cf. J. Zool. iii. p. 51].

Equus. Sanson considers there is not sufficient evidence to identify all the quaternary equine remains with *E. caballus*. C. R. lxxvi. pp. 55-57.

ARTIODACTYLA.

SUIDÆ. J. E. Gray, Ann. N. H. (4) xi. pp. 431-439, divides the group *Setigera* into two sections, *Homodontina* and *Eurodontina*. Of these the first is again sub-divided into *Pseudoperissodactyla* (*Dicotylidæ*), and *Artiodactyla* (*Suidæ*); the latter contains only one family, *Phacochoeridæ*.

Sus mystaceus, sp. n. *id. l. c.* p. 436, also Hand-list, p. 62, pls. 25 & 26, said to be from Japan.

Plesiomærix, g. n. (foss.), Gervais, J. Zool. ii. p. 369. Type, *P. cadurcensis*, sp. n., from phosphate-chalk of Tarn-et-Garonne.

Anthracootherium. W. Kowalewski commences a monograph of this genus and its allies: Palæontogr. xxii. [not seen by the Recorder; cf. J. Zool. iii. p. 51].

Elotherium imperator, sp. n. (foss.), Leidy, from Miocene of Oregon (? = *E. superbum*), Rep. U. S. Geol. Surv. i. p. 217, pls. 2, 7; *E. crassum*, sp. n. (foss.), Marsh, Am. J. Sc. (3), v. p. 487, from Miocene of Colorado.

Archæonodon, g. n. (foss.), E. Cope, Palæont. Bull. No. 17, allied to *Elothierium*. Type, *A. insolens*, sp. n. from the Bridger Eocene.

Hyopsodus minusculus, sp. n. (foss.), Leidy, Rep. U. S. Geol. Surv. i. p. 81, pl. 27, from Eocene of Wyoming.

Dicotyles pristinus, sp. n. (foss.), *id. l. c.* p. 216, pl. 7, from the Miocene of Oregon.

Oreodon occidentalis, sp. n. (foss.) Marsh, Am. J. Sc. (3), v. p. 409, from the Miocene of Oregon.

CERVIDÆ. Lord Walsingham writes on the distribution of Deer and other Ruminants in Oregon and Northern California. P. Z. S. 1873, pp. 561-563.

Cervus virginianus and *C. macrotis*. On "Spike-horns" (*cf.* Zool. Rec. viii. p. 17) : E. Cope, P. Ac. Philad. 1872, p. 124 ; Am. Nat. vii. p. 169.

Cervus kopschi, sp. n., Swinhoe, P. Z. S. 1873, p. 574, from the mountains south of the Yangtse ; its antlers are unknown, but the skull resembles that of *Hydropotes*.

Eucervus pusilla[-*lus*], sp. n., J. E. Gray, Hand-list, p. 157, N. America.

Cervus (*Coassus* ?) *whitelyi*, sp. n., *id.*, Ann. N. H. (4) xii. p. 163 ; Hand-list, p. 162, pl. 32, Peru. Being described from a skull without horns, this species cannot yet be referred to any of the modern genera.

Huamela leucotis, Gray, = *Cervus chilensis*, Gay and Gervais ; *Xenolophus anomalocerus*, Gray, = *C. antisiansis*, D'Orbigny : P. L. Sclater, Ann. N. H. (4) xi. pp. 213 & 214. The latter identification confirmed by Sir V. Brooke, P. Z. S. 1873, p. 518. Dr. Gray publishes further notes on these species, coming finally to the conclusion that *X. anomalocerus* = *C. chilensis* : Ann. N. H. (4) xi. pp. 214-220, 308-310, and xi. pp. 161-2 ; Hand-list, p. 159.

Blastocerus sylvestris, sp. n., Gray, Ann. N. H. (4) xii. p. 427 ; Hand-list, p. 158, pl. 49, Brazil.

Hydropotes inermis. Its tusks not muscularly movable : R. Swinhoe, P. Z. S. 1873, pp. 572-576.

H. coreanus, sp. n., A. David, J. N. China Soc. 1873, p. 233, Corea. Apparently distinct from *H. inermis*, but not described.

Amphimoschus ponteleviensis, sp. n. (foss.) Bourgeois, J. Zool. ii. pp. 235 & 236, pl. 10. From the Miocene of Loir-et-Cher.

Bos. J. A. Smith reviews "The Ancient Cattle of Scotland." He gives details of the discovery of remains of *B. longifrons* and *B. primigenius*, and of the history of the so-called "Wild Cattle" kept in parks. These, as well as our domestic Oxen, he believes to be probably derived from *B. longifrons*. P. Antiq. Scot. ix. pp. 587-674, pl. 41.

Bos taurus. H. Gripat describes an acephalous monster calf : J. Zool. ii. pp. 4-13.

Bubalus. *Bos brachycerus*, Gray, *Bubalus reclinis* and *planicerus*, Blyth, = *Bos pumilus*, Turton, with which the small Buffalo of Eastern Africa, *Bubalus centralis*, Gray, will probably also prove identical ; the head of this last is figured from a living animal in the Berlin Zoological Gardens, pl. 42 ; Sir V. Brooke, P. Z. S. 1873, pp. 474-484. J. E. Gray disputes the correctness of these conclusions ; Ann. N. H. (4) xii. pp. 499-500. [*Cf.* Brooke, *ib.* xiii. pp. 159-160.]

Ovis aries. Note on the varieties termed the "Ancon or Otter-sheep." C. Caverno, Am. Nat. vii. pp. 742 & 743.

Ovis karelini (p. 86, pls. 1, 5), *O. heinsi* (p. 87, pl. 5), and *O. nigrimontana* (p. 87, pl. 5), spp. nn., N. A. Severtzoff, Nachr. Ges. Mosc. viii. pt. 2, Turkestan. *O. argali* and *O. polii* are also figured, *ibid.* pls. 2-5. *O. karelini* and *O. polii* figured, Preroda, i. pp. 144 & 245.

Antelope tartarica. P. Gervais (J. Zool. ii. pp. 229-231), figures an engraved bone (of the "reindeer period") from a cave in the Haute Garonne, which he considers to represent the head of a Saiga, and he doubtfully refers a bone from the same cavern to this species.

Alcelaphus tora, sp. n., Gray, Ann. N. H. (4) xii. p. 341, Abyssinia: skull figured, Hand-list, pl. 41. Head figured: P. L. Selater, P. Z. S. 1873, p. 762.

Cephalopus aureus & *leucogaster*, spp. nn., Gray, Ann. N. H. (4) xii. pp. 42 & 44, Gaboon, W. Africa. Skull of former figured: Hand-list, pl. 31.

Gazella. Sir V. Brooke reviews this genus, with characters and synonyms of 19 species. A table illustrates their distribution and supposed genetic descent, traced back to the Miocene *G. brevicornis*. *G. melanura*, Heuglin, is figured, pl. 46; P. Z. S. 1873, pp. 535-554.

Gazella subgutturosa and *G. bennetti*. Notes on their distribution: W. T. Blanford, P. Z. S. 1873, pp. 313-317, map.

G. fuscifrons, sp. n., *id. l.c.* p. 317. From the Sistan desert. Its specific value confirmed; Sir V. Brooke, *op. cit.* p. 545.

Auchenia hesterna, sp. n. (foss.), Leidy, Rep. U. S. Surv. i. p. 255, pl. 37. From quaternary of California.

Camelus dromedarius. Prof. Panceri makes observations on the arrangement and development of the salivary glands. Ann. Mus. Genov. iv. pp. 269-274, pl. 4.

HYRACOIDEA.

J. E. GRAY (Hand-list, pls. 10-13), reviews the species, and figures skulls of *Hyrax irrorata*, *H. ferrugineus*, *Dendrohyrax blainvillii*, *dorsalis*, and *arboreus*, and *Euhyrax bocagii*.

Hyrax rufescens, sp. n., *id. l.c.* p. 41, North Africa.

Dendrohyrax arboreus. Its cranial characters; *id.* Ann. N. H. (4) xi. pp. 154 & 155.

GLIRES.

Sciurus hudsonicus is stated to have changed lately in its habits, having begun to capture birds and suck their blood. T. G. Gentry, P. Ac. Philad. 1873, pp. 101 & 102.

Macroxus aubinnii, sp. n., Gray, Ann. N. H. (4) xii. p. 65, Fantee.

Macroxus annulatus. A variety described; *id. l.c.* p. 265.

Sciurus sharpii, sp. n., *id. ibid.*, Gaboon.

Pteromys volucella. On its habits in confinement: G. H. Perkins, Am. Nat. vii. pp. 132-139.

Pteromys tephromelas, pl. 37, Penang; *phaemelas*, Borneo: A. Günther, P. Z. S. 1873, p. 413; spp. nn.

Sciuropterus pulverulentus, sp. n., *id. ibid.* pl. 38, Penang and Malacca.

Myoxus nitela recorded as destroying birds. Von Freyburg, Zool. Gart. 1873, pp. 415-418.

Mysops fraternus, sp. n. (foss.) Leidy, Rep. U. S. Geol. Surv. i. p. 112, pl. 27, from Eocene of Wyoming.

Cricetus frumentarius inhabited Italy in post-tertiary times. C. J. Forsyth-Major, Atti Soc. Ital. xv. f. 2.

Cricetus murinus, sp. n., N. A. Severtzoff, Nachr. Ges. Mosc. viii. pl. 2, p. 82, Turkestan.

Mus musculus. Note on a fungus-parasite on a mouse caught in a hospital, perhaps infected by the patients: J. Leidy, P. Ac. Philad. 1872, p. 260.

"*Mus tolmak?* sp. n. ? (= *M. wagneri*, *B. major?*)." N. A. Severtzoff, *l.c.* pp. 61 & 82, Turkestan.

Neomys panamensis, sp. n., J. E. Gray, Ann. N. H. (4) xii. p. 417, Panama.

Heliomys jeudei, sp. n., *id. l.c.* p. 418, habitat unknown.

Uromys arvensis, sp. n., *id. ibid.*, Aru and Celebes.

Hesperomys ratticeps, p. 36, *dorsalis*, p. 42, *subterraneus*, p. 44, S. Brazil: P. Hensel, Abh. Ak. Berl. 1872, spp. nn.

Phyllomys dasythrix, sp. n., *id. l.c.* p. 49, S. Brazil.

Arvicola gulielmi, Sanford, = *M. torquatus*, of which the quaternary and recent ranges are discussed. C. J. Forsyth-Major, Atti Soc. Ital. xv. 1872, pp. 111-129.

Myodes schisticolor, Lilljeb. On its distinctness from *M. lemmus*, and its habits: W. Leche, Zool. Gart. 1873, pp. 64-66.

Arvicola lebruni. Notes on its habits: Z. Gerbe, R. Z. 1873, pp. 116-121.

Meriones collium, sp. n., Severtzoff: Nachr. Ges. Mosc. viii. pt. 2, p. 83, Turkestan.

"*Meriones montanus*, sp. n.," *id. l.c.* p. 62 (in list of species, but no description given), Turkestan.

Myospalax dybowskii, sp. n., J. D. Cherskey, Bull. Mosc. 1873, pp. 430-447, Irkutsk.

Aulacodus swindernianus. Note on its visceral anatomy; its position is perhaps near *Lagostomus*: A. H. Garrod, P. Z. S. 1873, pp. 786-789.

Cavia aqarea is distinguished from *C. cobaya*: R. Hensel, Abh. Ak. Berl. 1872, pp. 59 & 60.

Dinomys, g. n., W. Peters, Festschrift Nat. Fr. 1873, pp. 227-234, 4 plates. "Labrum fissum, nares elongatæ S-formes, oculi mediocres, auriculæ breves; vellus duriusculum; cauda mediocris villosa; pedes omnes tetradactyli plantigradi, ungues falculæ unguæformes. Dentes incisores lati, plani; molares utrinque quatuor, lamellosi. Foramina suborbitalia magna, triangularia, optica coalita. Claviculæ imperfectæ, manubrium sterni latum." Type, *D. branickii*, sp. n., from the mountains of Brazil. This very remarkable animal, of about the size of the Paca, differs so much from the recognized sub-families of the *Hystrioidæ* that the author regards it as the type of a new group, *Dinomyses*, having affinities with the

Chinchillina, *Echinomyes*, *Dasyproctina*, and *Caviina*, and showing a closer relationship between these sub-families. He figures and fully describes the external and osteological characters.

Lagomys rutilus, sp. n., Severtzoff, Nachr. Ges. Mosc. viii. pt. 2, p. 57, Turkestan.

Lagomys corsicanus. Notes on its remains, by Lortet, Arch. Mus. Lyons, i. pl. 8.

Lepus lehmanni, sp. n., Severtzoff, *l.c.* p. 83, Turkestan.

EDENTATA.

J. E. GRAY (Hand-list, pls. 1-9) reviews the species of this order (in which he includes the *Monotremata*). Besides the new species mentioned below, he figures skulls of *Tatusia peba*, *Praopus kappleri*, *Chaetophractus villosus*, *C. vellerosus*, and *Dasypus sexcinctus*.

A. MACALISTER, in his monograph of *Chlamydochorus* (*infra*), remarks on the myology of other genera of this order.

Prof. TURNER has published his memoir "On the Placentation of the Sloths." He figures and minutely describes the uterus and placenta of *Cholopus hoffmanni*, and finds the latter to be discoid and truly deciduate, showing a greater resemblance to that of the human species and of Monkeys than to any other form examined. In the *Tardigrada*, *Dasypodidae*, and *Ocyteropodidae*, there is evidence to prove that the placenta is also deciduate, but that of *Manis* has been shown to be diffuse and non-deciduate. The value of placentation must be reconsidered, or the Scaly Ant-eaters cannot be retained in the same order with the Sloths. It is suggested as possible that genealogical relations may exist between the latter and the Lemurs. Tr. Soc. Edin. xxvii. pp. 71-104, pls. 3-6 (abstract, J. Anat. Phys. vii. pp. 302 & 303).

P. GERVAIS publishes a summary of a memoir on the Tardigrade Edentates which he has presented to the Académie des Sciences. Of the fossil American forms, he recognizes eight genera, *Megatherium*, *Cælodon*, *Lestodon*, *Megalonyx*, *Myiodon*, *Scelidotherium*, *Sphenodon*, and two others which are not named. J. Zool. ii. pp. 463-469.

BRADYPODIDÆ. W. H. Flower shows that in this family the trapezium is represented by the enlarged head of the first metacarpal, and not by the prolongation of the scaphoid, as has usually been stated. J. Anat. Phys. vii. pp. 255 & 256.

Cholopus didactylus. On its habits in confinement: M. Schmidt, Zool. Gart. 1873, pp. 126-130, 177-181.

Phatagin, g. n., J. E. Gray, Hand-list, p. 7; separated from *Manis*. Type, *M. tricuspis*, Gr.

Pangolin, g. n. [*Pangolinus*, Rafin., *Mammalia*], J. E. Gray. Separated from *Pholidotus* (Gray), the type being *Ph. dalmanni*, *ibid.* p. 8. A new species from Formosa is indicated but not named; *id. l.c.* p. 9.

Tatusia platycercus, Hensel, Abh. Ak. Berl. 1872, p. 105, S. Brazil; *T. mexicana*, p. 14, pl. 2, Mexico, *granadiana*, p. 14, pl. 2, Concordia, *leptorhynchus*, p. 15, pl. 1, Guatemala; *brevirostris*, p. 15, pl. 3, Brazil and Bolivia, *leptocephala*, p. 16, pl. 5, Brazil, and *boliviensis*, p. 16, pl. 3, Bolivia, J. E. Gray, Hand-list: sp. nn.

Xenurus latirostris, sp. n., *id. ibid.* p. 22, pl. 7, figs. 1 & 2, Brazil.

Ziphila, g. n., *id. ibid.*, pl. 7, figs. 3 & 4, separated from *Xenurus*. Type, *Z. lugubris*, sp. n., Demerara.

Cheloniscus, g. n. *id. l.c.* p. 24, pl. 9. Type, *Tolypeutes conurus*, Gray.

Chlamydochorus truncatus. A. Macalister describes its myology and visceral anatomy. Its natural position is among the *Dasypodidæ*, very close to *Tatusia*. Tr. R. Irish Ac. xxv. pp. 219-278, pls. 13 & 14.

Glyptodontidæ. Dr. Burmeister continues his monograph of the species in the Museum of Buenos Aires, figuring remains of *Glyptodon clavipes*, *levis*, and *asper*, and *Panochthus giganteus*. An. Mus. B. Aires, ii. pt. 5, pls. 29-34.

DIDELPHIA.

MARSUPIALIA.

R. OWEN. "On the Osteology of the Marsupiali," part iii.

Tr. Z. S. viii. pp. 345-360, pls. 50-57.

Illustrates and compares the skulls and teeth of *Phascolumys platyrhinus*, *vombatus*, and *latifrons*, and continues the author's papers "On the Fossil Mammals of Australia" (*cf.* Zool. Rec. ix. p. 18); in part vii. the cranial and dental characters of *Phascolumys medias*, *magnus*, and *gigas* are compared with those of the recent species. Phil. Tr. 1872, pp. 241-258, pls. 32-40.

Microdelphis sorex, sp. n., Hensel, Abh. Ak. Berl. 1872, p. 122, S. Brazil.

AVES

BY

R. BOWDLER SHARPE, F.L.S., F.Z.S., &c.

THE year 1873 was more remarkable for steady progress in Ornithological science than for any striking discoveries, but the establishment of a new sub-class of fossil Toothed Birds, by Prof. Marsh, cannot be passed over in silence; and W. Marshall's researches into the arrested development of the terminal caudal vertebræ of birds, which result in a further separation of *Archæopteryx* from the *Reptilia*, call for especial notice. Everywhere the votaries of Ornithology are active, and the new Indian Journal, mentioned in our preface last year, seems, under the management of Mr. Hume, to have entered on a prosperous career. In this country continued attention is being given to the anatomy of birds, the papers of Messrs. Parker and Garrod and Dr. Murie appearing to inaugurate a new era for this branch of the subject.

BIBLIOGRAPHY AND CRITICISM.

DROSTE, F., & BLASIUS, W. Bericht über einige Publicationen des Jahres 1872, welche die europäische Ornithologie berühren. Ber. xx. Vers. deutsch. orn. Ges. pp. 17-27.

A useful summary of the principal papers referring to European Ornithology in 1872.

FINSCH, O. Literarische Berichte. J. f. O. 1873, pp. 18-26.

Reviews recent Ornithological works.

——. [See SCLATER, P. L.]

MARTIN, P. L. [See REICHENOW, A.]

PELZELN, A. VON. Bericht über die Leistungen in der Naturgeschichte der Vögel während des Jahres 1872. Arch. f. Nat. 1873 (2), pp. 1-80.

A very complete index to Ornithological literature for 1872, worthy to follow Dr. Hartlaub's earlier "Berichte."

REICHENOW, A. Ph. L. Martin, Die Praxis der Naturgeschichte. J. f. O. 1873, pp. 26-29.

Reviews Herr Martin's book, which has not been seen by the Recorder.

SCLATER, P. L. & FINSCH, O. Index to the Ornithological Literature of 1872. Ibis, 1873, pp. 431-493.

Of the same character as the report mentioned last year (Zool. Rec. ix. p. 19), but exceedingly well compiled.

WATERHOUSE, F. H. List of periodicals in which Ornithological papers have appeared in 1872. *Tom. cit.* pp. 493-496.

THE GENERAL SUBJECT.

ALLEN, J. A. Geographical Variation in North American Birds. P. Bost. Soc. 1872, pp. 212-219. [See "NE-ARTIC REGION."]

ALTUM, B. Forstzoologie, II. Vögel. Berlin: 1873. 8vo, pp. 1-647.

The author has long been known as a good observer, and here presents us with a handbook of field Ornithology. The characters of the species are given, and those of the European *Larida* illustrated by figures of the wings.

BREHM, A. E. Bird-life. Translated from the German by H. M. Labouchere and W. Jesse. London: 1873. 8vo. Parts vii. & viii.

In continuation of the work already noticed (Zool. Rec. ix. p. 20). The present portion deals entirely with the life-history of many familiar Birds.

——. Gefangene Vögel. Ein Hand- und Lehr-buch für Liebhaber und Pfleger einheimischer und fremder Käfig-vögel. 8vo, 1872-73.

Only known to the Recorder from reviews (*Cf.* Bolle, J. f. O. 1873, pp. 183-186).

DEVIC, M. Sur quelques passages d'un écrivain Arabe du x^e siècle, relatifs aux oiseaux gigantesques de l'Afrique sud-orientale. C. R. lxxv. pp. 1782-1784.

The gigantic birds referred to are from Zanzibar.

GARROD, A. H. On certain muscles in the thigh of Birds, and on their value in classification. P. Z. S. 1873, pp. 626-645. [See "ANATOMY."]

GERBE, Z. Observations sur quelques oiseaux considérés comme auxiliaires de l'homme. R. Z. 1873, pp. 325-331.

HALLER, G. Untersuchungen über die Nahrung einheimischen Vögel. Zool. Gart. 1873, pp. 377-387.

Gives a tabular account of the food of different Birds at various seasons of the year.

KEULEMANS, J. G. Onze Vogels in huis en tuin. Leiden: roy. 8vo, pls. 70.

As regards illustrations, this is by far the best popular Bird-book seen by the Recorder.

KOCH, G. VON. Die Stellungen der Vögel. Heidelberg: 1872. Heft. ii.

In continuation of the part before noticed (Zool. Rec. viii. p. 29) which the Recorder had not then seen. In the two parts 250 outline sketches of Birds are given. They are very fairly executed, and may be of use to taxidermists.

MARSH, O. C. On a new sub-class of Fossil Birds (*Odontornithes*). Am. J. Sc. (3) v. pp. 161-162.

NEWTON, A. Note on the "Géant" of Leguat. P. Z. S. 1873, pp. 194-195.

PELZELN, A. On the Birds in the Imperial Collection of Vienna, obtained from the Leverian Museum. Ibis, 1873, pp. 14-54, 105-124, pl. 1.

One of the most important papers of the year, as it identifies and traces the history of many obscure types. Three species (*Rallida*, *Procellariida*, *Pelecanida*) are described as new, and one (*Psittacida*) is figured.

PERRIS, É. Les Oiseaux et les Insectes. Mém. Liège (2) iii. pp. 673-730. [Zool. Rec. ix. p. 227.]

A well written discussion on the utility of the Birds as a means of keeping down insects, the author writing from an entomologist's point of view, and considering that their utility has been exaggerated.

RIDGWAY, R. On the relation between colour and geographical distribution in Birds as exhibited in Melanism and Hyperchromism. Am. J. Sci. 1872, p. 454; 1873, pp. 39-44.

The author argues on Mr. Allen's views (Zool. Rec. viii. p. 24) with regard to this subject. A criticism on the paper by Dr. Coues is given in the American Naturalist (1873, pp. 415-418), and replied to by Mr. Ridgway (*op. cit.* pp. 548-555). [Cf. also H. Hartsborne, *op. cit.* pp. 746, 747.]

RUSS, C. Reisebericht. J. f. O. 1873, pp. 31-35.

An account of Birds observed in Continental Zoological Gardens.

SCHLEGEL, H. Muséum d'Histoire Naturelle des Pays Bas. Livr. 10. Leide: 1873. 8vo.

The author has resumed his useful catalogue of the Leiden collection.

the present part being devoted to the *Struthiones*, *Columbæ*, and *Rapaces*. (See *infra*.)

SOUZA, J. A. DE. Museu Nacional de Lisboa. Secção Zoologica. Catalogo das Collecções Ornithologicas. *Columbæ*, *Gallinæ*. Lisboa: 1873. 8vo, pp. 5-49.

This is the second part of the catalogue of the Ornithological collections in the Lisbon Museum. (*Cf.* Zool. Rec. vi. p. 59.)

TRIPPE, T. M. The irregular migrations of Birds. *Am. Nat.* 1873, pp. 389-394.

Very interesting; the author showing that many Birds formerly common in certain localities in North America have disappeared, while others are extending their range.

PALÆARCTIC REGION.

ALLEON, M. & VIAN, J. Explorations Ornithologiques sur les rives européennes du Bosphore. *R. Z.* 1873, pp. 235.

Notes on *Aquila nevioides*, *Accipiter badius* (sc. *brevipes*), *Garrulus krynickii*, *Motacilla melanocephala*, *Anthus cervinus*, *Fringilla hispanidensis*, *Parus tephronotus*, *Muscicapa parva*, *Pyrrhula pusilla*, *Perdix chukar*.

ALSTON, E. R. & BROWN, J. A. HARVIE. Notes from Archangel. *Ibis*, 1873, pp. 54-73.

A paper of considerable interest, being the best essay in English on the Birds of this district.

ARMITAGE, A. & LEY, C. The occurrence of rare birds in Herefordshire, and their nidification in the county. *Tr. Woolh. Club*, 1869, pp. 71-77.

About forty-six species noticed. Of local interest only.

BLANFORD, W. T. Descriptions of new species of *Nectarinia*, *Sitta*, and *Parus* from Persia and Baluchistan. *Ibis*, 1873, pp. 86-90. [*Nectariniidæ*, *Sittidæ*, *Paridæ*.]

——. Descriptions of a new Jay and a new Woodpecker from Persia. *Ibid.* pp. 225-227. [*Corvidæ*, *Picidæ*.]

BLASIUS, W. Einige ornithologische Mittheilungen aus den Vogesen. *Ber. xx. Vers. deutsch. orn. Ges.* pp. 35-40.

Gives critical and additional notes on the Birds of the Vosges, à propos of Kröner's list.

BROOKE, A. B. Notes on the Ornithology of Sardinia. *Ibis*, 1873, pp. 143-155, 233-248, 325-349.

An excellent account, embodying the results of four visits of the author; but also including notes on the labours of Cara and Salvadori.

BROWN, J. A. HARVIE. [See ALSTON, E. R.]

DRESSER, H. E. A History of the Birds of Europe; including all the species inhabiting the Western Palæarctic Region. London: 1873. Parts xvi.—xxiv. 4to.

Although the name of the Recorder appears on the wrappers of Parts xvi. xvii. and xviii., he had little to do with the writing thereof, beyond the synonymy and descriptions of a few birds. The entire synonymy and the descriptions in Parts xiii. and xiv., and a considerable share of xv., were, however, written by the Recorder. The various species are exhaustively treated, with many original observations as usual, while considerable alterations are introduced in the synonymy.

DROSTE, F. BARON. Beiträge zur Vogelfauna von Westfalen und Lippe. Zool. Gart. 1873, pp. 144–151.

Notes on seventy-two species.

———. Die in historischer zeit ausgestorbenen Vögel. Zool. Gart. 1873, pp. 161–166, 218–225.

A short account of the Birds known to have become extinct within historic times.

DUBOIS, A. De la variabilité de certaines oiseaux et indication de quelques espèces nouvelles pour l'Europe. R. Z. 1873, pp. 387–393.

Passes in review some of the doubtful European species, many of which the author would expunge from the list, whilst others he considers to be only varieties.

———. Observations touchant la Faune de la Belgique. Bull. Ac. Belg. xxxvi. [*Paridæ*].

FINSCH, O. Die zweite deutsche Nordpolarfahrt in dem Jahren 1869 und 1870 unter Führung des Kapitän Karl Koldewey, herausgegeben von dem Verein für die deutsche Nordpolarfahrt in Bremen. Band ii. Wissenschaftliche Ergebnisse. Erste Abtheilung. Vögel. Mit Noten von A. Pansch. Royal 8vo, pp. 180–239.

Thirty-one species are discussed, full notes being given in Dr. Finsch's usually complete way. (See also "OOLOGY.")

GOEBEL, H. Beiträge sur Ornithologie des Gouvernements Courland. J. f. O. 1873, pp. 6–18.

A sketch of the Ornithology of Courland, based on the author's own experience, and on the contents of a very good provincial museum.

———. Notizen aus der Vogelwelt Odessa's. *Tom. cit.* pp. 119–128.

After a few field-notes, chiefly oological, the author returns to the vexed question of *Aquila pennata* and *A. minuta*.

———. Zusätze und Berichtigungen zu dem Aufsätze über die im

Umanschen Kreise, 1867-69 und 1870, beobachteten Vögel, nach Beobachtungen in den Jahren 1871-72. *Tom. cit.* pp. 128-133.

Fresh notes on the Birds of Uman (*Zool. Rec.* viii. p. 32), which now number 210 species as observed by the author.

——. Beiträge zur Kenntniss der Ornithologie des Archangelschen Gouvernements. *Tom. cit.* pp. 406-422.

Gives a list of Birds observed day by day during the author's stay at Archangel in 1864.

GOULD, J. The Birds of Great Britain. Parts xxiii.-xxv. London: 1873.

Completes the work. Part xxv. contains the introduction, preface, titles, etc., and also some additional pictures of young birds, making more complete this branch of the subject, which has received the special attention of the author throughout the entire course of the work. The birds described are mentioned under their respective families.

——. An Introduction to the Birds of Great Britain. London: 1873. 8vo, pp. 1-135.

A reprint of the introduction to the foregoing book in a handy form, giving a review of the Birds of Great Britain. This is apparently the best of the author's introductions.

HOLTZ, L. Ueber Brutvögel Sud-Russlands, insbesondere des im Gouvernement Kiew belegenen Kreises Uman. *J. f. O.* 1872, pp. 133-144.

Notes on thirty-two species.

HOMBYER, A. VON. Bemerkungen über das Vorkommen einiger Vögel Schlesiens. *Tom. cit.* pp. 145-150.

Fifteen species noticed, the most interesting being *Calamoherpe fluvialis*.

——. Ueber einige Vögel des Hochwaldes in Schlesien. *Tom. cit.* pp. 218-223.

Short notes on nine species.

IRBY, L. H. Letter from. *Ibis*, 1873, pp. 96-98.

Adds ten species to the list of the Birds of Southern Spain, the most noticeable being *Ruticilla moussieri*. (*Cf. Zool. Rec.* vii. p. 34.)

KESSLER, G. Vogelleben auf Hiddens-Ooe. *J. f. O.* 1873, pp. 47-50.

LEY, C. [See ARMITAGE, A.]

LLOYD, J. W. Notes on the occurrences of rare Birds in Herefordshire and Radnorshire. *Tr. Woolh. Club.* 1869, pp. 78-80.

About twenty-eight species noticed, of local interest only.

MARCHAND, A. Poussins des oiseaux d'Europe. R. Z. 1873, pp. 393-397, pl. 11-13.

The author continues to illustrate the chicks of European Birds (Zool. Rec. viii. p. 47), those now described being *Sterna caspia*, *Haliaetus albicilla*, *Totanus ochropus*, *T. calidris*, *T. glareola*, *T. macularius*, *T. hypoleucus*, *Larus marinus*, *L. canus*.

NECKER, L. A. Mémoire sur les oiseaux des environs de Genève. Genève: 1864. 16mo, pp. 206.

A reprint of a paper published many years ago (Mém. Soc. Phys. Genève. 1823, p. 29), to which is added a reprint of a note by M. Mallet (*op. cit.* 1839, p. 107), and a note by M. Lunel.

NEWTON, ALFRED. A History of British Birds. By the late William Yarrell. Fourth edition: revised. 8vo. Parts v. vi. London: 1873.

Although the progress of this work is slow, there can be no doubt as to its thoroughness and exactitude, which when joined to the literary ability and known experience of its editor, combine to make it by far the best history of British Birds ever yet written. Considerable changes take place in nomenclature, all of which seem justifiable according to the recognized rules.

——. The Threshold of the Unknown Region. London: 1874. 8vo, pp. 307-311.

In the above work, by Mr. C. R. Markham, a few notes on the migration of Birds from Professor Newton's pen will be found at the pages indicated.

NINNI, A. P. Catalogo degli Uccelli del Veneto.

Noticed in Zool. Rec. vi. p. 36, but not then seen by the Recorder. It is published in three parts—the first including the *Accipitres* and *Passeres* of the district; the second, the *Columbæ*, *Gallinæ*, and some of the *Grallæ*; the third, the rest of the *Grallæ* and the *Palmipedes*.

PALMÉN, J. A., & SAHLBERG, J. R. Ornithologiska iakttagelser under en rese i Torneå Lappmark år 1867. Not. Fenn. 1870, pp. 237-252.

Contains the only list yet published of the Birds of the Muonio valley.

PANSCH, A. [See FINSCH, O.]

REINHARDT, J. Et Tillæg til Grönlands Fuglefauna. *Op. cit.* 1872, pp. 132-134.

Adds *Pandion haliaetus* and *Botaurus minor* to the Avifauna of Greenland.

SAHLBERG, J. R. [See PALMÉN, J. A.]

SAUNDERS, H. On the Ornithology of Spain. Tr. Norf. Soc. 1872-73, pp. 16-24.

A popular sketch of the Birds of South Spain.

SEVERTZOFF, N. A. Vertikalnoe i Gorizontanoe Raspreblenie Turkestaniki Jevotni. Islanie Obschestwa pod redakcie A. P. Fedtschenko i L. P. Sabanaeff. Bull. Mosc. viii. livr. 2, pp. 1-157, pls. vii.-x.

Not being acquainted with the Russian language, the Recorder can only note such titles as seem to him new to science. [*Vulturida*, *Falconida*, *Strigida*, *Corvida*, *Fringillida*, *Sylviida*, *Parida*, *Certhiida*, *Alaudida*, *Ciconiida*, *Charadriida*, *Tantalida*, *Anatida*.]

——. Allgemeine Uebersicht den Aralo-tianschanischen Ornithologie in ihrer horizontalen und verticalen Verbreitung. J. f. O. 1873, pp. 321-389.

This is a translation of the above paper by G. von Fischer, with original notes and additions by Herr Severtzoff himself. The part published is the introductory portion, describing the features of the country and the birds peculiar to the different zones and provinces. Several new names occur throughout the text, but no descriptions are as yet given. Some of the species published in the original Russian memoir will apparently be suppressed.

SHARPE, R. B., & DRESSER, H. E. A History of the Birds of Europe, etc. Parts xvi.-xxiv. [See DRESSER, H. E.]

STEJNEGER, L. Ornithologisches aus Norwegen. J. f. O. 1873, pp. 304-307.

Gives some notes made in Heligoland in 1841, by Pastor Heltzen, from a MS. in the Bergen Library.

STEVENSON, H. Ornithological Notes for 1873-4. Tr. Norf. Soc. 1873-74, pp. 81-85.

A record of the capture of rare Birds in Norfolk.

TACZANOWSKI, L. Bericht über die ornithologischen Untersuchungen des Dr. Dybowski in Ost-Sibirien. J. f. O. 1873, pp. 81-112. Nachtrag, *tom. cit.* pp. 113-115.

Continues the article noticed in Zool. Rec. ix. p. 26. Altogether 280 species are noticed, the observations on eggs and habits being from Dr. Dybowski's pen. Three American species are noticed from Siberia. [*Turdida*, *Scolopacida*, *Gruvida*.] An appendix (pp. 113-118) gives some excellent notes on *Accipitres* and other birds procured by Hr. Godlewski, in the Akscha district in East Siberia. Three plates of eggs are also given. (See "OOLOGY.")

TRISTRAM, H. B. The Land of Moab: Travels and Discoveries on the East Side of the Dead Sea and the Jordan. London: 1873. 8vo, pp. i.-xvi., 1-408.

Notes on Birds are interspersed through the volume, all of which are referred to in the index.

TSCHUSI-SCHMIDHOFEN, V. VON. Ornithologische Mittheilungen aus Oesterreich. J. f. O. 1873, pp. 148-150.

Notes on nine species.

VIAN, J. [See ALLEON, M.]

VOGEL, G. Ornithologische Beobachtungen. Ber. St. Gall. Ges. 1871-1872, pp. 188-220.

After some notes on the Nutcracker and other rare birds, two separate treatises follow, giving additions to the Avifauna of Switzerland, while the second is devoted to albinism.

WYATT, C. W. Notes on the Mammals and Avifauna of the Peninsula [of Sinai]. Ordnance Survey of the Peninsula of Sinai. By Capts. C. W. Wilson and H. S. Palmer, R.E. Southampton: 1869,* folio, chap. xi. part. i. pp. 251-262, pls. xv.-xx.

Does not add to the author's former paper (Ibis, 1870, p. 1). [*Sylviidæ*, *Alaudidæ*, *Fringillidæ*, *Sturnidæ*, *Tetraonidæ*.]

ETHIOPIAN REGION.

ANTINORI, O., & SALVADORI, T. Viaggio dei Signori O. Antinori, O. Beccari ed A. Issel nel Mar Rosso, nel territorio dei Bogos e regioni circostanti durante gli anni 1870-71. Catalogo degli Uccelli. Ann. Mus. Genov. iv. pp. 366-520, pls. i.-iii.

Two hundred and twenty-seven species are noted in this model catalogue, which gives the result of the travels of Antinori and his companions in Bogos Land. Three species are figured [*Falconidæ*, *Sylviidæ*, *Ploceidæ*], and a new genus [*Sylviidæ*] described.

AYRES, T. Additional List of and Notes on Birds obtained in the Republic of Trans-Vaal. Ibis, 1873, pp. 280-286.

Thirty-six species are added to the preceding records of the author (Zool. Rec. viii. p. 35).

BOCAGE, J. V. BARBOZA DU. Aves das possessões Portuguezas da Africa occidental. Setima lista. J. Sc. Lisb. 1873, pp. 194-200.

Senor Anchieta continues his explorations (Zool. Rec. ix. p. 27), and the present consignments consist of twenty-two species from Gambos in Mossamedes, and twenty-two from Humbe on the Cunene River.

GRANT, J. A. Summary of Observations on the Geography, Climate, and Natural History of the Lake Region of Equatorial Africa made by the Speke and Grant Expedition, 1860-1863. J. Geogr. Soc. 1872, pp. 243-342.

Gives a summary of the Ornithology (pp. 315-327) compiled from the papers of Selater and Blyth, but adding a few additional particulars.

* Preface dated October 31, 1871.

GURNEY, J. H. A Tenth Additional List of Birds from Natal (Zool. Rec. v. p. 45). Ibis, 1873, pp. 254-259.

Gives several corrections to the author's previous papers.

HEUGLIN, M. T. VON. Ornithologie Nordost Afrika's, der Nilquellen- und Küsten-Gebiete des Rothen Meeres und des nördlichen Somal-Landes. Lieferungen 28-43. Cassel: 1873. Imp. 8vo, pp. 917-1512, pls. xxxvii. xl. xii. b, xxi. xxxviii., xxxix., viii. a, viii. b.

With these parts the text of this most important work is concluded, and in a promised appendix the missing plates will appear. It is impossible to avoid surprise at the very complete way in which the synonymy of the Waders and Swimming birds has been compiled. Only one species (*Laridæ*) seems to be described as new.

REICHENOW, A., & LUHDER, W. Briefliche Reiseberichte aus West Africa. II. III. IV. J. f. O. 1873, pp. 209-218, 297-303, 446-454.

Field-notes on West African Birds, made principally in the eastern districts of the Gold Coast, and afterwards in the Cameroons. The third letter refers to the Weaver-birds noticed during the author's journey in West Africa.

SALVADORI, T. [See ANTINORI, O.]

SHARPE, R. B. On a Collection of Birds from Mombas in Eastern Africa. P. Z. S. 1873, pp. 710-716, pl. lviii.

Forty-six species enumerated, two being new [*Turdidæ*, *Columbidæ*].

——. On a Collection of Birds from the River Congo. *Tom. cit.* pp. 716-719.

Twenty-three species mentioned, several being of great interest.

SHELLEY, G. E. Descriptions of six new Species of West African Birds. Ibis, 1873, pp. 138-143. [*Strigidæ*, *Sylviidæ*, *Ploceidæ*, *Fringillidæ*, *Alaudidæ*.]

INDIAN REGION.

ADAM, R. M. Notes on the Birds of the Sambhur Lake and its vicinity. Str. Feath. i. pp. 361-404.

Two hundred and forty-four species are noticed. The interest of this paper is enhanced by an accompanying map of the locality.

ANDERSON, ANDREW. On the nidification of certain Indian Birds. Part ii. Ibis, 1873, pp. 74-78.

Gives an account of the parasitic breeding habits of *Eudynamis orientalis* [See also *Accipitres*].

BALL, V. List of Birds known to occur in the Andaman and Nicobar Islands. Str. Feath. i. pp. 51-90.

The number of Birds noticed is 133 [cf. Zool. Rec. ix. p. 28].

BLANFORD, W. T. Notes on "Stray Feathers." *Ibis*, 1873, pp. 211-225.

Reviews the first number of the above-named periodical [*Zool. Rec.* ix. p. 29].

BLYTH, E. Addenda to the Avifauna of India. *Ibis*, 1873, pp. 79-81. [*Sturnidæ*, *Psittacidæ*, *Coraciidæ*, *Rallidæ*, *Gruvidæ*.]

CONRAD, P. [See FINSCH, O.]

DAVID, A. Quelques renseignements sur l'Histoire naturelle de la Chine septentrionale et occidentale. *J. N. China Soc.* 1871-72, pp. 228-229.

A letter giving a sketch of the author's travels.

— —. Observations Zoologiques faites dans la province de Tché-Kiang. *C. R.* lxxiv. pp. 64-65.

A few Birds mentioned, some as new (*Falconidæ*, *Tantalidæ*).

— — —. Journal d'un voyage dans le centre de la Chine et dans le Thibet oriental. *N. Arch. Mus.* viii. Bull. pp. 3-128, ix. pp. 15-48, pls. 4 & 5.

Teems with notes of interest to the Ornithologist. The plate contains figures of several novelties discovered by the author (*Sittidæ*, *Timeliidæ*, *Troglodytidæ*, *Muscicapidæ*, *Turdidæ*).

— — —. Natural History of North China, with notices of that of the South, West, and North-east, and of Mongolia and Thibet. Shanghai: 1873. 8vo, pp. 45.

This pamphlet, which is reprinted from Chinese newspapers, gives an excellent account of the author's travels and discoveries, with notes on the Birds.

— — —. Notes on Zoological Researches in China. *P. Z. S.* 1873, pp. 555-556.

— — —. Note sur quelques oiseaux de la province de Chen-si. *Ann. Sci. Nat.* (5) xviii. art. 5, pp. 1-2.

Describes three new species (*Phasianidæ*, *Turdidæ*, *Fringillidæ*).

DESGODINS, —. Quelques mots sur l'Ornithologie du Thibet. *Bull. Soc. Acclim.* (2) x. 1873, pp. 328-332.

A few notes on some of the Birds of Thibet, but not giving their scientific names.

ELWES, H. J. On the geographical distribution of Asiatic birds. *P. Z. S.* 1873, pp. 645-682, pl. 21.

The characteristic Ornithological features of the different regions are clearly given under the heads of the countries. The study of Asiatic Birds necessitates a summary of Selater's Palæartic and Indian regions, the boundaries assigned by their original proposer being nearly adhered

to, though the latter is called the Indo-Malayan region, a change for which the author shows good reason. The Palæarctic Region is divided into three sub-regions—the Siberian or Boreal, the Mongolian, and the Mediterraneo-Persic; and the Indo-Malayan Region also into three other sub-regions—the Himalo-Chinese, the Indian, and the Malay. All these are again subdivided, and characteristic features are given.

FINSCH, O. & CONRAD, P. Ueber eine Vogelsammlung aus Ost-asien. Verh. z.-b. Wien, xxiii. pp. 341–360.

Seventy-seven species collected in Japan, China, Cochin China, Siam, Celebes, and at sea off different Moluccan Islands. Valuable notes are given on fifty out of this number.

GOULD, J. The Birds of Asia. Part xxv. London: 1873.

HENDERSON, G. & HUME, A. O. Lahore to Yarkand. London: 8vo, 1873, pp. 370, pls. xxxii.

Nearly half of this work is devoted to Ornithology; the illustrations are excellent, comprising many hitherto unfigured Indian Birds besides the remarkable novelties discovered by the Yarkand expedition [*Falconidæ*, *Picidæ*, *Laniidæ*, *Muscicapidæ*, *Turdidæ*, *Oriolidæ*, *Sylviidæ*, *Motacilidæ*, *Corvidæ*, *Sturnidæ*, *Fringillidæ*, *Alaudidæ*, *Columbidæ*, *Perdicidæ*, *Laridæ*].

HUME, A. O. Nests and Eggs of Indian Birds. Rough draft. Part i. Calcutta: 1873. 8vo, pp. 1–236. [See "Oology."]

— Contributions to the Ornithology of India. Sindh, No. ii. [cf. Zool. Rec. ix. p. 29]. Str. Feath. i. pp. 91–289, map: *tom. cit.* pp. 419–421.

An account of a journey in the form of a diary, full of interesting notes on Birds. The route traversed lay through Sindh, but several points on the Mekran coast, as well as the opposite coast of Arabia, were visited; 289 species (some of them new) are noticed [*Alcedinidæ*, *Picidæ*, *Sylviidæ*, *Sturnidæ*, *Columbidæ*, *Scolopacidæ*, *Laridæ*].

— Additional remarks on the Avifauna of the Andamans. *Tom. cit.* pp. 304–310.

Adds twenty-one species to Mr. Ball's list (*suprà*), three of which are described as new [*Falconidæ*, *Turnicidæ*, *Ardeidæ*].

— Notes on some Ceylonese Birds. *Tom. cit.* pp. 429–441.

Recent collections enable the author to add to Mr. Holdsworth's paper (Zool. Rec. ix. p. 29), and to give much additional information respecting the Avifauna of Ceylon. Three species are described as new [*Strigidæ*, *Turdidæ*, *Caprimulgidæ*].

— Acheen. *Tom. cit.* pp. 441–463.

An account of an Ornithological collection made by Mr. Davison. Thirty species (6 new) are noticed [*Alcedinidæ*, *Cuculidæ*, *Turdidæ*, *Muscicapidæ*, *Sylviidæ*].

HUME, A. O. [See HENDERSON, G.]

JOUAN, H. Notes sur les oiseaux de la Basse Cochinchine. Mém. Soc. Cherb. (2), xvi. 1872, pp. 257-322.

Of 192 species mentioned, scarcely one is determined with accuracy, the author generally giving merely the generic name. Some of the birds have short descriptions which may lead to their future identification, but it is scarcely credible that such genera as *Tropidorhynchus* and *Meliphaga* are found in Cochinchina.

LAYARD, E. C. Notes on Mr. E. W. H. Holdsworth's Catalogue of Ceylon Birds. P. Z. S. 1873, pp. 203-205 [cf. Zool. Rec. ix. p. 29].

LEGGE, W. V. Additions to the Avifauna of Ceylon. Str. Feath. i. pp. 487-492.

Adds six species to Mr. Holdsworth's list [Zool. Rec. ix. p. 29].

LLOYD, J. H. On the Birds of the province of Kattiawar, in Western India. Ibis, *tom. cit.* 1873, pp. 397-421.

The first record of the Ornithology of this district.

SWINHOE, R. On three new species of Birds from Chefoo (North China). Ann. N. H. (4) xii. pp. 373-377.

——. Notes on Chinese Ornithology. Ibis, 1873, pp. 361-372.

Contains field observations and excellent descriptions of rare birds.

——. Letters from. *Tom. cit.* pp. 95 & 96, and 227-231.

Refer respectively to some rare birds collected by Père Heude near Shanghai, and to various birds from Formosa, Ceylon, and Malacca.

——. On the Long-tailed Jay of Northern China, with further notes on Chinese Ornithology. P. Z. S. 1873, pp. 687-690.

After describing the Jay [*Corvidæ*], the author gives some very important corrections in the list of Père David's birds, published by J. Verreaux (Zool. Rec. viii. p. 40), many of the localities in which are wrong.

VERREAUX, J. Additions au journal du voyage de M. l'Abbé Armand David. N. Arch. Mus. viii. Bull. pp. 137 & 138, pls. i.-v.

Figures are given of several of Père David's discoveries [*Picidæ*, *Paridæ*, *Fringillidæ*, *Timeliidæ*].

WALDEN [ARTHUR HAY] VISCOUNT. On the Birds of the Philippine Archipelago. P. Z. S. 1873, pp. 519-526. Introductory.

——. On a Collection of Birds recently made by Lieutenant 1873. [VOL. X.]

Robert Wardlaw Ramsay in the Andaman Islands. *Ibis*, 1873, pp. 296-321, pls. xi.-xiii.

Amongst other things adds two species to the Andaman Avifauna [*Cuculidae*, *Turdidae*, *Sturnidae*, *Columbidae*].

AUSTRALIAN REGION.

BRENCHLEY, J. L. Jottings during the Cruise of H.M.S. Curaçoa among the South Sea Islands in 1865. London: 1873. 8vo, pp. 350.

Besides many cursory notes on birds, this work contains a special part of the appendix (Natural History Notices: Birds, pp. 351-394, pls. 1-21), illustrating the novelties brought home by Mr. Brenchley, and described by Mr. G. R. Gray (*Zool. Rec.* ix. p. 31). The letterpress accompanying the plates is written by the latter [*Falconidae*, *Cypselidae*, *Coraciidae*, *Meliphagidae*, *Muscicapidae*, *Campephagidae*, *Psittacidae*, *Cuculidae*, *Megapodidae*, *Rallidae*.]

BULLER, W. L. A History of the Birds of New Zealand. Part v. London: 1873. 4to, pp. 289-384, pls. 28-34.

Concludes the work (*Zool. Rec.* ix. p. 30), and includes a short general introduction (pp. xiii.-xxiii.) containing additional information.

FINSCH, O. Ueber die systematische Stellung der neuseeländischen Gattungen *Clytonyx*, Reichb., und *Phyllodytes*, Finsch. *J. f. O.* 1873, pp. 393-398.

Orthonyx ochrocephala, auctt., belongs to a distinct genus, for which the author prefers *Clytonyx*, Reich., to *Mhoua*, Lesson. *O. albicilla*, auctt. is a *Certhiparus*, for which the name *Phyllodytes* [preoccupied by Wagler in *Reptilia*] is proposed, p. 397.

GRAEFFE, E. Vogelbälge aus Huaheine gesammelt für das "Museum Godeffroy." *J. Mus. Godeff.*, Heft. i. pp. 48-51.

Thirteen species mentioned.

JOUAN, H. Notes sur l'Archipel Hawaïien (Iles Sandwich) Mem. Soc. Cherb. (2) xvii. pp. 5-104.

After describing the general features of the Sandwich Islands, the author gives a summary of their Ornithology (pp. 73-89), principally compiled from Mr. Dole's paper (*Zool. Rec.* vii. p. 32). He seems to be unaware of Dr. Sclater's later article (*op. cit.* viii. p. 41).

MEYER, A. B. Notiz über die Vögel von Celebes. *J. f. O.* 1873, pp. 404-405.

Points out the new species discovered by the writer, and the additions made by him to the Avifauna of the island.

SCIATER, P. L. Exhibition of a small Collection of Birds from New Ireland, New Britain, etc. *P. Z. S.* 1873, p. 3.

SCLATER, P. L. Characters of new species of Birds discovered in New Guinea by Signor d'Albertis. *Tom. cit.* pp. 690–698, pls. lii.–lvii.

Fourteen in number [*Timeliidae*, *Muscicapidae*, *Campephagidae*, *Certhiidae*, *Meliphagidae*, *Caprimulgidae*, *Columbidae*].

NEARCTIC REGION.

ADAMS, A. LEITH. Field and Forest Rambles, with notes and observations on the Natural History of Eastern Canada [*suprà*, p. 1].

Contains a good account of the birds of New Brunswick, and a complete list is given in the appendix (pp. 296–302).

AIKEN, C. E. A glimpse at Colorado and its Birds. *Am. Nat.* 1873, pp. 13–16.

Contains field notes.

ALLEN, J. A. Geographical variation in North American Birds. *P. Bost. Soc.* xv. pp. 212–219.

The author puts forward additional evidence in support of his views (*Zool. Rec.* viii. p. 24, ix. p. 33). In southern latitudes, species are apt to diminish in size, but have correspondingly larger bills and claws, and longer tails, while colour is generally liable to be intensified. A full discussion of the variation “in respect to colour” concludes the paper (pp. 214–219).

BREWER, T. M. Descriptions of some Nests and Eggs of Arizona Birds. *P. Bost. Soc.* xvi. pp. 106–111. [See “OOLOGY.”]

BREWSTER, W. [See MAYNARD, C. J.]

COUES, E. Some United States Birds, new to Science, and other things Ornithological. *Am. Nat.* vii. pp. 321–331, figs. 65–70.

Chiefly notes on Lieut. Bendire's Arizona collections, two species being new [*Fringillidae*, *Turdidae*].

HOLDEN, C. H. Notes on the Birds of Wyoming and Colorado territories; with additional memoranda by C. E. AIKEN. *P. Bost. Soc.* xv. pp. 193–210.

One hundred and forty-two species are mentioned, with general field-notes.

JASPER, T. The Birds of North America drawn from life, and uniformly reduced to one-quarter their natural size. Columbus, Ohio: 1873. Parts i.–v. Folio, pp. 1–20, pls. i.–xv.

Some of the figures are good. The work contains an appendix on classification (of which are published pp. 1–20, pls. A, B, C, D, pl. i.) giving a sketch of the orders of birds, with illustrations of anatomy, osteology, etc.

MAYNARD, C. J. A Catalogue of the Birds of Coos Co., N. H., and Oxford Co. Me.; with annotations relative to the breeding habits, migrations, &c. With Notes by Wm. Brewster. P. Bost. Soc. xiv. (1872), pp. 356-385.

The district is where the Alleghanian and Canadian faunas meet, and 164 species are known to have occurred there.

——. The Birds of Florida; containing original descriptions of upwards of 250 species. Part ii. Salem. [Mass.]: 1873. 4to, pp. 33-64.

RIDGWAY, R. Notes on the Vegetation of the Lower Wabash Valley. II. Peculiar features of the Bottom-lands. Am. Nat. vi. (1872), pp. 724-732.

Contains a few notes on birds.

——. The Prairie Birds of Southern Illinois. *Op. cit.* vii. pp. 197-203.

Contains some interesting notes on rare Hawks.

——. On some new forms of American Birds. *Tom. cit.* pp. 602-619.

Several groups of birds are discussed in this article, one of the synopses being written by Professor Baird, and several species or "varieties" named by him, but whether described by him or by Mr. Ridgway there is no evidence to show [*Troglodytidae*, *Mniotiltidae*, *Cerebidae*, *Laniidae*, *Fringillidae*].

ROSS, A. M. A classified catalogue of the Birds of Canada. Toronto: 1872. 8vo, pp. 9.

A nominal list only.

SCOTT, W. D. Partial list of the Summer Birds of Kanawha County, West Virginia; with annotations. P. Bost. Soc. xv. pp. 219-227.

Eighty-six species are mentioned.

TRIPPE, T. MARTIN. Notes on the Birds of Southern Iowa. *Tom. cit.* pp. 229-242.

One hundred and sixty-two species are enumerated, with field notes.

NEOTROPICAL REGION.

BERLEPSCH, H. VON. Zur Ornithologie der Provinz Santa Catharina, Süd Brasilien. J. f. O. 1873, pp. 225-293.

A well worked out paper on a large collection of birds from South Brazil, the geographical distribution of the species being especially well attended to. Eighty-seven species are treated of in this first part.

ELLIOT, D. G. [See SALVIN, O.]

LANDBECK, L. Sobre algunos Pájaros chilenos. An. Univ. Chil. xli. pp. 515-517.

Notes on some disputed species of Chilian *Laridæ* and *Psittacidæ*.

LEYBOLD, F. Excursion a las Pampas Argentinas. Hojas de mi diario. Santiago: 1873. 8vo, pp. 107, map.

Several field-notes on birds observed, two being new [*Columbæ* and *Psittacidæ*.]

LAYARD, E. L. Notes on Birds observed at Para, with descriptions of two new species by P. L. Sclater. Ibis, 1873, pp. 374-396, pls. xiv. & xv.

One hundred and twenty species are recorded [for those described as new, see *Dendrocolaptidæ* and *Formicariidæ*].

LEE, W. B. Ornithological Notes from the Argentine Republic. Tom. cit. pp. 129-138.

The notes refer to about forty species; those on the *Accipitres* being especially interesting.

PELZELN, A. VON. Verzeichniss einer an Dr. L. W. Schaufuss gelangten sendung Vögel aus Neu-Freiburg in Brasilien. Nunq. Ot. 1873, pp. 291-292.

Fifty species are enumerated.

SCLATER, P. L. On Peruvian Birds collected by Mr. Whitely. Part VII. P. Z. S. 1873, pp. 779-784.

Forty-two species are enumerated, remarks being made on sixteen of special interest, and five being new [*Troglodytidæ*, *Tyrannidæ*, *Formicariidæ*].

——. [See LAYARD, E. L.]

——. & SALVIN, O. Nomenclator Avium Neotropicalium, sive avium quæ in regione neotropicali hucusque repertæ sunt nomina systematice disposita, adjecta sua cuique patria: accedunt generum et specierum novarum diagnoses. London: 1873. Folio, pp. 163.

A list of all the birds known from Central and Southern America, the authors recognizing 3565 species as inhabiting these regions. The system of classification adopted is nearly that of Professor Huxley (Zool. Rec. iv. p. 46), though many of the subdivisions are novel, and published in anticipation of a proposed larger work by the authors. Nine new genera and thirty-one new species are described in an appendix. [*Troglodytidæ*, *Mniotiltidæ*, *Vireonidæ*, *Cærebidæ*, *Tanagridæ*, *Fringillidæ*, *Tyrannidæ*, *Cotingidæ*, *Dendrocolaptidæ*, *Formicariidæ*, *Pteroptochidæ*, *Anatidæ*, *Picidæ*, *Columbidæ*, *Perdicidæ*, *Psophiidæ*, *Tinamidæ*, *Charadriidæ*.]

SCLATER, P. L., & SALVIN, O. On Peruvian Birds collected by Mr. Whitely. Part vi. P. Z. S. 1873, pp. 184-187, pl. xxi.

In continuation of former articles (Zool. Rec. vi. p. 52); seventy-eight species are noticed, one being new [*Tyrannidae*].

——. On the Birds of Eastern Peru, with notes on the habits of the birds, by E. Bartlett. *Tom. cit.* pp. 252-311, pls. xxv. & xxvi.

The collections on which this paper is based, are those of Messrs. Bartlett, Bates, and Hauxwell, and a map showing the route of the first-named traveller is given. Four hundred and seventy-three species are noticed, two being new [*Formicariidae*, *Tinamidae*].

——. On some Venezuelan Birds collected by Mr. James M. Spence. *Tom. cit.* pp. 511-512.

Two species are new [*Dendrocolaptidae*, *Tinamidae*].

ANATOMY AND PHYSIOLOGY.*

BONSDORFF, E. J. Kritik der allgemein angenommenen Deutung der Furcula bei den Vögeln. *Not. Fenn.* (1871), ix. pp. 299-326, pls. 1-4. Separately printed, Helsingfors: 1869. 4to, 3 pls. [*Zool. Rec.* vi. p. 537.]

Anticipated by Parker's "Shoulder-girdle and Sternum;" with the exception of which most important work, the author cites freely the opinions held concerning the nature and relation of the furcula, bones connected therewith, and annexed ligaments, comparing these in Birds, Man, and other Mammals, and coming to the conclusion that the furcula represents the mammalian clavicles.

CHARLIER, E. Observations de tératologie. Observation d'un poulet pygomèle présentant une nouvelle variété de ce genre de monstrosité. *Mém. Liège* (2), iii. pp. 193-211, pl. 2.

Records a hitherto unnoted intermediate teratological variety of monstrosity in a fowl which lived some days. The left half of its body was natural, but the right possessed three legs, springing together from an additional pelvis, and two of which were united as far as the tarsus, the third being more free. Two *caca*, two anal apertures, and other abnormalities, existed.

COUGHTREY, M. Note respecting the tracheal pouch of the Emu. *Ann. N. H.* (4), xii. pp. 217 & 218.

Corroborates previous observations respecting this sac, although differing slightly in detail [*Struthionies*].

* [The Recorder desires to thank Dr. Murie and Mr. Garrod for many notices of the anatomical papers published in 1873.]

DUCHAMP, M. G. Observations sur l'anatomie du *Dromaius novæ-hollandiæ*. Ann. Sci. Nat. (5), xvii. art. 11, pp. 1-12, pl. 22. [*Struthionæ*.]

GOARRD, A. H. On the value in Classification of a peculiarity in the anterior margin of the nasal bones of certain Birds. P. Z. S. 1873, pp. 33-38.

The author describes a peculiar arrangement found in the Waders, Ibises, Cranes, Gulls, Auks, and Doves, in which the external osseous nares are prolonged backwards beyond the posterior ends of the upper processes of the premaxilla, whilst in other birds they never extend so far backwards. It is shown that *Parra* and *Hemipodius* possess this peculiarity, which would ally them to the Waders rather than to the Rails and game birds. This *Schizorhinal* (split-nosed) arrangement is so special and constant, that it is proposed to combine all birds possessing it into one order, the *Schizorhina*, by which the Gulls and Cranes are quite separated from the Petrels and Storks, an arrangement which can be further justified from other considerations. The *Pteroclidæ* are united to the *Columbæ*.

— On the carotid arteries of Birds. *T. c.* pp. 457-472.

The different ways in which the carotids of Birds are disposed are described in continuation of the observations of Nitzsch and Meckel. A previously undescribed condition is shown to exist in *Phanicopterus*, which genus, instead of possessing only one carotid artery (the right), as stated by other authors, has two which blend, the left being very much the smaller. Most of the generalizations of Nitzsch and Meckel are verified, and the arrangement in several families described for the first time. It is shown that the *Megapodidæ* and *Turnix* differ from the *Gallinæ* in having the left carotid only, that *Toccos* differs in the same manner from the other *Bucerotidæ*, and that *Cypseloides* is unlike all other Swifts in having both carotids present. A single carotid only, the left, is also mentioned as occurring somewhat unexpectedly in *Arctica alle*, and in *Apteryx*. A theory is given in explanation of the greater frequency of the single carotid being the left, where only one is developed.

— On certain muscles of the thigh of Birds, and on their value in classification. Part. I. *T. c.* pp. 626-645.

Certain muscles which the author finds to vary in Birds are compared in a large number of species, more than 400 having been examined. These muscles are all situated in the thigh; being the ambiens, which crosses the knee capsule, the femoro-caudal, the accessory femoro-caudal, the semi-tendinosus, and the accessory semi-tendinosus. Drawings are given of the different conditions observed; in some cases one, and in others some other, of these five muscles being deficient. The constancy of any given arrangement amongst closely allied Birds is to be inferred from the absence of any variation in large numbers of species and genera.

HECTOR, J. On *Cnemidornis calcitrans*, showing its affinity to the *Natatores*. *T. c.* pp. 763-771, pls. lxxv.-lxxviii.

The bones forming the subject of these observations were obtained in

the Earnsclough Cave, Otago. Though not a complete skeleton, the well-preserved condition of the more important segments, skull, sternum, pelvis, part of the vertebræ, and limb pieces, have enabled a tolerably good idea of the osseous framework to be instituted. The author regards it to have belonged to the Lamellirostrate *Natatores*, probably of similar habits to the Cape Barren Goose of Australia (*Cereopsis nova-hollandiæ*). He suggests its being incapable of flight, and observes that in its short lofty head, solid palate, and peculiarity of compound tympanic cavity, it materially differed from the Duck tribe. Other remarkable features are great solidity of skull, absence of occipital fontanelles, and the natural freedom of the naso-frontal and lachrymal bones. As to size, it probably stood two feet high, and from beak to tail measures about three feet. Traditionally, it is supposed to have been the "Powhangai" of the Maories.

JOBERT, M. Recherches sur la structure du bec de la Spatule (*Platalea*). C. R. lxxv. pp. 1780-1782.

In continuation of the labours of Leydig on the structure of the Curlews and Ducks, and of Grandey, Goujon, and Ihler, the author has examined the beak of the Flamingo (*Phœnicopterus*), and verified the nerve termination in connection with special corpuscles. Following up Herbst's discovery of a structural condition similar in kind in the beak of the Spoonbill (*Platalea*), he investigates the entire anatomical relations of the parts. The point of the beak internally contains fat and many vessels; superficially the bone is freely perforated. An elastic membrane with helical and sinuous fibres is covered by pigmental epidermis. The nervous trunks are alike remarkable for relative volume and splitting into minute branches following the osseous canals and foramina. Corpuscular nervous organs exist in great number. By this constitution and arrangement, the beak of the Spoonbill becomes an organ of great sensibility. The minute internal bony vacuities play under the slightest pressure, equilibrium is established by the elastic tissue, and the most delicate shock readily conveyed to the very sensitive nervous apparatus.

LARCHER, O. Note pour servir à l'histoire de la Pygomélie chez les oiseaux. J. de l'Anat. Phys. viii. (1872), pp. 408.

——. Mémoire sur le Difformités du Bec chez les Oiseaux. T. c. p. 593.

——. Mélanges de Pathologie comparée et de Tératologie. Paris: 1873. 8vo, pt. ii. pp. 1-48, pls. 1-3.

The latter pamphlet contains:—(I.) A short article on Malformations of the Liver of Birds. (II.) Remarks on the nature of the Anomaly designated "Pygomélie," with description of a case in a fowl, in which a supernumerary leg, possessing a double tarsus, sprung from the right of the abdomen, and rudiments of an additional pelvis and visceral peculiarities existed. (III.) An analysis of beak deformities, with the deductions that they most frequently occur in the upper mandible; the lower very rarely of itself is deformed, though subsequently affected by the

upper, the two by twisting simulating the normal condition of the Cross-bill; in malformations with duplicity of beak, the two upper mandibles remain apart, while the two lower tend to unite; wild birds are more frequently deformed than domestic species, the causes arising either during incubation or afterwards from accidental circumstances.

LEE, R. J. Remarks on the Sense of Sight in Birds, accompanied by a description of the Eye, and particularly of the Ciliary Muscle, in three species of the Order Rapaces. P. R. S. (1872), xx. pp. 351-358. [Translated, Z. Ges. Naturw. (2), vii. pp. 328-329.]

The author believes that the great range of vision, and consequent ocular accommodation for distance in birds, depends on the ample development and character of the ciliary muscle. He states, nevertheless, that near vision results from contraction of this muscle, whilst its relaxation aided by tension of the posterior elastic ligament, acts in a directly opposite way. The eyes examined were from the Eagle Owl, Egyptian Vulture, and Buzzard. He concludes that in the first of these the range of vision is small, and the power of accommodation very rapid; but in the two last, and notably in the Buzzard, the reverse is the case.

— Supplement, containing a Description of the Eye in *Rhea americana*, *Phœnicopterus antiquorum*, and *Aptenodytes humboldti*. T. c. pp. 358-360.

The histological characters appear to be similar to those of the *Raptores*: the figure of the eye itself distinguishing them. The choroidal insertion of the ciliary tendon in *Struthio* (as in *Rhea*) is apprehended to explain the deflection of the corneal margin and its change in curvature, and to reconcile supposed discrepancies in the various mechanical theories advanced by physiologists respecting visual accommodation.

MARSHALL, W. Ueber die knöchernen Schädelhöcker der Vögel. Niederl. Arch. Zool. i. pp. 133-178, pls. xi. & xii.

In *Fuligula clangula*, *F. spectabilis*, *Cygnus musicus*, and *C. coscoroba*, and species of *Anser*, the author distinguishes bony chambers of various sizes, which possess orifices leading one into the other, and have a connection with the frontal, ethmoidal, and maxillary sinuses as well as the nasal passages. He discusses the nature and anatomical peculiarities of the craniofacial elevations met with in some of the *Columbide* and *Galinae*, in the Cassowary and *Grus pavonia*. The complex series of pneumatic channels in the Hornbills' skulls, have their chief osseous septa conformed to the curves and lines of buttressing and archwork adopted by engineers and architects. The author's conclusions are:—That spongy texture characterizes the whole of the above avine chambers; that all these are pneumatic; that they occur in both sexes, though occasionally only in the male; that where it occurs in both, it is developed by age; that certain families have fellow prominences in one set of bones represented by another set in a different family; that it is immaterial which part of the organ is of interest in sexual choice so that the result happens; that when well developed in the adult it may have to do with sexual

selection or serve buoyancy in flight; and that the bony meshwork is constructed on mechanical principles, not interwoven irregularly.

MARSHALL, W. Beobachtungen über den Vogel-schwanz. *T. c.* pp. 194–210, pl. xvi.

Opens a highly interesting path of research, wherein the arrested development or coalescence of the terminal caudal vertebræ of living birds is compared with the elongate caudal appendage of the avine fossil form *Archæopteryx*, type of the *Saurura*. The author has carefully examined examples of the leading Avian orders and studied the segmental disposition of the ploughshare, pygostyle, or rearmost tail-bone, both in adult and chick specimens. He endeavours to show the relationship which subsists between the small intertransverse muscular bundles and the caudal members, and regards them as homologues of the levatores costarum. Between the gradation in numbers of the rectrices of existing birds, from more frequently ten and twelve to as many as twenty-four in *Pelicanus* or twenty-six in *Scelopax stenoptera*, he recognizes a kind of serial sequence connecting the recent with the abnormal mesozoic bird, *Archæopteryx*, which, though offering caudal variation from living birds, is considered by the author in this as in other respects to clearly foreshadow them, and therefore to be further separated from Reptiles.

McKENDRICK, —. Observations and experiments on the cerebral hemispheres and corpora striata of Birds. *P. R. Soc. Edinb.* 1872–1873, p. 47. [Title only.]

MURIE, J. Fragmentary notes on the Guacharo or Oil-Bird (*Steatornis caripensis*). *Ibis*, 1873, pp. 81–84 [*Caprimulgidæ*].

—. On the Upupidæ and their relationships. *T. c.* pp. 181–211, pls. v.–vii. [*Upupidæ*].

PARKER, W. K. Morphological elements of the skull. *J. Anat. Phys.* viii. pp. 62–73, pl. iv.

An appendix to the author's Memoirs in the Philosophical Transactions, primarily discussing the segments of the cranium generally, and as morphologically distinguished from the vertebral column, and afterwards more particularly referring to the segmentation and nomenclature of the visceral arches. He traces the original elements of the median pair of longitudinal bars ("trabeculæ" of Rathke), showing how by development and segmentation subsidiary compound bony chains arise. These, with so-called labial and hyoidean cartilages, he follows through the Fishes, Reptilia, and Batrachia, to Birds and Mammals. He opines that in the Bird's skull the præmaxillaries are formed from the prærostral cartilages, and that these are but modifications of familiar parts in the more complex Fishes' skull. In Birds, as compared with Sharks and Rays, "the least change in the direction of the two bones præmaxillary parastoses, whilst still growing upon the *transitory* cartilage, makes all the difference between the beak of a Crow, a Hawk, a Hornbill, or, indeed, any type of the beaked class." By accompanying

sketches he compares the snout of the snake with the deviation resulting in the Passerine beak.

REINHARDT, J. Om Vingens anatomiske Bygning hos Stormfugle-Familien (*Procellariidæ*, s. *Tubinares*). Vid. Medd. 1873, pp. 123-138, woodcuts. [See *Procellariidæ*.]

STIEDA, L. Ueber den Bau der rothen Blättchen an den Schwingen des Seidenschwanzes. Arch. mikr. Anat. 1872, p. 639.

From a minute microscopic examination and treatment with chemical reagents, the author shows that the scarlet tips of the wing feathers of *Ampelis garrulus* are composed of a central and peripheral substance differing somewhat in the shape of their constituent pigmentary cells. These latter contain abundance of yellowish and red colouring matter. He regards the red terminal appendages of the feather as an elongation, and but modification, of the shaft itself.

WIDERSHEIM, R. Die feineren Structurverhältnisse der Drüsen und Muskelmagen der Vögel. *Op. cit.* p. 435, pl. xix.

Following Hasse, Leydig, and Weinland, the author elucidates various moot points concerning the structure of glands and their surrounding tissues and relations to the internal cuticular layer in the muscular stomach of birds. His observations lead to the conclusion that gland cells are developed by a peripheral differentiation of the central protoplasmic material, and that, wending outwards, they produce the lumen or surrounding binding tissue of elastic fibres. By a similar conversion from the latter the horny layer is supposed to be derived. The glands of the Pigeon are found somewhat larger than in the Fowl.

WILCZEWSKI, P. Untersuchungen über den Bau der Magendrüsen der Vögel. Breslau: 1870. 8vo, pp. 30.

[Not seen by the Recorder.]

OOLOGY.

BALDAMUS, E. Catalogus Oothecæ Bædekerianæ, typos continens omnes iconum operis Bædekeri, "Die Eier der Europäischen Vögel." Iserlohn: 1871. 4to.

A nominal list only.

BREWER, T. M. Description of some nests and eggs of Arizona Birds. P. Bost. Soc. xvi. pp. 106-111.

Describes from a collection of Capt. Bendire the eggs of *Buteo montanus*, *Asturina plagiata*, *Pyrocephalus mexicanus*, *Helminthophaga lucia*, *Pyrranga hepatica*, *Harporhynchus crissalis*, *H. curvirostris*, *H. bendirii*, *Myiadestes townsendi*, *Carpodacus cassini*, *Peucea carpalis*, *Pipilo mesoleucus*, *P. aberti*, *Lophortyx gambelli*.

COCK, —, & MARSHALL, C. H. T. Notes on a collection of

eggs made in and about Murree. Str. Feath. i. pp. 348-358.

Seventy species noticed, the eggs of some of which have not been observed before.

HEUGLIN, M. T. VON. Ornithologie Nordost Afrika's, &c. [See "ETHIOPIAN REGION."]

Pls. xxxvii.-xl. contain figures of the eggs of *Vultur fulvus occidentalis*, *Falco concolor*, *Haliaetus albicilla*, *Milvus forskalii*, *Bubo ascalaphus*, *Cathartes percnopterus*, *Falco tinnunculus*, *F. lanarius græcus*, and *F. barbarus*.

HUME, A. O. Nests and Eggs of Indian Birds. Rough Draft. Part I. Calcutta: 1873. 8vo, pp. 1-236.

Full of entirely new information on the nesting habits of Indian Birds, embodying Mr. Hodgson's unpublished notes.

NEWTON, A. Die Zweite Deutsche Nordpolar-fahrt in dem Jahre 1869 und 1870, &c. Pp. 240-243.

Notes on and descriptions of the eggs of seven species, the most interesting being that of *Calidris arenaria*.

TACZANOWSKI, L. Bericht über die Ornithologischen Untersuchungen des Dr. Dybowski in Ost-Sibirien. Nachtrag: J. f. O. 1873, pp. 113-115, pls.

Figures are given of eggs described from time to time in the Journal (Zool. Rec. ix. p. 26), and belonging to the following species:—*Arundinax olivacea*, *Locustella salicaria*, *Dumeticola thoracica*, *Calamodyta certhiola*, *Phyllopeuste fuscata*, *P. coronata*, *Cuculus indicus*, *Reguloides proregulus*, *Ruticilla aurorea*, *Larvicora cyanea*, *Calliope camtschatkensis*, *Cyanistes cyaneus*, *Butalis sibirica*, *B. latirostris*, *Erythrosterna leucura*, *E. luteola*, *Cyanopica cyana*, *Budytes citreola*, *Corydalla richardi*, *Pipastes agilis*, *Emberiza cioides*, *Euspiza rutila*, *Uragus sibiricus*, *Saxicola saltatrix*, *Turtur rupicola*, *Gallinago heterocerca*, *Porzana pygmæa*, *P. erythrothorax*, *Archibuteo aquitinus*.

ACCIPITRES.

VULTURIDÆ.

Gyps nivicola, sp. n., Turkestan. N. A. Severtzoff, Turkest. Jevotn. p. 1, pl. vii. [*G. himalayensis* (Zool. Rec. vi. p. 60). R. B. Sharpe, Cat. B. i. p. 8].

Pseudogyys, g. n. Type, *P. bengalensis*. R. B. Sharpe, Ann. N. H. (4) xi. p. 130.

Catharista falklandica, sp. n., Falkland Islands. *Id. tom. cit.* p. 133.

FALCONIDÆ.

BROOKS, W. E. Notes upon some of the Indian and European Eagles. Str. Feath. i. pp. 290-294, 326-331, 463-464.

Three papers dealing with the vexed question of the identity of some of the species inhabiting both Europe and India. The birds treated of are *Aquila adalberti*, *mogilnik*, *bifasciata*, *nævia*, *clanga*, *hastata* (this being considered to occur in Europe, and to be the same as the small Spotted Eagle), *vindhiana*, and *nævioides* (see *infra*).

GURNEY, J. H. A sketch of the collection of Raptorial Birds in the Norwich Museum. London: 1872. 12mo, pp. 62.
A popular handbook to this fine collection.

RIDGWAY, R. Catalogue of the Ornithological collection of the Boston Society of Natural History. Part II. Falconidæ. P. Bost. Soc. xvi. pp. 43-72.

Two new sub-genera are characterized.

——. Appendix. Revision of the Falconine genera *Micrastur*, *Geranospiza*, and *Rupornis*, and the Strigine genus *Glaucidium*. *T. c.* pp. 73-106.

Only five species of *Micrastur* are recognized, instead of the seven admitted by Sclater and Salvin (*Zool. Rec.* vi. p. 61), *M. guerilla* and *M. zonothorax* being united to *M. ruficollis*. Three *Geranospizæ* are admitted, either as species or varieties (it is difficult to define the author's idea of a species). *Rupornis* is a subgenus of *Buteo*, and includes the brown *Asturina* of Sclater and Salvin. Only two "species" are allowed: 1. *R. magnirostris*, with five geographical races, var. *magnirostris*, var. *nattereri*, var. (n.) *griseicauda*, var. *ruficauda*, var. *pucherani*; and 2. *R. leuchorrhous*.

SALVIN, F. H. & BRODRICK, W. Falconry in the British Isles. Second Edition. London: 1873. 8vo, pp. i.-x., 1-171, xxviii.

Contains additional illustrations.

SCHLEGEL, H. Muséum d'Histoire Naturelle des Pays Bas. Livr. 10. *Aves Rapaces* (Revue), pp. 1-156.

A complete review of the Birds of prey in the Leyden Museum, showing the additions that have taken place since the publication of the last catalogue in 1862. As in all the foregoing works of the author, there is much new matter, but the wholesale way in which some forms are specifically united will scarcely find approval with Ornithologists.

SHARPE, R. B. On the *Falco arcticus* of Holboell, with remarks on the changes of plumage in some other Accipitrine Birds. P. Z. S. 1873, pp. 414-419, pl. xxxix.

The changes of plumage in *Falco candicans*, *Accipiter nisus*, and *Cymindis uncinatus* are illustrated with a view to show that these are accomplished without a moult.

In reply to this paper, cf. A. NEWTON, *Ann. N. H.* (4), xii. pp. 485-487.

Circus. Notes on the characters for distinguishing the various European species by the form of wing: H. Saunders, *Ibis*, 1873, pp. 232-235.

Falco palumbarius. Notes on: O. Grunert, *Forstl. Bl.* 1872, p. 298.

Rhynchofalco, sub-g. n. of *Falco*, allied to *Hypotriorchis*: type, *Falco femoralis*, Temm. Ridgway, *t. c.* p. 46, note.

Astur hensti, Madagascar, H. Schlegel, *Mus. P. B.*, Rapaces, p. 62.

A. cenchroides, Turkestan: N. A. Severtzoff, *Turkest. Jevotn*, p. 113, spp. nn.

Accipiter albigularis (Zool. Rec. ix. p. 39) figured. G. R. Gray, in Brenchley's Cruise of the Curaçoa, pl. i.

Antenor, sub-g. n. of *Urubitinga*, intermediate between it and *Buteo*: type, *Falco uncinata*, Temm. Ridgway, *t. c.* p. 63, note.

Buteo nigricans, sp. n., Turkestan. N. A. Severtzoff, *l. c.* p. 112.

Buteo borealis, var. *krideri*, described and figured. B. A. Hoopes, *P. Ac. Philad.* 1873, pp. 238 & 239, pl. 5.

Buteo auguralis [Zool. Rec. iii. p. 73] figured. O. Antinori & T. Salvadori, *Ann. Mus. Genov.* iv. pl. 1.

Buteo desertorum again in Thuringia. O. von Krieger, *J. f. O.* 1873, pp. 293-297.

Buteo aquilinus probably = *B. ferox*. A. O. Hume, Lahore to Yarkand, p. 176.

Archibuteo leucoptera, sp. n., Kooloo. *Id. Str. Feath.* i. pp. 315-318 [= *A. strophiatatus*, Hodgs.; R. B. Sharpe, *Cat. B. i.* p. 199].

Gypaetus barbatus. Its remains in quaternary deposits in Belgium. P. J. van Beneden, *Bull. Ac. Belg.* (2) xxxiii. pp. 221-226.

Aquila fulva, var. *intermedia*, from Turkestan. N. A. Severtzoff, *Turkest. Jevotn.* p. 112.

Aquila albipectus, from Turkestan; *id. l. c.*

Aquila pennata and *A. minuta*. A. E. Brehm and L. Holtz; *J. f. O.* 1873, pp. 56-61.

Aquila leucolena, sp. n., Spain; H. E. Dresser, *P. Z. S.* 1872, p. 864 := *A. adalberti*, *id. B. Eur.* part xviii.

Aquila mogilik figured; *id. op. cit.* part xiv.

DRESSER, H. E. On certain species of *Aquila*. *P. Z. S.* 1873, pp. 514-517.

Aquila orientalis compared with *A. bifasciata*; *A. clanga* probably = *A. vittata*, of India.

Aquila imperialis and allies. J. H. Gurney, *Ibis*, 1873, pp. 98-100.

Aquila bifasciata and allies. W. E. Brooks, *J. A. S. B.* 1873, pt. ii. pp. 145-147; *id. P. A. S. B.* 1873, pp. 173-175; *id. Zool.* 1873, pp. 3643, 3645. J. H. Gurney, *Ibis*, 1873, pp. 422 & 423.

Aquila nevia and allies. J. Cabanis, *J. f. O.* 1873, pp. 455-457.

Aquila nevioides on the Bosphorus. M. Alléon & J. Vian, *R. Z.* 1873, pp. 236-239.

Spizaetus kienerii. An adult fully described. A. O. Hume, *Str. Feath.* i. pp. 310-313.

Spizaetus sphynx, sp. n., Travancore. *Id. tom. cit.* pp. 319-323.

Spilornis minimus, Camorta, Nicobars, *id. t. c.* pp. 464-467; *S. davisoni*,

Andaman Island, *id. t. c.* p. 307 [*S. rutherfordi*, Swinh.; Lord Walden, Ibis, 1873, p. 298]; *S. minor*, sp. n., Central India, *id.* Nests Ind. B. i. p. 42 [*S. melanotis*, Jerdon; Sharpe, Cat. B. i. p. 289]: spp. nn.

Poliornis liventer, from Thayetmyo; *id.* Str. Feath. i. p. 318.

Milvus palustris, sp. n., N. W. India. A. Anderson, P. A. S. B. 1873, pp. 142-147.

Milvus melanotis is distinct from *M. govinda*, and its soft parts are described. R. Swinhoe, Ibis, 1873, p. 228.

Elanus sinensis, sp. n., China [with a description which suits every species of the genus]. A. David, C. R. lxxv. p. 65.

Elanus melanopterus in Belgium. A. Thielens, Mém. Soc. Hain. (3) iii.

Haliaeetus leucocephalus. Variation in scaling of tarsus. B. Gilpin, Am. Nat. vii. pp. 429 & 430.

Baza celebensis, sp. n., Celebes. H. Schlegel, Mus. P. B. Revue Accipitr. p. 135 [= *B. erythrothorax*; Sharpe, P. Z. S. 1873, p. 625].

Falco brookii, Sardinia, R. B. Sharpe, Ann. N. H. (4), xi. pp. 19-21; *F. cassini*, Straits of Magellan, *id. tom. cit.* pp. 220-222; *F. tscherniaievi*, Turkestan, N. A. Severtzoff, Turkest. Jevotn. p. 114; *F. sacroides* (*descr. nullá*), Tschè-Kiang province, China, A. David, C. R. lxxv. p. 65; *F. neglectus*, Cape Verd Islands, H. Schlegel, Mus. P. B. Rapaces, p. 43: spp. nn.

Falco peregrinus and allies. Eight species recognized: R. B. Sharpe, *t. c.* pp. 222-224.

Falco arcticus, Holb., *nec.* Gm., from Greenland, renamed *holballi*; *id.* P. Z. S. 1873, p. 415.

Falco eleonore figured. H. E. Dresser, B. Eur. part xvi.

Falco columbarius. Its habits: W. Wood, Am. Nat. vii. pp. 340-345.

Falco hendersoni (Zool. Rec. viii. p. 50) figured. G. Henderson & A. O. Hume, Lahore to Yarkand, pl. i.

Hieracidea novæ-zealandiæ. Notes on, and measurements of, a series. F. W. Hutton, Ibis, 1873, pp. 100-102. Evidence in favour of *H. brunnea* [*sc. H. australis*] being indistinguishable as a species; R. B. Sharpe, *t. c.* pp. 327-330.

STRIGIDÆ.

Glaucidium: 8 species (one new, *G. landsbergi*, Amazon and Orinoco region, p. 98) recognized. R. Ridgway, P. Bost. Soc. xvi. [*suprà*, p. 45.]

Ketupa magnifica, sp. n., Ningpo, China. R. Swinhoe, Ibis, 1873, p. 127.

Bubo hemalachana, sp. n., Kooloo. A. O. Hume, Str. Feath. i. p. 315.

Bubo ignavus and *Nyctea scandiaca* figured. H. E. Dresser, B. Eur. pts. xxii. & xxiii.

Syrnium lapponicum in Poland. L. Taczanowski, J. f. O. 1873, pp. 303 & 304.

Syrnium ochrogenys, sp. n., Ceylon. A. O. Hume, Str. Feath. i. p. 431.

Athene pulchra, Burmah, *id. tom. cit.* pp. 469 & 470; *A. orientalis*, Turkestan, N. A. Severtzoff, Turkest. Jevotn. p. 115: spp. nn.

Otus capensis major from Madagascar. H. Schlegel, Mus. P. B. Rapaces, p. 3.

Scops siaoensis, Siao-oudang Island, *id. t. c.* p. 13; *S. icterorhyncha*, Fantee, G. E. Shelley, Ibis, 1873, p. 138: spp. nn.

Ephialtes balli, sp. n., Andaman Islands. A. O. Hume, Str. Feath. i. pp. 407 & 408.

Heteroglaux, g. n., *id. t. c.* p. 467; type, *H. blewitti*, sp. n., Phooljan State, *id. t. c.* pp. 468 & 469.

Nyctale albifrons in Canada. J. A. Allen, Am. Nat. vii. pp. 427-429.

PSITTACI.

STRIGOPIDÆ.

Strigops habroptilus. Notes on: T. H. Potts, Zool. (s.s.) 1873, pp. 3621-3624.

ARIDÆ.

HUTTON, T. Notes on the Parroquets of India. Str. Feath. i. pp. 331-346.

Monographs the genus *Palæornis*, as represented in India, according to the author's ideas. He is acquainted with 9 species, no less than 4 of which, viz., *P. sivalensis*, *sacer*, *punjabi*, and *vindhiana*, are described as new.

Palæornis melanorhynchus and *P. ponticerianus*. E. Blyth, Ibis, 1873, p. 79.

Conurus glaucifrons, sp. n., Argentine Republic. F. Leybold, Excurs. Pamp. Argent. p. 38 (= *C. acuticaudatus*, Vieill.; P. L. Sclater, Ibis, 1873, p. 430).

Conurus cyanolyseos and *C. patagonus*. L. Landbeck, Ann. Univ. Chil. xli. p. 517.

PSITTACIDÆ.

Chrysotis bodini, sp. n., from an unknown part of America. O. Finsch, P. Z. S. 1873, pp. 569 & 570.

TRICHOGLOSSIDÆ.

Lorius hypænochrous, Gray, figured. G. R. Gray in Brenchley's "Cruise," pl. xiv.

Trichoglossus massenæ, Bp., and *T. palmarum*, Gen., figured. *Id. t. c.* pls. xv. & xvi.

Trichoglossus pygmaeus figured. A. von Pelzeln, Ibis, 1873, pl. i.

Trichoglossus josephinae, sp. n., New Guinea. O. Finsch, Atti. Soc. Ital. xv. pp. 427 & 428, pl. 7.

NESTORIDÆ.

Nestor meridionalis. Description of the tongue. H. Dorner, Zool. Gart. 1873, pp. 15-17.

PICARIÆ.

PICIDÆ.

Picus leuconotus figured. J. Gould, B. Gt. Br. pt. xxiii.

Picus scindianus figured. G. Henderson & A. O. Hume, Lahore to Yarkand, pl. ii.

Picus mursi (♂ ♀) and *Picoides funebris* ♂ juv. [Zool. Rec. viii. p. 52]. J. Verreaux, N. Arch. Mus. viii. Bull. pl. i. figs. 1-3.

Picus sancti-johannis, sp. n., Shiraz, S. Persia. W. T. Blanford, Ibis, 1873, p. 226.

Gecinus vaillanti figured. H. E. Dresser, B. Eur. pt. xxii.

Gecinus viridis, juv., figured. J. Gould, B. Gt. Br. pt. xxv.

Brachypternus dilutior, sp. n., Dehra Ghazee Khan. A. O. Hume, Str. Feath. i. p. 173.

Nesocoleus, g. n.; Type, *N. fernandineæ* (Vig.). P. L. Sclater & O. Salvin, Nomencl. Av. Neotr. p. 155.

CORACIIDÆ.

Coracias garrula interbreeds with *C. indica*. E. Blyth, Ibis, 1873, p. 80.

Eurystomus crassirostris [Zool. Rec. vi. p. 63] figured. G. R. Gray in Brenchley's "Cruise," pl. iii.

MEROPIDÆ.

Merops swinhoei, sp. n., S. India. A. O. Hume, Nests Ind. B. i. p. 102.

Meropogon forsteni, Bp., figured. J. Gould, B. Asia, pt. xxv.

MOMOTIDÆ.

SALVIN, O. On the tail-feathers of *Momotus*. P. Z. S. 1872, pp. 429-433.

Describes and illustrates the curious mode in which Motmots nibble their tail-feathers and produce the racket.

ALCEDINIDÆ.

Alcedo rufigastra [potiùs *rufiventer* vel *erythrogastra*], Andaman Islands, Ld. Walden, Ann. N. H. (4) xii. p. 487; *A. sindiana*, Sindh, A. O. Hume, Str. Feath. i. p. 169: spp. nn.

Pelargopsis intermedius, sp. n., Nicobars and Sumatra [?]. *Id. tom. cit.* p. 449. [Cf. also *op. cit.* ii. p. 166.]

Carcineutes amabilis, sp. n., Eastern Pegu. *Id. tom. cit.* pp. 474 & 475.

CAPITONIDÆ.

Megalama sykesi, sp. n., Western India. J. H. Lloyd, Ibis, 1873, pp. 124 & 125.

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BUCEROTIDÆ.

BOCAGE, J. V. BARBOZA DU. Observations sur le *Bucorax* de l'Afrique australe (*Buceros carunculatus cafer*, Schleg.). P. Z. S. 1873, pp. 698-703.

Bucorax cafer and (probably) *B. guineensis* are distinct from *B. abyssinicus*. The beaks of all are figured.

Buceros sharpii, sp. n., Angola, and its allies. D. G. Elliot, Ibis, 1873, pp. 177-179.

Rhyti[do]cerus narcondami, sp. n., Narcondam I. A. O. Hume, Str. Feath. i. pp. 411 & 412.

Ocyceros, "subgen. n." Type, *O. ginginiamus*. *Id.* Nests Ind. B. i. p. 113.

COLIIDÆ.

Colius. Dr. Murie (Ibis, 1873, p. 190) proposes the name *Pamprodactyle* instead of *Coliomorphæ* [Zool. Rec. ix. p. 42], pre-occupied by Prof. Sundevall (Av. Tent. 1872, p. 37).

INDICATORIDÆ.

Indicator xanthonotus. Fully described; A. O. Hume, Str. Feath. i. pp. 313-315. On its anatomy; F. Stoliczka, t. c. pp. 425-427.

UPUPIDÆ.

MURIE, J. On the *Upupidæ* and their relationships. Ibis, 1873, pp. 181-211, pls. v.-vii.

The cranial and external characters of *Irrisor senegalensis*, *erythro-rhynchus*, and *aterrimus* are determined, and the same parts in *Rhinopomastes cyanomelas* examined; studies being made of the distinctive relations between these species and *Promerops caffer*. The skeletons of *Upupa epops* and *U. minor* are also compared. The author eliminates by structural differentiation from the *Upupidæ* the genera *Fregilupus*, *Falculia*, and *Heteralocha*, and compares the Hoopoes with other groups, considering their nearest living relationship to be with the Hornbills, and finding certain indications in the fossil form, *Cryptornis antiquus*, Gerv., of a connection between the *Upupidæ* and *Bucerotidæ*. He substantiates Strickland's juxtaposition of *Upupa* and *Irrisor*, but raises the rank of that author's two subfamilies, and agrees with Alph. Milne-Edwards that the Hoopoes constitute a sufficiently distinct group to be called *Epopinæ* or *Epopomorphæ*. The family *Upupidæ* contains one genus, *Upupa*.

Upupa senegalensis probably distinct from *U. epops* and *U. indica*. T. Salvadori, in Antin. Viaggio Bogos, pp. 60 & 61.

CUCULIDÆ.

SHARPE, R. B. On the Cuculidæ of the Ethiopian Region. P. Z. S. 1873, pp. 578-624.

The African Cuckoos are divided into two subfamilies, *Cuculinæ* and

Phœnicophainæ, and a review of the various Asiatic and Ethiopian genera contained in the latter is given, with figures of the characters of the fifteen recognized genera.

Cuculus aurantiirostris, sp. n., Senegambia, *id. t. c.* p. 584.

Ceuthmochares australis, sp. n., Natal, *id. t. c.* p. 609.

Sericosomus olivaceiceps, sp. n., Madagascar, *id. t. c.* p. 615.

Rhinococcyx, g. n., type *R. curvirostris*: *id. t. c.* p. 604.

Poliococcyx, g. n., type *R. sumatranus*: *id. t. c.* p. 606.

Centrococcyx andamanensis figured. Ld. Walden, Ibis, 1873, pl. xi.

Centropus maximus, Sindh and Sikkim; *intermedius*, Burmah and Dacca, spp. un. : A. O. Hume, Str. Feath. i. p. 454.

Phœnicophaes pyrrhocephalus. Its habits: V. Legge, *ibid.* pp. 346-348.

Neomorphus. The four species of this genus fully described. G. N. Lawrence, Ibis, 1874, pp. 287-295.

Coccyzus euleri, sp. n., Catangallo. J. Cabanis, J. f. O. 1873, pp. 72 & 73.

Eudynamis orientalis. Its breeding habits. A. Anderson, Ibis, 1873, pp. 74-78.

Cuculus bronzinus, Gray, figured. G. R. Gray in Brenchley's "Cruise," pl. xvii.

Cuculus canorus. Discussion on nidification: A. C. Smith, Zool. (s.s.) 1873, pp. 3433-3439, 3473-3478, 3511-3517, 3723-3727. W. C. Hewitson, *t. c.* pp. 3468-3470. G. D. Rowley, *t. c.* 3470-3472. H. Doubleday, *t. c.* pp. 3472, 3473. A. Newton, *t. c.* pp. 3478, 3479. J. E. Harting, *t. c.* pp. 3648-3651. On its eggs: A. Grunack, J. f. O. 1873, pp. 454, 455. Laying a blue egg in nest of *Phyllopneuste sibilatrix*: E. Rey, *t. c.* pp. 45-47. Young figured: J. Gould, B. Gt. Br. part xxv.

CAPRIMULGIDÆ.

GARROD, A. H. On some points in the anatomy of *Steatornis*. P. Z. S. 1873, pp. 526-535.

The pterylosis of this bird is described and figured, as are also the skull and some of the muscles. A drawing is given of the peculiar trachea and bronchi. It is shown that in its myology it resembles the *Caprimulgidæ* rather than the *Strigidæ*, whilst in its pterylosis it approaches the latter.

Steatornis caripensis. J. Murie, Ibis, 1873, pp. 81-84, gives particulars as to exterior anatomy, and colour, and admeasurements, and weight (the latter but 6½ oz.). Feathering and scales are absent from the legs, some downy hairs alone representing cuticular appendages. From the construction of the parts, it would seem that the bird does not support itself on its toes, but rests chiefly on the tarsi.

SCOTT, D. The North American Goatsuckers. Am. Nat. vii. pp. 669-675.

To a popular account of these birds the author adds a synoptic table of the various North American species.

Egotheles albertisi, sp. n., New Guinea. P. L. Sclater, P. Z. S. 1873, p. 696.

Caprimulgus andamanicus, sp. n., Andaman Islands. A. O. Hume, Str. Feath. i. pp. 470 & 471.

Batrachostomus punctatus, sp. n., Ceylon. *Id. t. c.* p. 432.

Macrodipteryx sperlingi, sp. n., Bay of Malimba. R. B. Sharpe, P. Z. S. 1873, p. 626.

Antrostomus. Colour of eggs of various species: T. M. Brewer, Am. Nat. vii. pp. 434 & 435.

CYPSELIDÆ.

Cypselus horus, Heugl., is a good species. T. Salvadori & O. Antinori, Atti Soc. Ital. viii. pp. 94–96.

Chaetura indica, sp. n., India. A. O. Hume, Str. Feath. i. pp. 471–474.

Collocalia innominata, sp. n., Andaman Islands. *Id. t. c.* pp. 294–298.

Collocalia hypoleuca, Gray, and *C. uropygialis* [Zool. Rec. iii. p. 83], figured. G. R. Gray in Brenchley's "Cruise," pl. ii.

TROCHILIDÆ.

SALVIN, O., & ELLIOT, D. G. Notes on the *Trochilidæ*. The genus *Phaethornis*. Ibis, 1873, pp. 1–14.

Twelve species recognized, and their synonymy and geographical distribution thoroughly worked out.

——. Notes on the *Trochilidæ*. The genera *Pygmornis*, *Glaucis*, and *Threnetes*. *Tom. cit.* pp. 269–279.

The genera mentioned are thoroughly and effectively revised. The results are the following:—

Phaethornis viridicaudatus, Gould, = *Pygmornis idaliæ*, p. 271. *P. eremita*, Gould, and *P. rufigaster*, Less., = *P. pygmæus* (Spix); p. 273.

Trochilus aspasie, B. & M., and *Pygmornis zonura*, Gould, = *Pygmornis griseigularis* (Gould); p. 272.

Pygmæornis amaura, Bourc., = *P. striigularis* (Gould); p. 273.

Glaucis mazelppa (Less.), *G. affinis* & *ænea*, Lawr., *G. melanura* & *lanceolata*, Gould, = *G. hirsuta* (Gm.); pp. 276 & 277.

Glaucis fraseri, Gould, = *Thenetes rucheri*; p. 278.

Lophornis stictolophus, sp. n., Columbia; pp. 279 & 280.

——. Notes on the *Trochilidæ*. The genus *Thalurania*. *Tom. cit.* pp. 353–361.

T. tschudii, Gould, = *T. nigrifasciatus*, Gld.; p. 357. *T. venusta*, Gould, = *T. columbica*, Bourc. *T. verticeps* and *T. fannia*, Gould, = *T. eriphile* (Less.). *T. forficatus* and *T. subfurcata*, Cab. & H., = *T. furcatoides*, Gould: pp. 355, *et seq.*

WHITELY, H. Notes on Humming-birds collected in High Peru. P. Z. S. 1873, pp. 187–191.

Gives a short account of the habits of 19 species collected by the

author. In some additional notes, *tom. cit.* p. 784, 5 more species are added to this list.

Hylonympha macrocerca, g. & sp. nn., Brazil. J. Gould, *Ann. N. H.* (4), xii. p. 429.

PASSERES.

PITTIDÆ.

Pitta boschii figured. J. Gould, B. Asia, pt. xxv.

Pitta nympa near Chefoo. R. Swinhoe, P. Z. S. 1873, p. 730.

Hydrornis oatesi, sp. n., Upper Pegu. A. O. Hume, *Str. Feath. i.* pp. 477 & 478.

FORMICARIIDÆ.

Thamnophilus tristis, Guiana, P. L. Sclater & O. Salvin, *Nomencl. Av. Neotr.* p. 160; *T. simplex*, Para, P. L. Sclater, *Ibis*, 1873, p. 387, pl. xv. : spp. nn.

Thamnistes rufescens, sp. n., Peru. J. Cabanis, *J. f. O.* 1873, p. 65.

Grallaria ruficeps, Antioquia, P. L. Sclater, P. Z. S. 1873, p. 729; *G. erythroleuca*, High Peru, *id. t. c.* p. 783 : spp. nn.

Microbates, g. n., P. L. Sclater & O. Salvin, *Nomencl. Av. Neotr.* p. 155; type, *M. torquatus*, sp. n., Cayenne, *id. t. c.* p. 161.

Cercomacra carbonaria, sp. n., Guiana; *id. t. c.* p. 161.

Myrmotherula pyrrhonota, sp. n., Guiana; *id. ibid.*

Pithys lunulata, sp. n., Eastern Peru; *id. P. Z. S.* 1873, p. 276, pl. xxvi.

Hypocnemis subflava, sp. n., J. Cabanis, *J. f. O.* 1873, p. 65.

Hypsibamon andicola, sp. n., Peru; *id. t. c.* p. 318.

PTEROPTOCHIDÆ.

Rhinocrypta fusca, sp. n., Mendoza. P. L. Sclater & O. Salvin, *Nomencl. Av. Neotr.* p. 161.

DENDROCOLAPTIDÆ.

Furnarius agnatus, sp. n., Columbia. P. L. Sclater & O. Salvin, *op. cit.* p. 159.

Clibanornis, g. n. Type, *C. dendrocolaptoides* (Temm.); *id. t. c.* p. 155.

Cillurus rivularis, *Synallaxis humilis*, and *S. albicapilla*, spp. nn., Peru; J. Cabanis, *J. f. O.* 1873, p. 319.

Schizæaca palpebralis, g. & sp. nn., *id. t. c.* p. 319.

Lochmias sororia, Venezuela, P. L. Sclater & O. Salvin, P. Z. S. 1873, p. 511; *L. obscurata*, Peru, J. Cabanis, *J. f. O.* 1873, p. 65 : spp. nn.

Sclerurus olivascens, sp. n., Peru; *id. t. c.* p. 67.

Ipoborus stictoptylus, sp. n., Peru; *id. t. c.* p. 66.

Philydor subflavescens, Peru, *id. t. c.* p. 66; *P. erythronotus*, Columbia, P. L. Sclater & O. Salvin, *op. cit.* p. 160 : spp. nn.

Margarornis stellata, sp. n., Ecuador; *id. t. c.* p. 160.

Nasica gracilirostris, Burm. (La Plata Reis. ii. p. 446), = *Drymornis bridgesi* (Eyton, Contr. Orn. 1849, p. 130, pl. 38); *iid.* Ibis, 1873, p. 133.

Picolaptes puncticeps, Guiana, *iid.* Nomencl. Av. Neotr. p. 160; *P. layardi*, Para, P. L. Sclater, Ibis, 1873, p. 386, pl. xiv. : spp. nn.

MELIPHAGIDÆ.

Ptilotis cinerea and *P. melanophrys*, spp. nn., New Guinea. P. L. Sclater, P. Z. S. 1873, p. 693.

Melidectes, g. n. Type, *M. torquatus*, sp. n., New Guinea. *Id. t. c.* p. 694.

Melipotus, g. n. Type, *M. gymnops*, sp. n. *Id. t. c.* p. 695.

Glyciphila caledonica, *G. flavitincta* [Zool. Rec. ix. p. 44], *Philemon sclateri* [*ibid.*], *Anthochæra aubryana*, Verr. & Desm., *Zosterops flavifrons* (Gm.), and *Z. xanthochroa*, Gray, figured. G. R. Gray in Brenchley's "Cruise," pls. iv.-vii.

NECTARINIIDÆ.

Nectarinia (Arachnechthra) brevirostris, sp. n., Baluchistan. W. T. Blanford, Ibis, 1873, p. 86.

Arachnechthra andamanica, sp. n., Andaman Islands. A. O. Hume, Str. Feath. i. pp. 404-406.

Ethopyga nicobarica, sp. n., Kondul Island, Nicobars; *id. t. c.* pp. 412-415.

Diceum virescens, sp. n., Andaman Islands; *id. t. c.* pp. 482 & 483.

AMPELIDIDÆ.

Ampelis garrulus figured. H. E. Dresser, B. Eur. pt. xxiii.

COTINGIDÆ.

Hadrostomus aulææ, sp. n., Peru; J. Cabanis, J. f. O. 1873, p. 68.

Casiornis fusca, sp. n., Bahia; P. L. Sclater & O. Salvin, Nomencl. Av. Neotr. p. 159.

Lipaugus immundus, sp. n., Guiana; *iid. ibid.*

TIMELIIDÆ.

Pellorneum minor, sp. n., Thayetmyo; A. O. Hume, Str. Feath. i. pp. 298-300.

Stachyris rufifrons, sp. n., Pegu; *id. t. c.* pp. 479 & 480.

Stachyris precognitus [Zool. Rec. iii. p. 90], = *S. ruficeps*, Blyth: the latter figured. J. Gould, B. Asia, pt. xxv.

Eupetes leucostictus, sp. n., New Guinea; P. L. Sclater, P. Z. S. 1873, p. 690, pl. 211.

Paradoxornis heudii, sp. n., Lake of Kiang-sou, China; A. David, C. R. lxxiv. pp. 1449 & 1450. Figured; *id.* N. Arch. Mus. ix. Bull. pl. 4, fig. 2.

Alcippe pæcilotus and *cinereiceps* [Zool. Rec. viii. p. 57] figured; J. Verreaux, N. Arch. Mus. viii. Bull. pls. 2, fig. 4, 5, fig. 3.

Trochalopteryx elliotti [Zool. Rec. viii. p. 57]. *Ianthocincla lunulata* [*ibid.*] and *I. ocellata* (Vig.); *I. artemisia* [*t. c.* p. 60] figured: J. Gould, B. Asia, pt. xxv.

Trochalopteryx austeni, sp. n., North Cachar; T. C. Jerdon, Ibis, 1872, 1872, p. 304. Figured; J. Gould, *l. c.*

Trochalopteryx simile and *T. lineatum* figured; G. Henderson & A. O. Hume, Lahore to Yarkand, pls. vii. & viii.

HIRUNDINIDÆ.

Cotyle riparia, juv., figured; J. Gould, B. Gt. Br. pt. xxv.

ORIOOLIDÆ.

Oriolus kundoo figured; G. Henderson & A. O. Hume, Lahore to Yarkand, pl. xi.

VIREONIDÆ.

Vireo solitarius. Its nest. T. G. Gentry, P. Ac. Philad. 1873, p. 354.

Hylophilus flaviventris, Peru, J. Cabanis, J. f. O. 1873, p. 64; *H. muscicapinus*, Cayenne, P. L. Sclater & O. Salvin, Nomencl. Av. Neotr. p. 156: spp. nn.

Cyclorhis albiventris, sp. n., Bahia; *id. ibid.*

TYRANNIDÆ.

Sayornis fuscus. Variation in nesting habits: T. G. Gentry, P. Ac. Philad. 1873, pp. 292-294.

Cnipolegus pusillus, sp. n., Lower Amazon; P. L. Sclater & O. Salvin, Nomencl. Av. Neotr. p. 158.

Cnipolegus, sp., Scl. (Cat. Am. B. p. 203), = *Chasiempis sandwichensis*; P. L. Sclater, P. Z. S. 1873, p. 555.

Todirostrum pulchellum, sp. n., High Peru; *id. t. c.* p. 781.

Euscarthmus wuchereri, Bahia, P. L. Sclater & O. Salvin, Nomencl. Av. Neotr. p. 158; *E. rufigularis*, Peru, J. Cabanis, J. f. O. 1873, p. 67: spp. nn.

Hapalocercus acutipennis, sp. n., High Peru; P. L. Sclater & O. Salvin, P. Z. S. 1873, p. 187.

Serpophaga subflava, Para, *S. pæcilocerca*, Ecuador, *id.* Nomencl. Av. Neotr. p. 158: spp. nn.

Capsiempis orbitalis, sp. n., Peru; J. Cabanis, *t. c.* p. 68.

Phyllomyias platyrhyncha, Brazil, P. L. Sclater & O. Salvin, Nomencl. Av. Neotr. p. 159; *P. cinereicapilla*, Peru, J. Cabanis, *t. c.* p. 67: spp. nn.

SCLATER, P. L. Note on the genus *Ornithion* of Hartlaub. P. Z. S. 1873, pp. 576-578.

Four species are recognized:—*O. inerme*, Hartl., *O. pusillum* (Cab. & H.), *O. incanescens* (Max.), and *O. obsoletum* (Temm.).

Tyranniscus viridissimus, sp. n., High Peru; *id. t. c.* p. 782.

Myiobius aureiventris, High Peru, P. L. Sclater, *l. c.*; *M. stellatus*, Ecuador, J. Cabanis, *l. c.* p. 158: spp. nn.

Mitrephorus ochraceiventris, sp. n., Peru; J. Cabanis, *t. c.* p. 320.

DICRURIDÆ.

Dissemuroides, g. n., A. O. Hume, Str. Feath. i. p. 408; type, *D. dicruriformis*, sp. n., Andaman Islands, *id. t. c.* pp. 408 & 409.

LANIIDÆ.

Lanius excubitor and allies; J. Cabanis, J. f. O. 1873, pp. 74-79.

Lanius homeyeri and *L. sphenocercus*, spp. nn., S. E. Europe and China; *id. t. c.* pp. 75 & 76.

Collurio ludovicianus, var. *robustus*, California; R. Ridgway, Am. Nat. vii. p. 609.

Lanius arenarius figured: G. Henderson & A. O. Hume, Lahore to Yarkand, pl. iii.

GÜEINZIUS, W. Aus dem Vogelleben sud-Afrika's. J. f. O. 1873, pp. 434-446.

A full account of the life-history of the South African Bush-Shrikes (*Malaconotus*).

CAMPEPHAGIDÆ.

Lalage banksiana [Zool. Rec. ix. p. 47], *Pachycephala chlorura*, *moriarensis*, and *xanthetrea*, *Eopsaltria caledonica* and *E. cucullata* figured. G. R. Gray in Brenchley's "Cruise," pls. x. xi. xiii. figs. 1 & 2.

Campephaga aurulenta, sp. n., New Guinea; P. L. Sclater, P. Z. S. 1873, p. 692, pl. liv.

Pachycephala rufinucha and *P. soror*, spp. nn.; *id. ibid.*

Rectes bennetti, sp. n., New Guinea; *id. ibid.*

MUSCICAPIDÆ.

SHARPE, R. B. On the genus *Platystira* and its allies. Ibis, 1873, pp. 156-177, pl. iv.

Treats of *Platystira* (3 spp.), *Batis* (6 spp.), *Lanioturdus* (1 sp.), *Diaphorophya* (3 spp.), and *Stenostira* (1 sp.). *Platystira albifrons*, sp. n., Angola; p. 159. *P. peltata* ♂ ♀ figured, *id. l. c.* pl. iv. figs. 2 & 3. *Batis affinis* (Walhb, Œfv. Ak. Förh. 1855, p. 214), = *B. pririt* (Vieill., N. Dict. xxi. p. 486), p. 168. *Myiophila*, Hartl. (*Stiphromyias*, Heine), = *Diaphorophya*, Bp.; p. 171. *Diaphorophya blissetti* [Zool. Rec. ix. p. 47] figured; pl. iv. fig. 1.

Myiagra melanura, Gray, *M. caledonica*, Bp., and *Rhipidura spilodera* [Zool. Rec. ix. p. 47], figured. G. R. Gray, in Brenchley's "Cruise," pls. viii. & ix.

Leucocerca infumata, sp. n., Acheen; A. O. Hume, Str. Feath. i. p. 455.

Monarcha frater, sp. n., New Guinea; P. L. Sclater, P. Z. S. 1873, p. 691.

Leucophantes, g. n.; type, *L. brachyurus*, sp. n.; *id. ibid.* pl. liii.

Siphia hodgsoni [Zool. Rec. viii. p. 59] figured; A. David, N. Arch. Mus. ix. Bull. pl. 4, fig. 4.

Muscicapa collaris figured: J. Gould, B. Gt. Br. pt. xxiii.

Hemichelidon fuliginosa and *Alseonax latirostris* figured. G. Henderson & A. O. Hume, Lahore to Yarkand, pls. iv. & v.

MNIOTILTIDÆ.

Helminthophaga celata, var. n. *lutescens*, Pacific side of N. America; R. Ridgway, Am. Nat. vii. p. 606.

Dendroeca vieilloti, var. *bryanti*, and *D. dominica*, var. *albilora*, from Mexico; *id. t. c.* pp. 606-707. *D. gracia*, var. n. *decora*, from Honduras; *id. t. c.* p. 608.

Myiothlypis striaticeps, sp. n., Peru; J. Cabanis, J. f. O. 1873, p. 316.

Basileuterus leucopygius, sp. n., Costa Rica, P. L. Sclater, & O. Salvin, Nomencl. Av. Neotr. p. 156; *B. diachlorus*, Peru, J. Cabanis, *t. c.* p. 316: spp. nn.

CINCLIDÆ.

Cinclus melanogaster and *C. albicollis* figured: H. E. Dresser, B. Eur. pt. xxiv.

TURDIDÆ.

Turdus campbelli, sp. n., Chefoo; R. Swinhoe, Ann. N. H. (4) xii. p. 374.

Turdus auritus and *Merula gouldi* [Zool. Rec. viii. p. 60] figured: A. David, N. Arch. Mus. ix. Bull. pl. 5, figs. 1 & 2. The latter again figured; J. Gould, B. Asia, pt. xxv.

REINHARDT, J. Nogle Bemærkninger i Anledning af den i November, 1872, ved Viborg fangede Drossel. Vid. Medd. 1873, pp. 162-188, pl. ii. B, figs. 1 & 1a, 2 & 2a.

Refers to the occurrence of *Turdus atrigularis* in Denmark (head, &c. of young bird figured).

Turdus hodgsoni distinct from *T. viscivorus*: G. E. von Homeyer, J. f. O. 1873, p. 150.

Turdus gigantodes, sp. n., Peru; J. Cabanis, *t. c.* p. 315.

Turdus subcinereus [Zool. Rec. iii. p. 94], = *Colluriocincla rufiventris*: P. L. Sclater, P. Z. S. 1873, p. 555.

Cichloselys sibiricus figured: J. Gould, B. Gt. Br. pt. xxiii.

Oreocincla gregoriana, sp. n., Ceylon; G. Nevil, Str. Feath. i. p. 437.

Chamatylas princii, sp. n., Fantee; R. B. Sharpe, P. Z. S. 1873, p. 625.

Cyanocincla, g. n., type, *C. cyanus* (L.); A. O. Hume, Nests, &c. Ind. B. i. p. 226.

Criniger griseiceps, sp. n., Upper Pegu; A. O. Hume, Str. Feath. i. pp. 478 & 479.

- Garrulax chinensis* figured; J. Gould, B. Asia, pt. xxv.
- Brachypodius fusciflavescens*, sp. n., Andaman Islands; A. O. Hume, *tom. cit.* pp. 297 & 298.
- Otocompsa personata*, sp. n., Acheen; *id. tom. cit.* p. 457.
- Myiophonus eugenei*, sp. n., Pegu; *id. tom. cit.* pp. 475 & 476.
- Pomatorhinus gravivox*, Chen-si province, China, A. David, *Ann. Sc. Nat.* (5), xviii. pt. 5, p. 2; *P. ochraceiceps*, Burmah, Ld. Walden, *Ann. N. H.* (4), xii. p. 487: spp. nn.
- Cittacincla albiventris*, Blyth, figured: Ld. Walden, *Ibis*, 1874, pl. xii. fig. 1.
- Heterorhynchus*, g. n., L. Mandelli, *Str. Feath.* i. p. 415; type, *H. humii*, sp. n., Sikkim, *id. t. c.* pp. 415 & 416.
- Hodgsonius phoenicuroides* figured; G. Henderson & A. O. Hume, Lahore to Yarkand, pl. vi.
- Bradyornis subalaris*, Mombas, R. B. Sharpe, *P. Z. S.* 1873, p. 713, pl. lviii. fig. 1; *B. modesta*, Aguapim, G. E. Shelley, *Ibis*, 1873, p. 140: spp. nn.
- Ceropia crassirostris*, notes on: T. H. Potts, *J. L. Soc.* xi. pp. 505-509.
- Harporhynchus*. Notes on the genus, with woodcuts of the heads of several species: E. Coues, *Am. Nat.* vii. p. 327. *H. bendirii*, sp. n., Arizona; *id. t. c.* p. 330.
- Chatarrhea caudata* and *C. earli* figured: G. Henderson & A. O. Hume, Lahore to Yarkand, pls. ix. & x.

SYLVIIDÆ.

KOCH, G. VON. Die Sanger Mitteledeutschland. Nurnberg: 1869-1870. 8vo, pp. 17, pls. 18.

Gives very brief descriptions and rather poor coloured figures of twenty-three species, together with two plates of details and one of eggs.

Lamprolia, g. n., type *L. victorie*, sp. n., Ovalau, Fiji Islands; O. Finsch, *P. Z. S.* 1873, pp. 734 & 735, pl. lxii.

Saxicola hendersoni [*Zool. Rec.* viii. p. 6] figured; G. Henderson & A. O. Hume, Lahore to Yarkand, pl. xiii.

Saxicola talas, N. A. Severtzoff, *Turkest. Jevotn.* p. 119, pl. viii. figs. 1-6; and *S. melanogenys*, *id. t. c.* p. 120; Turkestan; *S. leucolema*, Bogos, O. Antinori & T. Salvadori, *Atti. Acc. Tor.* viii. p. 32 (figured); *id.* *Ann. Mus. Genov.* iv. pl. ii): spp. nn.

Dromolea monacha (♂♀), *D. leucocephala*, *Saxicola deserti* (♂♀) *S. curymelæna* and *S. amphileuca* figured; C. W. Wyatt, *Mamm. & Avif. Sinai*, pls. xv. & xvi.

Saxicola monacha, *S. philothamna*, *S. leucura*, *S. leucopyga*, and *S. mæsta* figured; H. E. Dresser, *B. Eur.* pts. xvi. & xvii.

Pratincola rubicola and *P. rubetra* figured: *id. t. c.* pt. xxiv.

Pratincola ferrea figured; G. Henderson & A. O. Hume, Lahore to Yarkand, pl. xii.

Pratincola melanura figured; C. W. Wyatt, *Mamm. & Avif. Sinai*, pl. xvii. fig. 1.

Ruticilla cæruleocephala and *R. fuliginosa* figured; G. Henderson & A. O. Hume, *t. c.* pls. xiv. & xv.

Ruticilla fuscicaudata [Zool. Rec. vi. p. 81] figured (s. n. *Saxicola scotocerca*); M. T. von Heuglin, Orn. N. O. Afr. pl. xii^b. Type of *Philothamna*, g. n., T. Salvadori & O. Antinori, Ann. Mus. Genov. iv. p. 466.

Ruticilla moussieri figured; H. E. Dresser, *t. c.* pt. xxiii.

Ruticilla lugens, sp. n., Turkestan; N. A. Severtzoff, Turkest. Jevotn. p. 121.

Calliope ballioni, sp. n., Turkestan; *id. t. c.* p. 122.

Cyanecula leucocyana figured; J. Gould, B. Gt. Br. pt. xxiii.

Erithacus rubecula figured, H. E. Dresser, *t. c.* pt. xxiii.

Irania albigula, sp. n., N. A. Severtzoff, Turkest. Jevotn. p. 122.

Luscinia golzii, Turkestan, J. Cabanis, J. f. O. 1873, pp. 79 & 80; *L. occidentalis*, *L. infuscata*, and *L. hafizi*, Turkestan, N. A. Severtzoff, *l. c.* pp. 120 & 121: spp. nn.

Accentor fulvescens, sp. n., Turkestan: *id. tom. cit.* p. 132.

Accentor collaris and *A. modularis* figured; H. E. Dresser, B. Eur. pts. xvii. xxi.

Calamoherpe locustella and *C. fluviatilis*. A. Hausmann, J. f. O. 1873. pp. 426–434, gives a good account of the economy of these species, but renaming them respectively *Locustella gryllus* and *L. cicada*. E. Schauer, *tom. cit.* pp. 161–182, also gives an account of the habits of these birds, and of *Sylvia luscinioides*, proposing the new generic name *Thenetria* for the three species, and the new specific names *gryllina* for *fluviatilis*, and *acheta* for *luscinioides*. No valid reason is given for any of these alterations.

Locustella subsignata, sp. n., Andaman Islands; A. O. Hume, Str. Feath. i. pp. 409 & 410.

Acrocephalus brunnescens figured; G. Henderson & A. O. Hume, *t. c.* pl. xvi.: wing figured, p. 214.

Salicaria brevipennis, *capistrata*, *turcomana*, *macronyx*, *eurhyncha*, *sphenura*, *modesta*, *obsoleta*, *scitopsis*, *gracilis*, *concolor*, and *tamariceti*, spp. nn., Turkestan; N. A. Severtzoff, Turkest. Jevotn. pp. 127–131.

Cettia fusca, *albiventris*, *nigricans*, and *scalenura*, Turkestan, *id. t. c.* pp. 131 & 132; *C. cettoides*, Sindh, A. O. Hume, Str. Feath. i. p. 194: spp. nn.

Tatara longirostris distinct from *T. otaitiensis*: A. von Pelzeln, Ibis, 1873, pp. 23 & 24.

Drymæca eremita figured; C. M. Wyatt, Mamm. & Avif. Sinai, pl. xvii. fig. 2.

Drymipus longicaudatus figured; G. Henderson & A. O. Hume, *t. c.* pl. xvii. fig. 2; nest figured, p. 216.

D. inornatus figured; *iid. t. c.* pl. xvii. fig. 1. Not the true *D. inornatus*, and re-named *D. terricolor*; A. O. Hume, Str. Feath. i. pp. 382, 494.

Dryodromas nigriceps, sp. n., Aguapim; G. E. Shelley, Ibis, 1873, p. 139.

Cisticola ayresi and *C. terrestris* not separable from *C. cursitans*; J. H. Gurney, *ibid.* p. 257.

Cisticola ayresi, Hartl. *C. iodopygia* [Zool. Rec. vi. p. 83], and *C. cinerascens* [*op. cit.* iv. p. 103], figured; M. T. von Heuglin. Orn. N. O. Afr. pl. viii^a.

Orthotomus longicaudus (Gen.) with nest, figured. J. Gould. B. Asia, pt. xxv.

Blanfordius, g. n., type, *B. striatulus*, sp. n., Sindh; A. O. Hume, Str. Feath. i. pp. 300 & 301.

Sylvia magnirostris, sp. n., Turkestan; N. A. Severtzoff, Turkest. Jevotn. p. 123.

Homochlamys luscinia, Salv. [Atti Acc. Tor. v. p. 510], = *Arundinax canturiens*, Swinh. (Ibis, 1860, p. 52), recently made the type of *Herbivox*, Swinh. (Zool. Rec. viii. p. 61), which becomes a synonym of *Homochlamys* (containing at present three species: *H. canturiens*, *H. cantans*, and *H. minutus*). T. Salvadori, Ibis, 1873, pp. 179 & 180.

Suya albigularis, sp. n., Acheen; A. O. Hume, Str. Feath. i. p. 459.

Suya albisuperciliaris [Zool. Rec. viii. p. 61] figured; G. Henderson & A. O. Hume, Lahore to Yarkand, pl. xviii.

Rhopophilus pekinensis [Zool. Rec. v. p. 87] figured. J. Gould, B. Asia, pt. xxv. (? = *Suya albisuperciliaris*, Hume. P. L. Sclater, Ibis, 1874, p. 185).

Sylvia doriae and *S. rueppelli* (♂ ♀) figured; C. W. Wyatt, Mamm. & Avif. Sinai, pls. xxvii. fig. 3, xviii. figs. 2 & 3.

Atraphornis, g. n., N. A. Severtzoff, Turkest. Jevotn. p. 124; type, *A. aralensis* (Eversm.); also *A. platyura*, sp. n., *id. ibid.*

Sylvia curruca occurs in India; E. Blyth, Ibis, 1873, p. 80.

Sylvia minula, sp. n., Sindh; A. O. Hume, Str. Feath. i. p. 198.

Phylloscopus viridanus, figured; G. Henderson & A. O. Hume, Lahore to Yarkand, pl. xix.

Phyllopneuste obscura, sp. n., with two "varieties," *intermedia* and *hypolaina* (vel *Hypolais graminis*, sp. n.), Turkestan; N. A. Severtzoff, Turkest. Jevotn. pp. 124 & 125.

Ficedula fulvescens, sp. n., with a "variety" *nevia*, Turkestan, *id. tom. cit.* p. 126 [probably = *Phylloscopus tristis*].

Abrornis xanthoschistus and *A. albisuperciliaris* figured; G. Henderson & A. O. Hume, *t. c.* pl. xx. These names should be transposed: A. O. Hume, Str. Feath. i. p. 493.

Gerygone flaveola, sp. n., Celebes; J. Cabanis, J. f. O. 1873, p. 157.

MOTACILLIDÆ.

BROOKS, W. E. Notes on some of the Indian Pipits. Str. Feath. i. pp. 358-360.

Notes on *Corydalla richardi*, *C. striolata*, and *C. rufula*.

Agrodroma jerdoni, Finsch, figured; G. Henderson & A. O. Hume, *t. c.* pl. xxi.

Anthus cervinus figured; J. Gould, B. Gt. Br. pt. xxiii.

Anthus correndera. Its habits in the Argentine Republic: W. H. Hudson, P. Z. S. 1873, pp. 771 & 772.

TROGLODYTIDÆ.

Troglodytes parvulus and *T. borealis* figured; H. E. Dresser, B. Eur. pt. xxiii.

Pnoepyga troglodytoides [Zool. Rec. viii. p. 63] figured; A. David. N. Arch. Mus. ix. Bull. pt. 4, fig. 3.

Presbys peruanus, sp. n., Peru; J. Cabanis, J. f. O. 1873, p. 317.

Uropsila, g. n., type, *U. leucogastra* (Gould). P. L. Sclater & O. Salvin, Nomencl. Av. Neotr. p. 155.

Thryothorus fulvus, sp. n., High Peru; P. L. Sclater, P. Z. S. 1873, p. 781.

Catherpes mexicanus (Heerm.), var. n. *conspersus*, Middle United States; R. Ridgway, Am. Nat. vii. p. 603.

CERTHIIDÆ.

Certhia tenuira, sp. n., Turkestan; N. A. Severtzoff, Turkest. Jevotn. p. 138.

Climacteris placens, sp. n., New Guinea; P. L. Sclater, P. Z. S. 1873, p. 693.

CÆREBIDÆ.

BAIRD, S. F. Synopsis of the species of the genus *Certhiola*. Am. Nat. 1873, pp. 609-613.

Fifteen species are admitted, the following being described as new:—*C. newtoni*, Santa Cruz, *C. caboti*, Yucatan, *C. barbadensis*, Barbadoes, and *C. frontalis*, Antigua.

Chlorophanes purpurascens, sp. n., Venezuela; P. L. Sclater & O. Salvin, Nomencl. Av. Neotr. p. 157.

Dacnis. Twelve species recognized: H. v. Berlepsch, J. f. O. 1873, pp. 68-70.

Dacnis modesta, sp. n., Peru; J. Cabanis, *tom. cit.* p. 64.

Coinirostrum cinereum, sp. n., Peru; *id. ibid.*

Xenodacnis parina, g. & sp. nn., Peru; *id. tom. cit.* pp. 311 & 312.

Diglossa pectoralis, sp. n., Peru; *id. tom. cit.* p. 318.

SITTIDÆ.

Sitta europæa and *S. cæsia* figured; H. E. Dresser, B. Eur. pts. xvi. & xviii.

Sitta rupicola, sp. n., Persia; W. T. Blanford. Ibis, 1873, p. 87.

Sitta sinensis [Zool. Rec. viii. p. 63] figured; A. David. N. Arch. Mus. ix. Bull. pl. 4, fig. 1.

PARIDÆ.

Parus pekinensis [Zool. Rec. vii. p. 54] figured; J. Verreaux, N. Arch. Mus. viii. Bull. pl. 5, fig. 1.

Parus ater breeding in Belgium; A. Dubois, Bull. Ac. Belg. (2), xxxvi. p. 345.

Parus flavipectus (pl. viii. fig. 7), and *P. songarus*, spp. nn. Turkestan; N. A. Severtzoff, Turkest. Jevotn. pp. 133 & 134.

Parus ater, "var. *rufipectus*," Turkestan; *id. t. c.* p. 134.

Leptopæcile sophia, g. & sp. nn., Turkestan; *id. t. c.* p. 135, pl. viii. figs. 8 & 9.

Mecistura peltzami, sp. n., Turkestan; *id. t. c.* p. 135, pl. ix. fig. 1.

Ægithalus coronatus, *Æ. castaneus*, *Æ. citricapillus*, *Æ. macronyx*, *Æ. rutilans*, spp. nn., the latter with two "varieties," *cucullata* and *pectoralis*, and a "variety" *javartica* of *Æ. pendulinus*, Turkestan; *id. tom. cit.* pp. 135-138. All figured, *id. t. c.* pl. ix. figs. 2-8.

Parus pheonotus and *P. (Cyanistes) persicus*, spp. nn., Persia; W. T. Blanford, *Ibis*, 1873, pp. 88 & 89.

Mecistura caudata, juv., figured; J. Gould, *B. Gt. Br. pt.* xxv.

Lophophanes humii, sp. n., Sikkim; W. E. Brooks, *J. A. S. B.* 1873, pt. ii. p. 57.

Minla jerdoni, *Proparus swinhoii*, *Mecistura vinacea* and *M. fuliginosa*, *Siva ruficapilla* and *Yuhina diademata* [*Zool. Rec.* viii. p. 64], *Suthora gularis* and *S. alphonsiana* [*t. c.* p. 66], figured; J. Verreaux, *N. Arch. Mus.* viii. Bull. pls. ii. figs. 1-3, iii. figs. 1-3, & v. figs. 1, 2, 4.

Minla rufigularis, sp. n., Sikkim; L. Mandelli, *Str. Feath.* i. p. 416.

TANAGRIDÆ.

Euphonia. Note on the song: A. E. Brehm, *J. f. O.* 1873, pp. 71 & 72.

Euphonia mesochrysa, locality unknown; T. Salvadori, *Atti. Soc. Ital.* viii. p. 193; *E. chalcopasta*, Columbia, P. L. Selater & O. Salvin, *Nomencl. Av. Neotr.* p. 157: spp. nn.

Chlorospingus semifuscus, Ecuador, *iid. ibid.*; *C. auricularis*, Peru, J. Cabanis, *J. f. O.* 1873, p. 318: spp. nn.

Phlogothraupis, g. n., type, *P. sanguinolentus* (Less.); P. L. Selater & O. Salvin, *Nomencl. Av. Neotr.* p. 155.

Arremon wuchereri, sp. n., Bahia; *iid. tom. cit.* p. 157.

Chlorochrysa nitidissima, sp. n., Antioquia; P. L. Selater, *P. Z. S.* 1873, p. 728.

Tanagra olivina figured; P. L. Selater & O. Salvin, *tom. cit.* pl. xxi.

Iridornis jelskii and *Pecilothraupis ignicrissa*, spp. nn., Peru; J. Cabanis, *J. f. O.* 1873, p. 316.

Pyrranga roseigularis figured; P. L. Selater, *Ibis*, 1873, pp. 125 & 126, pl. iii.

PLOCEIDÆ.

Hyphantornis superciliosus, Fantee, G. E. Shelley, *Ibis*, 1873, p. 140; *H. dimidiatus*, T. Salvadori & O. Antinori, *Atti Acc. Tor.* viii. p. 360 (figured; *iid. Ann. Mus. Genov.* iv. pl. iii.): spp. nn.

Philagrus melanorhynchus, Rüpp., figured; M. T. von Heuglin, *Orn. N. O. Afr.* pl. xvi.

FRINGILLIDÆ.

Fringilla celebs, *F. tintillon*, *F. spodiogena*, and *F. teydea* figured; H. E. Dresser, *B. Eur.* pts. xvii. & xviii.

Coturniculus lecontii. Note on: E. Coues, *Am. Nat.* vii. pp. 748 & 749.

Peucea carpalis, sp. n., Arizona; *id. tom. cit.* p. 322.

Peuceea aestivalis, var. n. *arizonæ*, Sonora and S. Arizona; R. Ridgway, *tom. cit.* pp. 616-618.

Centronyx ochrocephalus, sp. n., Colorado; C. E. Aiken, *tom. cit.* pp. 236 & 237 (= *C. bairdi*; D. Scott, *t. c.* pp. 364 & 365; E. Coues, *t. c.* pp. 696 & 697).

Porphyrospiza, g. n., type, *P. cyanella* (Pelz.); P. L. Sclater & O. Salvin, *Nomencl. Av. Neotr.* p. 155.

Junco, Sel. R. Ridgway, *tom. cit.* pp. 613-616, in a synopsis of the "species" of this genus, includes *oregonus*, Townsend, and *caniceps*, Woodh. (joined with *annectens*, Baird, *cinereus*, Swains., *alticola*, Salv., a "var." n. *aikeni* (p. 615; Colorado), and *hyemalis*, Linn., under the latter name.

Cardinalis, Bp. The same author, *tom. cit.* pp. 618 & 619, distinguishes two "species," *C. virginianus* and *C. phaniceus*, the former composed of four forms, viz.:—var. *virginianus*, var. *coccineus*, Ridgw. (*Am. J. Sc.*, Dec. 1872, Eastern Mexico), var. *igneus*, Baird, and var. *carneus*, Ridgway (*l. c.* Western Mexico: ? = *carneus*, Less.).

Haplospiza uniformis, sp. n., S. Mexico; P. L. Sclater & O. Salvin, *Nomencl. Av. Neotr.* p. 158.

Linota brevirostris (? *L. montanella*, sp. n.), Hume (figured); G. Henderson & A. O. Hume, Lahore to Yarkand, pl. xxvi.

Nesospiza acunhae, g. & sp. nn., Tristan d'Acunha; J. Cabanis, *J. f. O.* 1873, p. 154.

Crithagra insularis, sp. n., Tristan d'Acunha; *id. tom. cit.* p. 153.

Lagonoticta polionota, sp. n., Fantee; G. E. Shelley, *Ibis*, 1873, p. 142.

Munia fumigata, sp. n., S. Andaman; Ld. Walden, *Ann. N. H.* (4), xii. p. 488.

Passer pulverulentus, sp. n., Turkestan; N. A. Severtzoff, *Turkest. Jevotn.* p. 116.

Passer cinnamomeus figured; G. Henderson & A. O. Hume, *t. c.* pl. xxv.

Carpodacus sinaiticus figured; C. W. Wyatt, *Mamm. & Avif. Sinai*, pl. xvii. fig. 4.

Carpodacus edwardsi, *C. trifasciatus*, and *C. vinaceus* [*Zool. Rec.* viii. p. 66] figured; J. Verreaux, *N. Arch. Mus.* viii. pls. 3, fig. 4, 4, figs. 1-3.

Carpodacus lepidus, sp. n., Chen-si province, China; A. David, *Ann. Sci. Nat.* (5), xviii. art. 5, p. 2.

Procarduelis mandelli, Hume [*Zool. Rec.* ix. p. 51], = *P. rubescens*, Blanf. [*op. cit.*]; A. O. Hume, *Str. Feath.* i. p. 318.

Pyrrhula. Further notes on: J. Cabanis, *J. f. O.* 1873, pp. 314 & 315.

Pyrrhula vulgaris, juv., figured; J. Gould, *B. Gt. Br.* pt. xxv.

ALAUDIDÆ.

BROOKS, W. E. Notes on the Skylarks of India. *Str. Feath.* i. pp. 484-487.

Five species are discriminated, of which *Alauda guttata* and *A. australis* are said to be new; pp. 485 & 486.

HOMBYER, E. F. VON. Monographische Beiträge über einige

Gruppen der Lerchen (*Alaudidæ*). J. f. O. 1873, pp. 186-209.

Passes in review several genera of Larks, and gives some useful synonymy. The author's conclusions, especially as to Indian species, not being based upon original work, will scarcely meet with general acceptance. The following new genus and species are described:—

Pallasia (type, *A. mongolica*, Pall.) p. 190.

Calandrella immaculata, Spain (ex MS. C. L. Brehm), p. 194.

Calandritis heinii, R. Volga, pp. 197, 425.

Galerita microcristata [*parvicristata*], Abyssinia, p. 202.

Certhilauda duponti, *Rhamphocoris clot-bey*, *Galerita isabellina*, *G. macrorhyncha*, *G. cristata*, *Calandrella pispoletta*, *C. minor*, *C. brachydactyla* and *Melanocorypha sibirica* figured: H. E. Dresser, B. Eur. pts. xvi. xvii. xix.-xxii.

Calandrella deserti figured; C. W. Wyatt, Mamm. & Avif. Sinai, pl. xvi. fig. 3.

Calandrella reboudia in Southern Spain; Ld. Lilford, Ibis, 1873, p. 98 (considered a distinct species, and named *C. batica*; H. E. Dresser, B. Eur. pt. xx.).

Calandrella buckleyi, sp. n., Accra; G. E. Shelley, Ibis, 1873, p. 142.

Melanocorypha maxima, from Thibet; A. O. Hume, Str. Feath. i. pp. 492 & 493.

Melanocorypha torquata figured; G. Henderson & A. O. Hume, Lahore to Yarkand, pl. xxvii.

Alauda triborhyncha and *A. gulgula* figured; *id. t. c.* pls. xxviii. & xxix.

Alauda inconspicua and *Calandrella leucophea*, spp. nn., Turkestan; N. A. Severtzoff, Turkest. Jevotn. p. 142.

Galerita magna, sp. n., Yarkand; A. O. Hume, Lahore to Yarkand, p. 270, pl. xxx.

Mirafra microptera, sp. n., Burmah; *id.* Str. Feath. i. p. 483.

ICTERIDÆ.

Icterus formosus, sp. n., Tehuantepec; G. N. Lawrence, Ann. Lyc. N. Y. x. p. 184.

Ostinops atricastaneus and *O. sincipitalis*, spp. nn., Ecuador and New Grenada; J. Cabanis, J. f. O. 1873, p. 309.

Quiscalus macrurus in Mexico; M. Barcena, Nat. Mex. ii. pp. 203-207.

STURNIDÆ.

Sturnus nitens [Zool. Rec. viii. p. 67] figured; G. Henderson & A. O. Hume, Lahore to Yarkand, pl. xxiv.

Sturnus vulgaris, juv., figured. J. Gould, B. Gt. Br. pt. xxv.

Sturnus minor, sp. n., Sindh; A. O. Hume, Str. Feath. i. p. 207.

Pastor roseus figured; H. E. Dresser, B. Eur. pt. xxi. The young figured; J. Gould, B. Gt. Br. pt. xxv.

Sturnia andamanensis (Tytler) figured; Ld. Walden, Ibis, 1874, pl. xii. fig. 2.

Podoces hendersoni and *P. humilis* [Zool. Rec. viii. p. 67] figured; G. Henderson & A. O. Hume, Lahore to Yarkand, pls. xxii. & xxiii. Beaks, wings, and legs figured; *id. t. c.* pp. 246-249.

Podoces panderi. Its egg: J. Cabanis, J. f. O. 1873, p. 63.

Acridotheres mahrattensis distinct from *A. fuscus*; Blyth, Ibis, 1873, p. 79.

Calornis tytlerei, Andaman Islands; A. O. Hume, Str. Feath. i. pp. 480-482: *C. irwini*, Tipperah, *id. t. c.* p. 481: spp. nn.

PARADISIIDÆ.

ALBERTIS, L. M. Notes on the Birds of New Guinea. P. Z. S. 1873, pp. 557-560.

Gives an account of the habits of many of the rarer Birds of Paradise, of which the author was the first observer.

ELLIOT, D. G. A monograph of the *Paradisiidæ*, or Birds of Paradise. London: 1873. Fo. pp. i.-xxx. pls. xxvii.

The most complete account as yet published, the illustrations being especially good. The author discusses the literature of the family (pp. ix.-xv.), their classification (xv.-xviii.), and genera (xviii. & xix.), giving also a review of the family (xix.-xxii.), and an account of their geographical distribution (xxii.-xxvii.) The following are figured:—*Paradisea apoda*, *P. raggiana*, *P. minor*, *P. sanguinea*, *Manucodia chalybea*, *M. atra*, *M. keraudreni*, *Astrapia nigra*, *Parotia serpennis*, *Lophorina atra*, *Diphylloides speciosa*, *D. chrysoptera*, *D. republica*, *Xanthomelus aureus*, *Cicinnurus regius*, *Paradigalla carunculata*, *Semioptera wallacii*, *Epimachus speciosus*, *E. ellioti*, *Drepanornis albertisi*, *Seleucides alba*, *Ptilorhis magnificus*, *P. paradiseus*, *P. alberti*, *P. victoriae*, *Sericulus melinus*, *Ptilonorhynchus violaceus*, *P. rawnsleyi*, *Chlamydodera maculata*, *C. nuchalis*, *C. cerviniventris*, *C. xanthogastra*, *Ælurædus crassirostris*, *Æ. melanotis*, *Æ. buccoides*, *Amblyornis inornata*.

WAGNER, R. Die Verbreitung der Paradiesvögel. Zool. Gart. 1873, pp. 6-14.

A short account of the Birds of Paradise, their geographical distribution being illustrated by a small map for each species.

Drepanornis albertisi, Mt. Arfak, and *Paradisea raggiana*, Orangeisa Bay, spp. nn.; P. L. Selater, P. Z. S. 1873, pp. 558 & 559. The former described as *Epimachus wilhelminæ*; A. B. Meyer, J. f. O. 1873, pp. 404 & 405.

Epimachus ellioti, sp. n., New Guinea; E. Ward, P. Z. S. 1873, pp. 742 & 743.

CORVIDÆ.

Corvus collaris from Kashmir; E. Blyth, Ibis, 1873, p. 80.

Corvus subcorax, Turkestan, N. A. Severtzoff, Turkest. Jevotn. p. 115; *C. lawrencii*, Punjab, A. O. Hume, Lahore to Yarkand, p. 235: spp. nn. 1873. [VOL. X.]

Garrulus hyrcanus, sp. n., N. Persia; W. T. Blanford, *Ibis*, 1873, pp. 225 & 226.

Garrulus glandarius, *G. brandti*, *G. krynickii*, *G. cervicalis*, *G. atricapillus*, and *Perisoreus infaustus* figured; H. E. Dresser, *B. Eur.* pts. xvi.–xx.

Pica rustica and *P. mauritanica* figured; *id. t. c.* pt. xxii.

Pica caudata [sc. *rustica*] in confinement; G. von Gizycki, *J. f. O.* 1873, pp. 35–45.

Nucifraga caryocatactes. Its history in Solothurn; C. Vogel, *Ber. St. Gall. Ges.* 1871–72, pp. 156 & 157. The young figured; J. Gould, *B. Gt. Br.* pt. xxv.

Urocissa cucullata, Gould, = *U. flavirostris*; A. O. Hume, Lahore to Yarkand, p. 242.

Urocissa brevixilla, sp. n., Pekin; R. Swinhoe, *P. Z. S.* 1873, p. 687.

Cyanura stelleri and its races, *coronata*, Sw. *diademata*, Bp. *macrolopha*, Baird, *stelleri*, Gm., and *frontalis*, Ridgw.; R. Ridgway, *Am. J. Sci.* (3) v. pp. 39–44.

COLUMBÆ.

SCHLEGEL, H. Muséum d'Histoire Naturelle des Pays Bas. Livr. 10. *Aves Columbæ*, pp. 1–180.

A most extensive review of the Leyden collection, which contains no less than 2309 specimens arranged under the headings, *Ptilopus*, *Treeron*, *Columbæ*, *Carpophaga*, *Macropygia*, *Turtures*, *Phapes*, *Galli-Columbæ*. The author describes the following new species, viz. :—

Ptilopus neglectus, Viti, p. 7.

Chloroenas fallax, Mexico, p. 80.

Carpophaga geelvinkiana, Méosnoum and other islands of the Bay of Geelvink, p. 86.

Macropygia reinwardti-minor, Soek Island, p. 106.

Turtur neglectus, India and Africa, p. 122; *T. fallax*, N.E. Africa, p. 124.

Peristera lansbergi, Caracas, p. 139.

SOUZA, J. A. DE. Museu Nacional de Lisboa. Secção Zoológica. Catalogo das Collecções Ornithologicas. *Columbæ*. Lisboa: 1873. 8vo, pp. 5–24.

One hundred and forty-seven species are in the Lisbon Museum.

Palumbæna evermanni figured; G. Henderson & A. O. Hume, Lahore to Yarkand, pl. xxxi.

Columba neglecta, Ladak, A. O. Hume, *t. c.* pp. 272 & 273 (= *C. livia*, *id.* *Str. Feath.* i. p. 218); *C. speleæ*, Himalayas, T. Hutton, *t. c.* p. 272: spp. nn.

Carpophaga palumboides, sp. n., Andaman Islands; A. O. Hume, *Str. Feath.* i. p. 302. (Is an *Ianthanas*; Ld. Walden, *Ibis*, 1874, p. 315: figured, pl. xiii.)

Carpophaga brenchleyi [*Zool. Rec.* ix. p. 63] and *Macropygia crassirostris* figured; G. R. Gray in Brenchley's "Cruise," pls. xviii. & xix.

Treron wakefieldi, sp. n., Mombas; R. B. Sharpe, P. Z. S. 1873, p. 715, pl. lviii. fig. 2.

Ptilonopus rarotongensis [Zool. Rec. viii. p. 68], *P. fasciatus*, Peale, *P. porphyraceus*, Forst., *P. chrysogaster*, Gray, *P. pelewensis* (*op. cit.* v. p. 96), and *P. swainsoni*, Gould, figured; J. Mus. Godeff. i. pl. 7.

Ptilonopus bellus, sp. n., New Guinea; P. L. Sclater, P. Z. S. 1873, p. 696.

Phlogoenas tristigmata figured; J. Gould, B. Asia. pt. xxv.

Turtur sharpii [Zool. Rec. vii. p. 58] = *T. isabellinus*, Bp.; M. T. von Heuglin, J. f. O. 1873, pp. 151 & 152.

Ectopistes migratoria in Mexico. J. y Villada Sanchez; Nat. Mex. ii. pp. 250–255.

Columbina aurisquamata, sp. n., Argentine Republic; F. Leybold, Exc. Pamp. Argen. p. 38.

Gymnopelia, g. n., type, *G. erythrothorax* (Meyen); P. L. Sclater & O. Salvin, Nomencl. Av. Neotr. p. 156.

Leptoptila rufinucha [? *vox hybr.*], sp. n., Veragua; *iid. tom. cit.* p. 162.

GALLINÆ.

J. A. de Souza, Catalogo &c. "Gallinæ," pp. 25–49, records 167 species in the Lisbon Museum.

PHASIANIDÆ.

JEITTELES, L. W. Zur Geschichte des Haushuhns. Zool. Gart. 1873, pp. 55–63, 88–97, 130–138.

Researches into the history and antiquity of the domestic fowl.

TEGETMEIER, W. B. Pheasants for Coverts and Aviaries. London: 1873. 4to, pp. 124.

Phasianus colchicus figured; J. Gould, B. Gt. Br. pt. xxiv.

Lophophorus lhuysi [Zool. Rec. iii. p. 107] and *Chalcophasis sclateri* [*op. cit.* vii. p. 59] figured; *id.* B. Asia, pt. xxv.

Ithaginis sinensis, sp. n., Chen-si Province, China; A. David, Ann. Sci. Nat. (5), xviii. art. 5, p. 1.

TETRAONIDÆ.

Megaloperdix caspia. Its habits: G. Radde, J. f. O. 1873, pp. 1–6.

Tetrao tetrix, *T. urogallus*, and *Lagopus scoticus* figured; H. E. Dresser, B. Eur. pts. xx. xxi. xxiii. The last also figured by J. Gould, B. Gt. Br. pt. xxiii.

Lagopus albus. Its changes of plumage. H. Goebel, J. f. O. 1873, pp. 422–425.

Caccabis heyi and *C. saxatilis* figured; C. W. Wyatt, Mamm. & Avif. Sinai, pls. xix. & xx.

Caccabis pallescens, Ladak, *C. arenarius*, Aden, p. 283, and *C. pallidus*, Yarkand, p. 284; A. O. Hume, Lahore to Yarkand: spp. nn.

Odontophorus hypospodius, sp. n., Columbia; P. L. Sclater & O. Salvin. Nomencl. Av. Neotr. p. 162.

TURNICIDÆ.

Turnic albiventris, sp. n., Andaman Islands; A. O. Hume, Str. Feath. i. p. 305.

Hemipodius chrysostomus, sp. n., Chefoo; R. Swinhoe, Ann. N. H. (4) xii. p. 375.

MEGAPODIIDÆ.

Megapodius brenchleyi [Zool. Rec. ix. p. 55], figured. G. R. Gray in Brenchley's "Cruise," pl. xx.

Megapodius nicobaricus. Its eggs; A. O. Hume, Str. Feath. i. p. 313.

TINAMIDÆ.

Nothoprocta, g. n., type, *N. perdicaria* (Kittl.); P. L. Selater & O. Salvin, Nomencl. Av. Neotr. p. 156. *N. curvirostris*, sp. n., Ecuador; iid. t. c. p. 163.

Tinamus ruficeps, sp. n., Ecuador, iid. t. c. p. 162.

Crypturus bartletti, Eastern Peru, iid. P. Z. S. 1873, p. 311; *C. cerviniventris*, Venezuela, iid. t. c. p. 512: spp. nn.

GRALLÆ.

RALLIDÆ.

CROMMELIN, J. P. VAN W. Notes sur les Râles des Pays Bas. Arch. Néerl. viii. pp. 297-322.

All the Rails of Europe occur in Holland, and their geographical distribution is worked out with more than ordinary care.

HUTTON, F. W. Ueber die Arten der Gattung *Ocydromus* in Neuseeland. J. f. O. 1873, pp. 398-401.

The author recognizes no less than six species in New Zealand, two being new, viz., *O. hectori*, p. 399, *O. finschi*, p. 400. Dr. Finsch gives some critical notes on the paper, *op. cit.* pp. 401-404.

Rallus aquaticus and *R. indicus*, both occur in India; E. Blyth, Ibis, 1873, p. 80.

Rallus modestus [Zool. Rec. ix. p. 55]. Its distinctness from *R. dieffenbachi* insisted on, and the head and sternum figured; F. W. Hutton, Ibis, 1873, pp. 349-352.

Hypotenidia australis, sp. n., Australia and Oceania; A. von Pelzeln, tom. cit. pp. 42 & 43.

Eulabeornis lafresnayanus (Verr. & Desm.) figured; G. R. Gray in Brenchley's "Cruise," pl. xxi.

Porzana exquisita, sp. n., Chefoo; R. Swinhoe, Ann. N. H. (4) xii. p. 376.

Gallinula phenicura. Its nest: E. H. Aitken, Str. Feath. i. pp. 424 & 425.

Notornis alba figured; O. Salvin, Ibis, 1874, p. 295, pl. x.

SCOLOPACIDÆ.

SCLATER, P. L. & SALVIN, O. Notes on the range of several American *Limicolæ*. P. Z. S. 1873, pp. 453-457.

The chief interest in this paper consists in the separation of two Stilts in America, as *Himantopus nigricollis* and *H. brasiliensis*, the heads of both being figured.

Numenius borealis, *N. phaeopus*, and *N. arquatus*, figured; H. E. Dresser, B. Eur. pts. xvii. & xviii.

Totanus ochropus, *T. calidris*, *T. glareola*, *T. macularius*, *T. hypoleucus*. Heads of young in down figured; A. Marchand, R. Z. 1873, pl. ii.

Tringa fuscicollis figured; H. E. Dresser, B. Eur. pt. xx. Again figured (s. n. *Pelidna bonapartii*); J. Gould, B. Gt. Br. pt. xxxiii.

Tringa canutus in the Arctic Regions: A. Newton, in Markham's "Threshold of the Unknown Region," p. 307. Figured; J. Gould, B. Gt. Br. pt. xxiii.

Tringa bairdi. Note on: E. Coues, Am. Nat. vii. p. 226.

Actitis maculosa figured; J. Gould, B. Gt. Br. pt. xxiv.

Eurynorhynchus pygmaeus from Shanghai; R. Swinhoe, Ibis, 1873, p. 425.

Gallinago stenura. Description of: G. F. L. Marshall, Str. Feath. i. pp. 423 & 424.

Macrorhamphus griseus figured; J. Gould, B. Gt. Br. pt. xxiii.

Lobipes tropicus, sp. n., Sindh; A. O. Hume, Str. Feath. i. p. 247.

CHARADRIIDÆ.

HARTING, J. E. On rare or little known *Limicolæ*. Ibis, 1873, pp. 260-269, pls. viii. & ix.

In continuation of the series of papers on this subject [Zool. Rec. vi. p. 95; vii. p. 61]. The present essay deals with *Ægialites varius* (*vel-pecuarius*) and its ally *Æ. sanctæ-helencæ*, sp. n., from St. Helena, p. 266, pl. 9. *Ægialites hartingi* [Zool. Rec. vii. p. 61] = *Æ. placidus* (Gray); *id. t. c.* pp. 325-327.

Ægialites hiaticula figured; J. Gould, B. Gt. Br. pt. xxiii.

Ægialophilus cantianus figured; *id. ibid.*

Calodromas, g. n., type *Charadria elegans*, D'Orb. & Isid. Geoff.; P. L. Sclater & O. Salvin, Nomencl. Av. Neotr. p. 156.

Eudromias crassirostris, sp. n., Turkestan; N. A. Severtzoff, Turkest. Jevotn. p. 146.

OTIDIDÆ.

Otis tarda figured; H. E. Dresser, B. Eur. pt. xx.

GRUIDÆ.

Grus cinerea figured; J. Gould, B. Gt. Br. pt. xxiii. Again figured [s. n. *G. communis*]; H. E. Dresser, B. Eur. pt. xviii. Two species usually confounded under this name; E. Blyth, Ibis, 1873, p. 80.

PSOPHIIDÆ.

Psophia napensis, sp. n., Ecuador; P. L. Sclater & O. Salvin, Nomencl. Av. Neotr. p. 162.

ARDEIDÆ.

Ardea purpurea and *Herodias alba* figured; J. Gould, B. Gt. Br. pt. xxiii.
Ardetta pulchra, sp. n., Andaman Islands; A. O. Hume, Str. Feath. i. p. 309.

Ardetta eurhythmia, sp. n., Amoorland and North China; R. Swinhoe, Ibis, 1873, pp. 73 & 74, pl. ii.

Baleniceps rex. Notes on; E. Marné, Zool. Gart. 1873, pp. 321 & 324: C. G. Giebel, Z. ges. Naturw. (2) vii. pp. 350-354.

CICONIIDÆ.

Ciconia boyciana, sp. n., Japan; R. Swinhoe, P. Z. S. 1873, pp. 512-514.
Ciconia alba-asiatica, Turkestan; N. A. Severtzoff, Turkest. Jevotn. p. 145.

Ciconia alba and *C. nigra* figured; H. E. Dresser, B. Eur. pts. xix. xxiv.

TANTALIDÆ.

Ibis nippon. Complete description of the species in China; R. Swinhoe, Ibis, 1873, pp. 249-253.

Ibis sinensis, sp. n., Tché-Kiang province, China; A. David, C. R. lxxv. p. 64 (not separable from *I. nippon*; E. Oustalet, N. Arch. Mus. viii. Bull. pp. 129-137, pl. vi.).

Ibis falcinellus in Belgium; A. Thielens, Mém. Soc. Hain. (3) iii.

Falcistrostra, g. n., types *F. kaufmanni* and *longipes*, spp. nn., Turkestan; N. A. Severtzoff, Turkest. Jevotn. p. 146, pl. x. figs. 1 & 2 [= *Ibidorhynchus struthersi*].

Platalea leucorodia. Structure of its bill: M. Jobert, C. R. lxxv. pp. 1780-1782. Figured; H. E. Dresser, B. Eur. pt. xxiii.

ANSERES.

ANATIDÆ.

CROMMELIN, J. P. VAN W. Notes sur quelques Oiseaux observés en Hollande. Arch. Néerl. vii. pp. 130-135.

Describes wild hybrids between *Anas boschas* and *A. crecca*, *A. acuta* and *A. crecca*, and *Fuligula ferina* and *F. nyroca*.

Anser segetum and *A. ferus* figured; J. Gould, B. Gt. Br. pt. xxiv.

Anser skorniakovi and *A. middendorffi*, spp. nn., Turkestan; N. A. Severtzoff, Turkest. Jevotn. pp. 148 & 149. The former figured; *id. t. c.* pl. x. figs. 3 & 4.

Chen hyperboreus and *C. albatrus* figured; H. E. Dresser, B. Eur. pt. xix.

Nettapus kopschii, sp. n., R. Yangtsze; R. Swinhoe, Ann. N. H. (4) xi. pp. 15-17.

Anas boschas, *Chaulelasmus streperus*, *Dafila acuta*, *Spatula clypeata*, and *Fuligula rufina* figured; H. E. Dresser, B. Eur. pts. xvii. xviii. xix. xxii.

Mareca albigularis, sp. n., Andaman Islands; A. O. Hume, Str. Feath. i. pp. 303 & 304 (= *M. gibberifrons*, Müll.; Ld. Walden, Ibis, 1873, p. 321).

Fuligula mariloides in China; R. Swinhoe, P. Z. S. 1873, pp. 411-413.

Dendrocygna discolor, sp. n., Venezuela and Brazil; P. L. Selater & O. Salvin, Nomencl. Av. Neotr. p. 161.

Querquedula andium, sp. n., Ecuador; *iid. tom. cit.* p. 162.

Odontopteryx, g. n. (foss.), described from the skull of a dentigerous bird from the London clay of Sheppey. Type, *O. toliapica*, sp. n. foss., R. Owen, P. Geol. Soc. 1873, pp. 511-522, pls. xvi. & xvii.

LARIDÆ.

Larus fuscus, *L. canus*, *L. ichthyaetus*, *L. argentatus*, and *L. leucophæus* figured; H. E. Dresser, B. Eur. pts. xvi. xvii. xviii. xxii.

Larus marinus, *L. glaucus*, *L. islandicus*, *L. argentatus*, *Chrococephalus ridibundus*, and *C. philadelphia* figured; J. Gould, B. Gt. Br. pt. xxiv.

Larus marinus and *L. canus*. Young in down figured; A. Marchand, R. Z. 1873, pls. 12 & 13.

Xema brunneicephala figured; G. Henderson & A. O. Hume, Lahore to Yarkand, pl. xxxii.

Stercorarius asiaticus, sp. n., Sindh; A. O. Hume, Str. Feath. i. p. 269.

Hydroprogne caspia figured; J. Gould, B. Gt. Br. pt. xxiv.

Sterna frobeni distinct from *S. trudeauii*, and *S. cornuta* from *S. galericulata*; L. Landbeck, An. Univ. Chil. xli. p. 515.

Hydrochelidon (Haliplana) somalensis, sp. n., Somali coast; M. T. von Heuglin, Orn. N. O. Afr. p. 1512.

PROCELLARIIDÆ.

REINHARDT, J. Om Vingens anatomiske Bygning hos Stormfugle-Familien (*Procellariidæ* s. *Tubinares*). Vid. Medd. 1873, pp. 123-128, woodcuts, pp. 128 & 130. (Translated) Sur la structure Anatomique des ailes dans la famille des Pétrels; J. Zool. iii. pp. 139-144, figs. 1 & 2.

A new classification of the Petrels is brought forwards, based on the presence or absence of a sesamoid bone or bones in connection with the humerus, which, when present only in certain of the *Procellariidæ*, have attachments with, and are mechanically subservient to, the *extensor metacarpi radialis longus*, *tensor patagii longus*, and *t. p. brevis* muscles. The sesamoid bone is very small in *Æstrelata fuliginosa*, *Æ. bulweri*, *Diomedea chlororhyncha*, and *Phæbetria fuliginosa*. Besides the Albatross, four species of *Diomedea* and one of *Phæbetria* possess it of large size. It is wanting in species of *Fulmarus*, *Ossifraga*, *Daption*, *Pagodroma*, *Prion*, *Procellaria*, *Oceanites*, and *Pelecanooides*, and probably also *Halobœna*, not examined by the author. Under the denomination *Puffine*, subsidiary to the sub-family of *Procellarine*, he includes four genera, viz.:—

Estrelata, *Puffinus*, *Majaqueus*, and *Adamastor*. His proposed divisions of the *Procellariæ* are :—

- I. Humeral sesamoids present :—
 Twelve RectricesPuffin[in]æ.
 II. Humeral sesamoids absent :—
 a, First primary longest.
 a', More than twelve RectricesFulmaræ.
 b', Twelve Rectrices :—
 a'', Edge of beak without denticulation.....*Pagodroma*.
 b'', Edge of beak with denticulationPrionæ.
 b, Second primary longestProcellariæ.

A footnote in the summary expresses a doubt whether *Pagodroma* ought not to be placed among the *Fulmaræ* instead of forming a separate division.

Diomedea derogata, sp. n., China; P. L. Scater, P. Z. S. 1873, pp. 784-786.

Procellaria fuliginosa and *P. lessoni* figured: W. L. Buller, B. N. Zeal. pl. 28.

Prion australis, sp. n., New Zealand; T. H. Potts, Ibis, 1873, pp. 84 & 85.

Puffinus tenebrosus, sp. n., King George's Sound; A. von Pelzeln, *t. c.* p. 47. Its head and that of *P. obscurus* figured; *id. t. c.* p. 50.

PELECANIDÆ.

Phalacrocorax carbo figured; J. Gould, B. Gt. Br. pt. xxiv.

Phalacrocorax carunculatus, *P. brevirostris*, and *P. punctatus*, figured; W. L. Buller, B. N. Zeal. pls. 29 & 30.

Phalacrocorax featherstoni, sp. n., Chatham Islands; W. L. Buller, Ibis, 1873, pp. 90 & 91. Figured; *id.* B. N. Zeal. pl. 31.

Graculus lucidus added to the Damara list [Zool. Rec. ix. p. 26]; J. H. Gurney, Ibis, 1873, p. 232.

Plotus anhinga figured; P. L. Scater, P. Z. S. 1873, p. 2.

Sula bassana figured; J. Gould, B. Gt. Br. pt. xxiv.

Sula plumigula, sp. n., New Holland [?]; A. von Pelzeln, Ibis, 1873, p. 52.

SPHENISCIDÆ.

Eudyptes chrysocomus and *Eudyptila minor* figured; W. L. Buller, B. N. Zeal. pl. 32.

Spheniscus trifasciatus, sp. n., Valdivia; R. A. Philippi, Z. ges. Naturw. (2) vii. pp. 121-127, pls. 1 & 2.

ALCIDÆ.

Alca impennis and *Uria troile* figured; J. Gould, B. Gt. Br. pts. xxiii. & xxiv.

STRUTHIONES.

SCHLEGEL, H. Muséum d'Histoire naturelle des Pays Bas.
Livr. 10. *Aves Struthiones*, pp. 1-14.

The author recognizes the following extinct species as members of the order:—*Didus borbonicus*, *D. ineptus*, *Pezohaps solitarius*, *P. bræcki*, *P. herberti*, and the genus *Dinornis*; and of recent genera, *Struthio* (1 sp.), *Rhea* (2 spp.), *Dromæus* (2 spp.), *Apteryx* (3 spp.), and *Casuarius* (6 spp.).

STRUTHIONIDÆ.

Struthio camelus in captivity; M. Crépu, Bull. Soc. Acclim. (2) x. 1873, pp. 624-640.

CASUARIIDÆ.

Casuarius kaupi, Selater, from New Guinea [Zool. Rec. ix. p. 59] is not that species (which = *C. uniappendiculatus*), but a new one, named *C. papuanus*; Baron Rosenberg, J. f. O. 1873, pp. 39 & 40.

Dromæus novæ-hollandiæ. Notes on its anatomy: M. G. Duchamp, Ann. Sci. Nat. (5), xvii. art. 11, pp. 1-12, pl. 22.

COUGHTREY, M. Note on the tracheal pouch of the Emu (*Dromæus novæ-hollandiæ*). P. Liverp. Soc. 1872-73, pp. 293-299: Ann. N. H. (4) xii. p. 217.

——. Note on the heart of the *Dromæus novæ-hollandiæ*, with remarks on the homological relations of the valves of the pre-cavæ. *Op. cit.* pp. 327-333.

The author tabulates the number of incomplete cartilaginous rings in the tracheal pouch, varying from five to thirteen. (His specimen did not present the band-like duplications described by Dr. Murie.) At the opening of the right pre-caval vein into the auricular sinus venosus of the heart, is a semilunar membranous valve, viz.:—a duplicature of the endocardium, containing a few muscular fibres. This (hitherto unnoticed) he compares with a similar structure occasionally found in Man and some Mammals. Physiologically, he considers this must have had considerable influence in directing the blood towards the cavity of the right auricle, and away from the foramen ovale.

DUCHAMP, M. G. Observations sur l'anatomie du *Dromaius novæ-hollandiæ*. Ann. Sci. Nat. (5) xvii. art. 11, pp. 1-12, pl. 22.

In this bird, unlike the Cassowary, the representative of a crop is absent. The hepatic and pancreatic ducts offer peculiarities. Two tubes lead from the liver, one partially dilated into a biliary reservoir; close to the duodenum the pancreas forks, and joins each bile duct. There are two cœci of unequal length, and a well developed penis, a dissection of which is figured.

ÆPYORNITHIDÆ.

BIANCONI, G. G. Osservazioni addizionali intorno alla brevità del femore di *Æpyornis*. Mem. Acc. Bologn. (3) iv. pp. 169-179, pl. xxv.

Æpyornis is again referred to the *Vulturidæ* [cf. Rend. Acc. Bologn. 1871-72, pp. 55-57].

APTERYGIDÆ.

Apteryx mantelli and *A. oweni* figured; W. L. Buller, B. N. Zeal. pls. 33 & 34.

AVIS INCERTÆ SEDIS.

Struthiolithus, g. n. (foss.) from the Crimea; type, *S. chersonensis*, sp. n., founded on a fossil egg. A. Brandt, Bull. Pétersb. xviii. p. 158.

MARSH, O. C. On a new sub-class of Fossil Birds. Am. J. Sci. (3), v. pp. 161 & 162.

The author establishes a Sub-class "*Odontornithes*," and Order "*Ichthyornithes*," for the reception of his genus *Ichthyornis* [Zool. Rec. ix. p. 60], and *Apatornis*, g. n. (foss), founded *l. c.* p. 162, upon *Ichthyornis celer*, sp. n. (foss.), from cretaceous formations of Western Kansas, *id. l. c.* p. 74, both of which have regularly developed teeth in both jaws [cf. Ann. Sci. Nat. xvii. art. 9; Am. Nat. vi. pp. 115-117].

REPTILIA.

BY

A. W. E. O'SHAUGHNESSY.

THE GENERAL SUBJECT.

BOCAGÉ, J. V. BARBOZA DU. Mélanges erpétologiques. I. Note sur quelques Geckotiens nouveaux ou peu connus de la Nouvelle Calédonie. *Jorn. Sc. Lisb.* xiv. pp. 201–207. II. Sur quelques Reptiles et Batraciens nouveaux rares ou peu connus d'Afrique occidentale. *Op. cit.* xv. pp. 209–227. III. Sur quelques Sauriens nouveaux de la Nouvelle Calédonie et de l'Australie. *Ibid.* pp. 228–232.

———. Reptiles nouveaux de l'intérieur de Mossamedes. *Ibid.* pp. 247–253.

BOCOURT, F. Notes erpétologiques. *Ann. Sci. Nat.* (5) xvii. Art. 2.

———. [See DUMÉRIL.]

COPE, E. D. Report on the recent Reptiles, in F. V. Hayden's Preliminary Report of the U. S. Geological Survey of Montana and portions of adjacent territories. Washington: 1872, pp. 467–469.

The Reptile part of the collection consisted of five Snakes, four Lizards, one Tortoise, and six Batrachians (all known species).

DUMÉRIL, A., & BOCOURT, F. Mission scientifique au Mexique et dans l'Amérique Centrale. Publié sous la direction du Ministre de l'Instruction Publique. Recherches Zoologiques publiées sous la direction de M. Milne Edwards. Part III. Études sur les Reptiles et les Batraciens, 2^e livrⁿ. Paris: 1873. 4to. (See *Zool. Rec.* ix. p. 62.)

The publication of this work, commenced before the late war, and suspended during the siege of Paris, is now continued. The second part of the Reptiles at present published begins at p. 33, continuing the Crocodiles, and embracing the *Geckotidæ* and the *Iguanidæ* as far as *Polychrus*. References are made to plates xvi. & xvii., but plates i. to xv. only have yet appeared. For strictures upon a previous portion of this work, cf. J. E. Gray, *Ann. N. H.* (4) xii. p. 109.

FISCHER, J. VON. Die Reptilien und Amphibien des St. Petersburger Gouvernements. Zool. Gart. 1873, p. 324.

GERVAIS, P. Du Moloch et de l'Héloderme. J. Zool. 1873, p. 451.

Contains also some remarks on the teeth of venomous serpents.

GRAY, J. E. Hand-list of the Specimens of Shield Reptiles in the British Museum. London: 1873. 4to, pp. 1-124.

This catalogue comprises—I. Testudinata. II. Emydosauri. III. Rhyngocephalia. IV. Amphisbænia. The total number of species contained in it is 239, arranged as in the catalogues published in 1855, 1870, and 1872, but all subsequent new species and corrections are embodied or adopted. Characters and diagnoses are not given, but the new species have been described in Ann. N. H. (4) xi. and will be recorded *infra*.

GÜNTHER, A. Notes on some Reptiles and Batrachians obtained by Dr. Adolf Bernhard Meyer in Celebes and the Philippine Islands. P. Z. S. 1873, pp. 165-172, pls. xvii. & xviii.

HASSE, C. Das Gehörorgan der Crocodile nebst weiteren vergleichend anatomischen Bemerkungen über das mittlere Ohr der Wirbelthiere und dessen Annexe. Anatom. Studien I, Heft ix. 1873, pls. xxx.-xxxiii.

HILGER, —. Ueber die chemischen Bestandtheile des Reptilien-eies. SB. Soc. Erlang. 1873, p. 17.

JULLIEN, J. Sur la respiration des Psammodromes. C. R. lxxvi. 1873, p. 585.

The author's remarks apply to all Reptiles breathing by means of lungs, and relate to the internal muscular structure of those organs, by which, and not by any action of the thoracic muscles, the contractions resulting in expiration are effected.

LANGERHANS, P. Notiz zur Anatomie des Amphibienherzens. Z. wiss. Zool. xxiii. pp. 457 & 458, pl. xxv. fig. 3.

O'SHAUGHNESSY, A. W. E. Herpetological Notes. Ann. N. H. (4) xii. p. 44.

PETERS, W. Ueber zwei Giftschlangen aus Afrika, und über neue oder weniger bekannte Gattungen und Arten von Batrachiern. MB. Ak. Berl. 1873, pp. 411-418.

——. Ueber eine von Hon. F. Pollen und Van Dam auf Madagascar und anderen ostafrikanischen Inseln gemachte Sammlung von Amphibien. L. c. pp. 792-795.

——. Ueber eine neue Schildkrötenart *Cinosternon effeldtii* und einige andere neue oder weniger bekannte Amphibien. L. c. pp. 603-618.

SEGOND, L. A. Reptiles et Batraciens classés d'après leurs affinités par rapport à cinq types dont les caractères sont empruntés aux parties les moins modifiables du squelette. Suite et fin. J. de l'Anat. Phys. 1872, pp. 645-660, and 1873, pp. 1-29.

The five typical forms which the author has selected are—*Chelone mydas*, *Crocodylus niloticus*, *Lacerta ocellata*, *Python*, and *Rana viridis*, and he considers that a classification of Reptiles, as well as of Mammalia and Birds, ought to be based upon characters derived primarily from the anterior vertebræ, aided by a general view of the vertebral column, the sternum, and the pelvic arch. He gives a general account of these parts of the skeleton in the five types mentioned, and a synoptical view of an arrangement, which, however, is merely general, the author observing that, in regard to the *Lacertilia*, a more extended examination of prepared skeletons would be necessary to render it complete.

SEVERTZOFF, N. A. Turkestanskije Jevotnie [Fauna of Turkestan]. Nachr. Ges. Mosc. viii. pt. 2.

The Reptiles enumerated amount to 39 species, viz.:—2 Tortoises, 22 Lizards, 9 Snakes, and 6 Batrachians. They are arranged in tables showing their local distribution.

STOLICZKA, F. Notes on some species of Malayan Amphibia and Reptilia. J. A. S. B. (n. s.) xlii. pt. 2, pp. 111-125.

A list of Reptiles collected in Penang, or in the Wellesley province, with notes and descriptions of new species.

— —. Note on some Andamanese and Nicobarese Reptiles, with the description of three new species of Lizards. L. c. pp. 162-169.

STRAUCH, A. Die Schlangen des Russischen Reichs in systematischer und zoogeographischer beziehung. Mém. Pétersb. (7) xxi. No. 4, pp. 287, 6 pls.

The first of a proposed series of similar works on the entire reptilian fauna of Russia, commencing with the Snakes, as standing in need of more especial critical revision at the present time. Prefixed to the technical part is a complete historical introduction, treating of all the previous materials in chronological succession from the earliest notices of this division of the fauna of Russia down to the present time. The number of species to be regarded as belonging to the Russian fauna is 37 or 38; and these are distributed over the vast range of the Russian territories, here divided superficially into four provinces; viz., the European, Caucasian, West and East Siberian. A table shows the several species belonging to each, and those that are common to two or more, and the geographical details attached to the notice of each species are copious. The descriptions are lengthy, preceded by diagnoses, and complete synonymy, and giving measurements and particulars of specimens. At the end of the work is a list of these in the Museum of the Imperial Academy, which have formed the basis of the author's investigations.

SUMICHRAST, F. Coup d'œil sur la distribution géographique des Reptiles au Mexique. Arch. Sci. Nat. 1873, pp. 233-250.

The author divides the Mexican territories into—1. The region of the plains and alpine region. 2. The Littoral, or hot and temperate regions. The first belong zoologically to the Nearctic, the second to the Neotropical region. A tabular view of the distribution of the *Ophidia* in Mexico is appended.

——. Notes sur quelques Reptiles mexicains peu connus. L. c. pp. 251-262.

CHELONIA.

GRAY, J. E. On the original form, development, and cohesion of the bones of the sternum of Chelonians; with notes on the skeleton of *Sphargis*. Ann. N. H. (4) xi. pp. 162-172, pls. iv.-vi.

The author quotes a passage and plate in Cuvier's "Ossemens Fossiles," v. p. 204, and the figure of the skeleton of a young *Testudo indica* by Prof. Owen, Phil. Tr. cxxxix. (1849) pl. 19, figs. 4-6, as the only previous observations he has found on the form of the bones in the sternum of young Chelonians, adding that "these authors did not seem to be aware of the great variation in the forms of the bones in the young of the different genera, the changes that they undergo during the growth of the animal, and the important assistance that their study affords in the arrangement of the animals." He then describes the conditions of the sternum in the young, and its gradual change and comparative degrees of coalescence in Land Tortoises (*Testudo*), Freshwater Tortoises or Terrapins, Mud Tortoises (*Trionyx*), and Sea Turtles—illustrating his remarks with plates. In conclusion, he says: "The study of the development of the sternum of the Tortoises has brought out affinities between groups that have not hitherto been observed; and no doubt, as the state of the bones in more young specimens is known, it will greatly add to our knowledge of the relations which the genera bear to each other." He then divides the *Chelonia* into groups founded upon the characters of the sternum. The skeleton of *Sphargis* is altogether unlike that of other Chelonians, the bones being not more developed in the adult than in the young state. Its peculiarities are described, and an analogy drawn between the hard longitudinally costate skin and the *Ostracion* or Trunkfish.

——. Additional Notes on the form of the bones in the sternum of very young Tortoises, and their development. L. c. pp. 319-323, pl. xii.

The result of an examination of the sterna in very young individuals of two genera of Land Tortoises, with further general remarks on the subject, and figures of the sterna of many species.

GRAY, J. E. Observations on Chelonians, with descriptions of new genera and species. *L. c.* pp. 289–308.

A series of further remarks on the sternal and other osteological peculiarities of Chelonian genera and species. Attention is drawn to differences in the adult sternum and caudal plate in Land Tortoises, believed to be sexual.

GÜNTHER, A. Preliminary notice of some extinct Tortoises from the islands of Rodriguez and Mauritius. *Ann. N. H.* (4) xi. p. 397.

A brief preliminary notice of some gigantic Chelonian remains obtained in Rodriguez and Mauritius, supplemented by bones in the Geological Department of the British Museum, discovered at the same time and in the same place with *Didus ineptus*.

RÜTIMEYER, L. Ueber den Bau von Schale und Schädel bei lebenden und fossilen Schildkröten, als Beitrag zu einer paläontologischen Geschichte dieser Thiergruppe. *Verh. Ges. Bas.* 1873, vi. 1.

WILLIAMS, H. Comparison of the muscles of the Chelonian and Human shoulder girdles. *Tr. Conn. Ac.* ii. p. 301.

C. F. KNIGHT makes observations on the habits of some of the Tortoises of Florida. *P. Bost. Soc.* xiv. (1871) p. 16.

TESTUDINIDÆ.

J. E. Gray arranges this family according to the alveolar surfaces of the jaws, which he figures in most of the genera [this arrangement differs from that followed in the "Hand-list" mentioned *suprà*]. *P. Z. S.* 1873, pp. 722–728, pl. lx.

Testudo. Remarks on bones of sternum of *T. tabulata*, *elephantopus*, *platynotus*, and *stellata*: *id. Ann. N. H.* (4) xi. p. 162, pl. iv. figs. 1, 2, 3, 4. Further remarks on *T. tabulata*; *id. l. c.* p. 290.

Peltastes. Remarks principally on the sternum and caudal plate as showing differences of sex in the following species: *P. geometricus*, *tensorius*, *stellatus*, *platynotus*, *elongatus*, *leithi*, *græcus*; *id. l. c.* pp. 390–392.

Testudinella horsfieldi. Descriptive note: *id. l. c.* p. 143.

Chersina angulata. Remarks on sternum and caudal plate: *id. l. c.* p. 292.

Homopus signatus. Sternum in the young described: *id. op. cit.* xii. p. 320, pl. xii. fig. 1.

Kinixys belliana. Remarks on animal and shell; *id. op. cit.* xi. p. 292: and on *K. erosa* and *homeana*, p. 393. Description of the sternum in the young of *K. erosa*: *id. op. cit.* xii. p. 320, pl. xii. fig. 2. Peters refers *K. belliana* doubtfully to the fauna of Madagascar: *MB. Ak. Berl.* 1873, p. 792.

Manouria fusca. Remarks on the sternum: J. E. Gray, *op. cit.* xi. p. 293.

Testuda rodericensis, Rodriguez, *serrata* and *inepta*, Mauritius, spp. nn. (extinct), briefly characterized: A. Günther, *Ann. N. H.* (4) xi. p. 397.

CISTUDINIDÆ.

J. E. Gray describes or makes remarks on *Cistudo carolina*, *Cistoclemmys flavi-marginata*, *Cuora amboinensis*, *Cyclemys dhor*, l. c. pp. 294 & 295, and figures the sternum of the last-named and of *Notochelys platynota*, pls. iv. & v. The sternum of *Cuora amboinensis* figured; *id. op. cit.* xii. pl. xii.

EMYDIDÆ.

Geoemyda spinosa and *G. grandis*. Sterna of young described and figured. J. E. Gray, *op. cit.* xii. p. 320, pl. xii.

Nicoria spengleri and *Geoclemmys muehlenbergi*. Colours described: *id. op. cit.* xi. p. 296.

Rhinoclemmys. Synoptical table of the species, including as new *R. frontalis* and *ventricosa*, from Tropical America: *R. pulcherrima* is probably a very large species when adult. *Id. l. c.* pp. 144 & 145. The sternum of *R. scabra* figured: *id. l. c.* pl. v. fig. 4.

Melanochelys trijuga. Descriptive remarks: *id. l. c.* p. 297.

Chrysemys picta, *C. pulchra*, sp. n., Mississippi, and *C. belli* (= *Emys oregonensis*, Harl., and *Actinemys marmorata*, Lord) are characterized as three forms of this genus, which in a large series seem constant and have special localities. *Id. l. c.* p. 146.

Chrysemys picta. Sternum figured: *id. op. cit.* xii. pl. xii.

EMYDINA. On the two modifications of the alveolar edge in this tribe: *id. op. cit.* xi. p. 296.

Emys. The species divided, and remarks on some of them appended: *id. l. c.* p. 298.

Emys fraseri, sp. n., *id. l. c.* p. 146, Algiers. Sternum figured, *id. op. cit.* xii. pl. xii.

Emys grayi, Dum. & Boc. (Miss. Sc. Mex. Amer. Centr. pt. ii. 1870, p. 13, pl. iii. figs. 2, 2a) = *Callichelys concinna*, Gray (Ann. N. H. 1873, xi. p. 148, and "Hand-list Sh. Rept." p. 48), of which "the name accidentally dropped out in the 'Hand-list,' and the specimens were referred to as belonging to *C. callirostris*." *Id. op. cit.* xii. p. 110.

Emys pulcherrima, Dum. & Boc. (*l. c.* p. 15, pl. vii. figs. 1, 1a, & 1b), ? Gray, is renamed *Rhinoclemmys bocourti*. J. E. Gray, *l. c.* p. 111.

Emys marmorata, Dum. & Boc. (*l. c.* p. 16), ? Bd. & Gir. (1852), ?? = *Redamia olivacea*, Gray (1855). *Id. ibid.*

Emmenia grayi. Sternum figured: *id. l. c.* pl. xii.

Orlitia, g. n., *id. op. cit.* xi. p. 156. Head covered with large plates, plain-coloured; lower jaw strong, acute, upcurved at the tip; alveolar plate of upper jaw narrow, with a raised inner margin, of lower jaw narrow, sharp-edged. Toes short, well webbed to the end; claws 5: 4, short, acute. Thorax ovate, very convex, shelving on the sides, with a blunt and interrupted vertebral keel. Vertebral plates in the young as broad as long, front one narrowed behind; second, third, and fourth hexagonal; fifth much smaller, square. First, second, and third costal plates large, angular above; the fourth very small, square, only as high as the small

fifth vertebral. Marginal plates broad, hinder four much narrower, with a serrated edge. Nuchal plate broad, well developed. All the distal and upper part of the marginal plates in the young with a very large punctate areola. Sternum flat, strongly keeled on the sides. Anal shields small. Tail short. *O. borneensis* (under *Cuora amboinensis* in Suppl. Cat. Shield R. p. 21), sp. n., *id. ibid.* Borneo.

Bellia crassicollis. Sternum figured: *id. op. cit.* xii. pl. xii.

Staurotypus marmoratus, sp. n., Fischer, Arch. f. Nat. 1872, i. p. 265, pl. x. Texas and Mexico.

MALOCLEMMYDIDÆ.

Maloclemmys concentrica. Sternum figured: J. E. Gray, *op. cit.* xi. pl. v. fig. 1.

Damonia unicolor, sp. n., *id. op. cit.* xii. p. 78, Shanghai.

Damonia reevesi. Descriptive note on specimens of the "Hairy Tortoise," supposed to be *Emys reevesi* (Illustr. Ind. Zool.): *id. op. cit.* xi. p. 299, pp. 148 & 299, and xii. pl. xii. (sternum).

Damonia macrocephala. Remarks on shell and sternum: *id. op. cit.* xi. p. 299. Sternum figured: *id. op. cit.* xii. pl. xii.

Damonia oblonga, Gray [Zool. Rec. viii. p. 80], probably = *D. macrocephalus*. var. *Id. op. cit.* xi. p. 299.

Graptemys pseudogeographica. Descriptive remarks: *id. l. c.* p. 300.

PSEUDEMYDIDÆ.

Pseudemys concinna. Note on variation of colour: J. E. Gray, *l. c.* p. 299. Sternum figured: *id. op. cit.* xii. pl. xii.

Trachemys holbrookii. Sternum figured: *id. ibid.*

Trachemys lineata, sp. n., *id. op. cit.* xi. p. 147, North America.

Callichelys concinna, sp. n., *id. ibid.*, Tehuantepec.

BATAGURIDÆ.

Kachuga. Remarks on ribs, sternum, and nuchal plate of *K. trilineata*, *dentata*, and *major*: *id. op. cit.* xi. p. 300. The sterna of the two last figured: *ibid.* pl. vi. figs. 1 & 2.

Ocadia is referred to this family, in consequence of an examination of the skull (described and figured): *id. P. Z. S.* 1873, p. 191.

Remarks on *O. sinensis*: *id. Ann. N. H.* (4) xi. p. 300

CHELYDRIDÆ.

J. E. GRAY, *Ann. N. H.* (4) xii. pp. 66-70, gives the results of a study of the sterna of adult animals of this family, having been still unable to procure those of young animals to complete his investigations. He divides the family into two sections, which may perhaps eventually be considered as families:—

I. CRUCISTERNA. The sternum cross-shaped, simple and acute behind, with more or less elongate lateral processes to the sternal costal suture, and united to the marginal bones by an osseous suture. The

anterior pair of bones elongate, broad, with a well developed odd internal bone; the two middle pairs are well developed, and in the adult united on each side by a straight dentate suture and also by a medio-longitudinal suture. The hinder pair of bones are slender and united together in the middle, and in front to the hinder edge of the central pair. This section embraces:—

Tribe I. Chelydrina. Genera, *Macrochelys* and *Chelydra*.

Tribe II. Staurotypina. Genera, *Staurotypus*, *Stauremys*, and *Claudius*.

II. EURYSTERNA. The sternum covered with five pairs of shields, and generally a small odd or gular shield, formed of the rudiments of the two geminate front shields, between the fore parts of the front lateral pair. The sternum without any odd internal or mesosternal bone, which is found in all the other Chelonians. The lateral pair of bones joined together by a linear cross suture and by a dentate central longitudinal suture, forming a square disk which is covered by the abdominal pair of plates, the anterior and posterior pairs being very broad and united by a central longitudinal suture, and each being united to the front and back of the central abdominal portion by a more or less straight transverse suture at each end, which allows the front and hinder portions to be moveable on the central one. The front portion is covered externally with two pairs of plates and the odd anterior one when present: the hinder portion with two pairs of plates. *Goniochelys*, *Aromochelys*, *Kinosternon* [*Cinosternum*], and *Swanka*.

Kinosternon. Note on pelvis in this genus; Gray, *op. cit.* xi. p. 301: and figure of sternum of *K. pennsylvanicum*, *id. l. c.* pl. v. fig. 6.

Kinosternon effeldti, sp. n., described from living examples. Peters, MB. Ak. Berl. 1873, p. 603, pl. v. figs. 1-3, Vera Cruz.

Swanka. Note on sternum in three species: Gray, *l. c.* p. 301.

Staurotypus marmoratus, J. V. Fischer (Arch. f. Nat. 1870, p. 265, pl. x.). ? = *S. salvini*, Gray, Dum. & Boc. (Miss. Sc. Mex. 1870, p. 22, pl. v. figs. 3 & 3a): *id. op. cit.* xii. p. 113.

Claudius, Cope, part 1. = *Stauremys*, Gray; *C. pictus* and *C. severus* = *S. salvini*: *id. l. c.* p. 114.

PLATYSTERNIDÆ.

Platysternum pequense. Sternum figured: *id. l. c.* pl. xii.

HYDRASPIDIDÆ.

Hydromedusa. Divided into two sub-genera, with characters of the species, including *H. maximiliana* and *H. (Chelomedusa) flavilabris*, spp. nn. Brazil: *id. op. cit.* xi. p. 304. Sternum of the latter figured: *id. l. c.* pl. vi. fig. 3.

Hydraspis depressa, *gaudichaudi*, *bicolor*, and *maculata*, described: *id. l. c.* pp. 304 & 305.

Acanthochelys and *Mesoclemmys* re-characterized: *id. l. c.* p. 305.

Spatulemys lasale. Figured, with additional notes: *id. l. c.* p. 73, pl. ii.

Elseya dentata. Sternum figured: *id. l. c.* pl. v. fig. 5.

PELOMEDUSIDÆ.

Sternotherus. Skull described and figured: J. E. Gray, P. Z. S. 1873, p. 392; Ann. N. H. (4) xi. p. 306.

Pelomedusa subrufa. Sternum figured: *id.* Ann. N. H. (4) xi. pl. v. fig. 2.

PELTOCEPHALIDÆ.

Dumerilia madagascariensis, Grandid., re-described: *id. l. c.* p. 149.

CHITRIDÆ & TRIONYCHIDÆ.

GRAY, J. E. Notes on Mud-Tortoises (*Trionyx*, Geoffr.) and on the skulls of the different kinds. P. Z. S. 1873, pp. 38-72, pl. viii.

In the preliminary remarks, the author states that the skull affords the best characters for distinction of species and division into groups, and draws attention to the unfortunate lack of opportunities and the difficulties which interfere with the study of this part of the animal. He then gives a complete synopsis of the above-named families, with synonymy, descriptions, or remarks, and 13 figures of skulls.

——. Notes on Chinese Mud-Tortoises (*Trionychidæ*), with the description of a new species sent to the British Museum by Mr. Swinhoe, and observations on the male organ of this family. Ann. N. H. (4) xii. pp. 156-161.

Tortoises, or at least Mud-Tortoises, have a well-developed organ for the intromission of semen, differing in outline in the two allied species in which it is described.

Nilssonia formosa, Gray. Described, and skull figured: *id.* P. Z. S. 1873. p. 45, fig. 2.

Fordia africana, Gray. Skull figured: *id. ibid.* fig. 1.

Trionyx gangeticus. Described; entire animal figured: *id. l. c.* p. 47, pl. viii.

Trionyx leithi. Skull figured, with remarks: *id. l. c.* p. 49, fig. 3.

Trionyx sewaare, Gray. Skull figured, with remarks: *id. l. c.* p. 50, fig. 4.

Ida, [-*lus*, Rafin., *Crustacea*], g. n. *id. l. c.* p. 51. Palate of the skull with a broad shallow concavity to the internal nostrils, rather widest behind. The skull rather elongated (four inches long); the nose rather tapering on the side, rounded in front, and at the eyes about two-thirds the width of the orbit; the groove in front of the palate rather wide, shallow in front, gradually wider and deeper behind; the upper edge of the lower jaw flat behind, rather widest in front, and more concave, with a deep oblong impression on each side of the well-marked keel, which occupies more than half of the middle of the front end. Type, *Trionyx peguensis*, Gray, Suppl. Cat. Sh. R. p. 99. Ann. N. H. (4) x. p. 337. Skull figured: *l. c.* fig. 5.

Ida, g. n., *id.* P. Z. S. 1873. p. 55. Animal only known in the young state.

not exhibiting the dorsal bones. Sternal callosities not developed, but apparently like *Landemania*. Skull short, broad; nose very short, contracted in front, not one-third the length of the large orbits which are only separated by a very narrow forehead; palate with a rather broad and deep groove before the internal nostrils; alveolar process broad. The lower jaw slender, tapering, regularly rounded in front; alveolar surface broad and concave in front, with a sharp raised outer edge; sides narrow, concave on the inner side of the alveolar surface, with a raised inner and outer edge. Type, *I. ornata*, Gray. Skull figured: *id. l. c.* fig. 7.

Dogania subplana, Geoffr. Lower jaw figured, with remarks: *id. l. c.* p. 57, fig. 8.

Platypeltis ferox. Skull described and figured: *id. l. c.* p. 58, fig. 9.

Callinia spinifera, Les., & *C. microcephala*, Gray. Skulls figured and described: *id. l. c.* pp. 60 & 62, figs. 10 & 11.

Rafetus euphraticus, Daud. Skull figured: *id. l. c.* fig. 12.

Aspilus javanicus, Geoff. Lower jaw figured, with remarks: *id. l. c.* pp. 67 & 68, fig. 13.

Trionyx ? dillwyni described: *id. Ann. N. H.* (4) xi. p. 306.

Tyrse nilotica. Peculiarities in the skeleton described for the first time: *id. l. c.* p. 470.

Landemania perocellata, Gray, and *irrorata*, Gray, described: *id. P. Z. S.* 1873, p. 53, fig. 6 (jaws); and *Ann. N. H.* (4) xii. pp. 159 & 160.

Emyda granosa and *ceylonensis*. Synonymy cleared up, and an allied form (*E. fuscimaculata*, Gray, MS.) mentioned: *id. Ann. N. H.* (4) xi. p. 308.

Oscaria, g. n., *id. op. cit.* xii. p. 157. Skull broad. Nose short, not half the diameter of the orbit. Palatal groove wide, deep, gradually narrowing from the back edge of the internal alveolar process, and rounded in front. Internal nostrils large, roundish, about half the length of the internal alveolar margin, with a deep concavity in front. The alveolar process of the lower jaw simple, concave in front, with a slight indication of a longitudinal ridge on the outer side of the middle of the front end, deeply concave and rather widened on each side, with a slightly elevated end and much more elevated outer ridge. Tympanic cavity very deep, subtriangular, with a rounded front edge. Type, *O. swinhoi*, sp. n., *id. ibid.* pl. v., China.

CHACOPODES (SEA TURTLES).

A full account of the characters (especially as to skeletons and skulls) of the *Caouanide*, *Cheloniide*, and *Sphargidide*, and of their tribes and genera. J. E. Gray, *P. Z. S.* 1873, pp. 395-411.

Eremonia elongata. Dorsal disk figured: *id. l. c.* p. 409.

Onychochelys kraussi figured: *id. l. c.* pp. 399 & 400.

Chelonia mydas. Sternum figured: *id. Ann. N. H.* (4) xi. pl. vi. fig. 4.

Sphargis coriacea: Krauss has compared the adult skeleton in the Stuttgart Museum with the figures in "Archives du Muséum," and can find no difference between them; he gives the measurements of the

Stuttgart specimen : Ann. N. H. (4) xii. p. 77. *Sphargis mercurialis* ; sternum figured : J. E. Gray, *op. cit.* xi. pl. vi. fig. 5. *Sphargis luth* ; Gervais, N. Arch. Mus. 1872, pp. 199-228, pls. v.-ix.

CROCODYLIA.

DUMÉRIL & BOCOURT, Miss. Sci. Mex. Zool. iii., describe, figure, and give the synonymy of *Crocodylus mexicanus*, p. 34, pl. viii. figs. 3 & 3a ; *C. rhombifer*, p. 35, pl. ix. fig. 4 ; *C. moreleti*, p. 37, pl. viii. figs. 1 & 1a, and pl. ix. figs. 2, 2a, 2b, & 3.

Crocodylus lewyanus, sp. n., *id. l. c.* p. 33, pl. viii. figs. 2 & 2a, Columbia.

Australian Crocodiles : remarks by G. Krefft, P. Z. S. 1873, p. 334.

Crocodylus johnsoni, sp. n., *id. l. c.* p. 335. Queensland.

Crocodylus porosus. Stoliczka has a note on the similarity of the young of this species to *C. pondicerianus*. J. A. S. B. (n. s.) xlii. pt. 2, p. 113.

Crocodylus americanus : habits. Sumichrast, Arch. Sci. Nat. 1873, p. 256.

REINHARDT, J. Anomalier i Krydshvirvlerne hos Krokodilerne. Vid. Medd. 1873, pp. 221-228.

Describes three cases of anomalous sacral vertebræ which occurred out of eleven skeletons of alligators and crocodiles. In these three cases the sacrum was composed of three vertebræ instead of two, the usual number. In one, it was the last lumbar, in the others the first caudal vertebra which was transformed.

SAURIA.

LEYDIG, F. Die in Deutschland lebenden Arten der Saurier. Pts. 1 & 2. Tübingen : 1872. 4to. 12 pls.

Detailed descriptions, etc., of *Lacerta viridis*, *agilis*, and *muralis*.

VARANIDÆ.

Hydrosaurus marmoratus appears to be confined to Luzon ; and *H. nuchalis* is from Negros. A. Günther, P. Z. S. 1873, p. 165.

Heloderma. Notes, with figures of skull and teeth. P. Gervais, J. Zool. 1873, p. 451, pl. xii.

TEIIDÆ.

Ameiva edwardsi, sp. n., Bocourt, Ann. Sc. Nat. (5) xvii. Art. No. 17, Guatemala.

LACERTIDÆ.

Blanford changes the name of *Gymnops* (pre-occupied in *Aves* by Cuvier) to *Chondrophlops*. J. A. S. B. (n. s.) xlii. pt. 2, p. 144.

Lacerta muralis ; blue variety. Eimer, Verh. Ges. Würz. June, 1872.

ZONURIDÆ.

The Recorder gives a list of the species of *Gerrhonotus*, with additional particulars respecting those of which the types are in the British Museum. Ann. N. H. (4) xii. p. 45.

Gerrhonotus viridiflavus, sp. n., Bocourt, Ann. Sci. Nat. (5) xvii. Art. No. 2, Mexico.

Hyalosaurus, g. n., A. Günther, Ann. N. H. (4) xii. p. 351. No external ear-opening. Allied to *Pseudopus*. Type, *H. källikeri*, sp. n., *id. ibid.* N. Africa?

Lepidophyma flavimaculatum, Dum., is semi-nocturnal, and lives in dark damp localities; the males possess femoral pores. Sumichrast, Arch. Sc. Nat. 1873, p. 251.

CHALCIDIDÆ.

Chalcides (Hapalolepis) abendrothi, Peters (MB. Ak. Berl. 1871, p. 399), = *Ophiognomon trisanale*, Cope (P. Ac. Philad. 1868, p. 100). A. W. E. O'Shaughnessy, Ann. N. H. (4) xii. p. 44.

PYGOPODIDÆ.

Delma grayi, Smith, *ex. typ.*, undoubtedly from Australia, and *D. mœlleri*, Lütke. (Vidd. Medd. 1862), = *D. fraseri*, Gray: A. Günther, Ann. N. H. (4) xii. p. 145.

APRASIIDÆ.

Aprasia pulchella. All the specimens in the British Museum collection have 12 series of scales round the body, and not 14, as found by Peters (MB. Ak. Berl. 1863, p. 233); consequently *A. octolineata*, Ptrs., = *A. pulchella*, Gray. A. Günther, *l. c.*

LIALIDÆ.

Lialis leptorhyncha, sp. n., Peters, *op. cit.* 1873, p. 605, Port Mackay. Some remarks are added upon other known species in the Berlin Museum.

SCINCIDÆ.

Hinulia variegata, Peters, figured: A. Günther, P. Z. S. 1873, pl. xvii. fig. B. *H. nigrilabris*, sp. n., *id. l. c.* p. 166, pl. xvii. fig. A., N. Celebes.

Mocoo (Lygosoma) lineo-ocellata, A. Dumér., described: Peters, *l. c.* p. 745 [= *M. smithi*, Gray (Cat. Liz. Mus. Brit. p. 82), = *M. zelandica*, Gray].

(*Mocoo*) *Lygosoma nigriplantare*, sp. n., Peters, *l. c.* p. 745, Chatham Island.

Mocoo macrotympanum, sp. n., Stoliczka, J. A. S. B. (n. s.) xlii. pt. 2, p. 166, South Andaman.

Euprepes novaræ, Steind., = *Scincus noctua*, Lesson. A. W. E. O'Shaughnessy, Ann. N. H. (4) xii. p. 44.

Cophoscincus infralineolatus, Sangi Island, and *C. subvittatus*, Manado, spp. nn., A. Günther, P. Z. S. 1873, pp. 166 & 167.

Lygosoma deplanchii, sp. n., Bocage, J. Sci. Lisb. 1873, p. 229, New Caledonia [= *L. arborum*, Bavay, Mém. S. L. Norm. xv. p. 19].

Lygosoma scutirostrum, sp. n., Peters, l. c. p. 743, Port Bowen.

Chelomeles pseudopus, locality unknown, *sumatrensis*, Agam, *reticulatus*, Clarence River, Günther, Ann. N. H. (4) xii. p. 146: spp. nn.

Pholeophilus capensis, Smith (Ill. S. Afr. 1849), = *Soridia lineata*, Gray (1839); and reasons stated for the conclusion that the types of the former came from Australia, and not from Namaqua Land: *id. l. c.* p. 147.

Herpetosaura (Lithophilus, Smith, nec Fröhl.) inornata, Smith (= *H. arenicola*, Ptrs., Arch. f. Nat. 1855, p. 48), re-characterized: *id. ibid.*

Herpetosaura atra, sp. n., *id. ibid.*, Zambesi.

Anguis fragilis re-described: Leydig, l. c. part 3.

Ophioscincus, g. n. "Corpus anguiforme, squamis lævissimis vestitum, pedibus externis nullis. Oculi palpebris muniti, apertura auricularis nulla. Rostrale mentalique majuscula; caput scutellis internasali, frontali, præfrontalibus, frontoparietalibus, parietalibus interparietalique obtectum. Nares latero-anteriores, utrinque in parte scutelli simplicis anteriore apertæ." Allied to *Rhodona*, Gray. Type, *O. australis*, sp. n., Port Bowen. Peters, MB. Ak. Berl. 1873, p. 747.

Lioscincus, g. n. Scales smooth, striated; teeth conical, simple, obtuse; two supero-nasals on each side; nostrils lateral, between the nasal and anterior supranasal; ear-opening round, anterior margin without lobules; lower eyelid with transparent disk; frontoparietal single; five long toes, somewhat compressed, and graduated on each extremity. *L. steindachneri*, sp. n., New Caledonia. Bocage, J. Sci. Lisb. 1873, p. 228.

Euprepes (Mabuya) breviceps, sp. n., Peters, l. c. p. 604, Gaboon and Camaroons.

Tropidoscincus, g. n. Scales keeled; tongue flat, scaly, slightly notched at the extremity; teeth conical, obtuse; ear-opening large, triangular, with small rounded lobules anteriorly; lower eyelid with transparent disk; nostrils between two nasal plates; no supranasals: frontoparietal single; five unequal toes to all the limbs. Type, *T. aubrianus*, sp. n., Bocage, l. c. p. 230, New Caledonia (= *Tropidolepisma variable*, Bavay, Mém. Soc. L. Norm. xv. p. 26).

Tropidolepisma dorsale, sp. n., Peters, l. c. p. 743, Port Bowen.

Macroscincus, g. n.; type, *Euprepes coctai*, of which the teeth are denticulated as in the *Iguana*, Bocage, l. c. No. xvi. with photograph and map. The author has succeeded in procuring examples of this species, previously known only from the description by Duméril & Bibron. He is thus able to establish its habitat as Branca, one of the Cape Verd Islands, to which it is exclusively confined, having by virtue of its isolation escaped the attention of naturalists since the first specimen was described with a merely conjectural habitat.

Euprepes olivaceus. On its changes of colour, cf. Stoliczka, J. A. S. B. (n. s.) xlii. pt. 2, p. 118.

SEPIDÆ.

Sepsina copii, sp. n., Benguela, ? = *S. grammica*, Cope, on which, and on *S. angolensis*, critical remarks are made. Du Bocage, J. Sci. Lisb. 1873, p. 212.

Ophioseps, g. n. Eyes lidless, surrounded by a complete circle of narrow plates; tongue flat, scaly, slightly forked at extremity; teeth very small, in the lower jaw only. No external ears. Body very long, cylindrical; tail almost quarter of total length, diminishing a little towards the tip, which is obtuse and enclosed in a semicircular scale. No extremities or pre-anal pores. Scales comparatively large, rounded, covering trunk and tail. Head short, flattened above, with muzzle somewhat produced, and much swollen. Scutellation of the head approaching the Ophidian type; nasal plates enormous, uniting superiorly on the muzzle behind the rostral and descending on each side to the edge of the jaw; two contiguous fronto-nasals behind the nasals, descending to articulate with the first labial; one frontal largely developed, one pre-ocular, one post-ocular. Nuchal region, immediately behind the frontal and the supra-oculars, covered by imbricated plates of the same form as those on the neck. No supra-nasals; no frenals. Four upper and three lower labials. *O. nasutus*, sp. n., *id. l. c.* p. 231, Australia.

ACONTIADIDÆ.

Typhlacontias, g. n. No eyelids; eye bare, with no trace of palpebral circle. No limbs. Nostrils lateral in the rostral, with slightly curved posterior groove; palate toothless; tongue scaly, feebly split at the point; teeth conical, small, numerous. No external ear. No pre-anal pores. Scales smooth. *Typhlacontias punctatissimus*, sp. n., Du Bocage, *l. c.* p. 213, Mossamedes.

TYPHLINIDÆ.

Anelytrops elegans, Dum., = *Sphenorhina elegans*, Hallow., = *Feylinia currori*, Gray, Cat. Liz. p. 129. Du Bocage, *l. c.* p. 214.

Dibamus nicobaricus, Fitz., re-described: Stoliczka, J. A. S. B. (n. s.), xlii. pt. 2, p. 168.

GECKOTIDÆ.

F. Bocourt gives a tabular view of the subfamilies founded upon Cuvier's seven genera, and describes and figures a new genus and species belonging to the Hemidactylian group. Miss. Sci. Mex. pp. 40 & 41.

CARTIER, —. Studien über den feineren Bau der Epidermis bei den Geckotiden. Verh. Ges. Würz. iii. (1872).

Idiodactylus, g. n. The five toes clawed, their base enlarged to a disk out of which the two last phalanges take their origin, and the inferior surface of which is covered with entire and imbricated subdigital plates. All

the thumbs ending in a slender portion, the extremity of which resembles the disk of *Spherodactylus*. Type, *I. georgiensis*, sp. n., which is stated to differ from *Aristelliger*, Cope, in the character of the thumbs being terminated by disks, in a lateral flattening of the end of the tail and in the absence of the horn-like excrescences on the upper eyelid. Island of St. George, Belize. Bocourt, *l. c.* p. 41, pl. x. figs. 1 & 1a-l.

Phyllodactylus tuberculosus, Wieg., described, with synonymy, and the foot figured. *Id. l. c.* p. 43, pl. x. figs. 3 & 3a.

Hemidactylus verruculatus, Boc., from W. Africa, = *H. guineensis*, Ptrs.: Bocage, *J. Sci. Lisb.* 1873, p. 209.

Hemidactylus longicephalus [*longiceps*], sp. n., provisionally named, very closely allied to *H. platycephalus*; *id. l. c.* p. 210, Mossamedes and Catumbella near Benguela.

Hemidactylus cessacii, Cape Verd Islands, *ibid.* (= *H. bouvieri*, Bocourt, *N. Arch. Mus.* vi. 1870, *Bull.* p. 17), and *H. gutturalis*, Bissau, *id. l. c.* p. 211, spp. nn.

Peripia peroni, D. & B., = *Peropus mutilatus*, Wieg., as supposed by Peters. A. Günther, *P. Z. S.* 1873, p. 168.

Rhacodactylus (*Platydactylus*, Cuv.) *leachianus*: two specimens described. *R. aubrianus* and *trachyrhynchus*, spp. nn., New Caledonia. Du Bocage, *l. c.* pp. 201-203.

Amydosaurus (*Lepidodactylus*, Fitz.), *neocaledonicus*, sp. n., *id. l. c.* p. 206, New Caledonia.

Phelsuma andamanense, Blyth, described in detail. Stoliczka, *l. c.* p. 163.

Spherodactylus fantasticus described, and head and foot figured. Bocourt, *l. c.* p. 44, pl. x. figs. 4 & 4a-c.

Spherodactylus lineolatus, Licht., described: *id. l. c.* p. 46.

Spherodactylus inornatus, sp. n., Peters, *MB. Ak. Berl.* 1873, p. 738, Mexico.

Cyrtodactylus considered a section of *Gymnodactylus*; and note on *G. pulchellus*; Stoliczka, *l. c.* p. 118.

Gymnodactylus wicksi, sp. n., *id. l. c.* p. 165, Preparis Island.

Gymnodactylus fuscus, Hallow. (= *G. caudiscutatus*, Günth., *P. Z. S.* 1859, p. 410), described and figured: Bocourt, *l. c.* p. 48, pl. x. figs. 5 & 5a-c.

Goniodactylus albigularis. The chin-shields figured: *id. l. c.* pl. x. fig. 6.

Brachydactylus mitratus, Peters (*MB. Ak. Berl.* 1864), is doubtfully given as a synonym of *Coleonyx elegans*, Gray, and described, and the various parts figured: *id. l. c.* p. 49, pl. x. figs. 7 & 7a-d.

Stenodactylus variegatus, Baird, re-characterized: *id. l. c.* p. 51. The figures referred to are those of *Coleonyx elegans*.

Ceratolophus, g. n. Head elongated, rather depressed; interocular region strongly excavated or channelled. Three strongly marked osseous eminences on the back of the head, joined together by osseous crests, covered by the skin, one being above and behind the eye, one above the ear opening, and the third on the nape. Edge of upper eyelid with conical scales. Five toes on each foot, free, with retractile claws, moderately dilated, and with unbroken imbricated lamellæ beneath. Tail long, dilated at the base, where there is a large compressed tubercle on each

side in the male, slender and conical for the rest of its length. Upper parts covered with small, smooth, convex and rounded granules; lower parts with small, flat, hexagonal scales; submaxillary region granular, like the back. Tail with quadrangular verticellated scales. No apparent lateral folds. *C. hexacerus*, sp. n., Du Bocage, *l. c.* p. 204, New Caledonia.

Rhoptropus afer has been found in Mossamedes: *id. l. c.* p. 212.

Correlophus ciliatus, Guich. Remarks on two specimens: *id. l. c.* p. 204.

IGUANIDÆ.

Polychrus. Synoptical table of the four species, describing *P. (Chaunolemus) multicarinatus*, Peters; Bocourt, *l. c.* pp. 111 & 112.

Anolis and *Norops*. Bocourt, *l. c.* pp. 52-110, pls. xiv.-xvi., comprehensively treats these genera, giving figures illustrating their generic differences. Of thirty-six species of the former belonging to Mexico or Central America, twenty-nine have been examined and ten described as new. The heads of all these, and of others from different localities, and more or less rare in collections, are delineated, entire figures of some species and characteristic parts of others being given. The species are divided into groups:—1, with the ventral scales smooth, and 2, with keeled ventral scales; and under these heads synoptical tables are given of the species, arranged according to subordinate characters. The new species of *Anolis* are:—

Group 1. *A. bouvieri*, p. 58, pl. xiv. figs. 8 & 8a, Guatemala; *baccatus*, p. 59, pl. xiv. fig. 14; and *guentheri*, p. 61, fig. 15, Mexico; *rodriguezii*, p. 62, pl. xiii. fig. 1 & 1a, Central America (figured entire).

Group 2. *A. jabobi*, p. 73, pl. xiii. fig. 8, Vera Cruz; *nebuloides*, p. 74, pl. xiii. fig. 10, Oaxaca; *bourgevi*, p. 76, pl. xv. fig. 9, Vera Cruz and Orizaba; *copii*, p. 77, pl. xv. figs. 10 & 10a, Guatemala; *petersi*, p. 79, pl. xiii. fig. 2 (entire), and pl. xv. figs. 11 & 11a, Vera Paz; *dollfusianus*, p. 84, pl. xvi. figs. 19 & 19a, Guatemala.

Other species described, figured, or commented on are:—

A. cynocephalus, Boc., compared with *A. bouvieri*, p. 59, pl. xiv. figs. 4-7. *A. goudoti*, D. & B., of which the single type specimen is believed to be a young female of *A. alligator*, D. & B.; p. 59, note. *A. schiedii*, Wieg. ; habitat (hitherto unknown) Coban, Guatemala; described, and head figured, p. 64, pl. xiv. fig. 19. *A. fusco-auratus*, D'Orb.; head figured, pl. xiv. figs. 16 & 16a. *A. limifrons*, Cope; described, and head figured: p. 65, pl. xiv. fig. 20. *A. (Dactyloa) nebulosus*, Wieg. ; described and head figured, p. 68, pl. xv. fig. 3. *A. argillaceus*, Cope, ? = *A. loysiana*; head figured, p. 69, pl. xiv. fig. 9. *A. intermedius*, Peters, p. 69, pl. xv. fig. 4. *A. nannodes*, Cope, p. 71, pl. xv. fig. 5. *A. sagræi*, Cocteau, p. 81, pl. xv. fig. 14. *A. crassulus*, Cope, p. 82, pl. xvi. fig. 17. *A. hoffmanni*, Peters, p. 86, pl. xv. figs. 15 & 16. *A. (Dactyloa) leviventris*, Wieg., *l. c.* p. 87, pl. xvi. figs. 18 & 18a (base of tail). *A. cumingi*, Peters, p. 89, pl. xvi. fig. 20. *A. sallæi*, Gthr., p. 90, pl. xiii. fig. 3, pl. xvi. figs. 21a & b. *A. binotatus*, Peters, p. 92, pl. xvi. figs. 22 & 23. *A. biporcatus*, Wieg., p. 98, pl. xv. figs. 8 & 8a, and *A. (Draconura) chrysolepis*, D. & B., p. 99, pl. xvi. fig. 26, respectively described and heads figured. *A. (D.) capito*, Peters, described and head

and tail figured; p. 101, pl. xvi. fig. 27. *A. tropidonotus*, Peters, described, scales and head figured, and asserted to be distinct from *Norops auratus*, with which the Recorder had considered it to be identical; p. 103, pl. xiii. figs. 6 & 6a, pl. xvi. fig. 30. *A. humilis*, Peters, described, scales and head figured; p. 105, pl. xii. figs. 7 & 7a. pl. xvi. fig. 31. *A. heliactin*, ? Cope, described and figured; p. 106, pl. xiii. figs. 4a-c, pl. xvi. fig. 32.

Norops auratus, Daud., described; scales, head, and toes figured: *id.* l. c. p. 108, pl. xiii. figs. 5 & 5a, pl. xvi. figs. 33a & b.

Anolis rubiginosus and *metallicus*, Mexico, *id.* Ann. Sci. Nat. (5) xvii. Art. No. 2; *A. polylepis*, *pulchripes*, *palpebrosus*, and *obtusirostris*, Chiriqui, Peters, l. c. pp. 739-742: spp. nn.

Sceloporus acanthinus, Guatemala, Bocourt, *op. cit.* Art. No. 6 bis; *S. lunæi* and *smaragdinus*, Guatemala, *dugesi*, Colima, and *humeralis*, Oaxaca, *id. op. cit.* Art. No. 10: spp. nn.

Hoplurus torquatus, Cuv., has been found in Northern Madagascar. Peters, l. c. p. 793.

Phrynosoma spinimentum, sp. n., *id.* l. c. p. 742, Tehuantepec.

Phrynosoma asio, Cope. On its habits, Sumichrast, Arch. Sci. Nat. 1873, p. 258.

AGAMIDÆ.

Draco quinquefasciatus and *fimbriatus* described: Stoliczka, J. A. S. B. (n. s.) xlii. pt. 2, pp. 118 & 119.

Draco ornatus, Gray, distinguished from *D. spilopterus*, Wiegman. A. Günther, P. Z. S. 1873, p. 167.

Tiaris humii, sp. n., Stoliczka, l. c. p. 167, Tillingchang Island.

Calotes (Bronchocæla) philippinus, Peters (MB. Ak. B. 1867, p. 16), = *B. marmorata*, Gray. Günther, l. c. p. 168.

Lophura shawi, Gray, and *L. celebensis*, Peters (MB. Ak. B. 1872, p. 581), doubtfully distinct from *L. amboinensis*: *id. ibid.*

Moloch. Remarks and figures of skull and teeth. P. Gervais, J. Zool. 1873, p. 451, pl. ii.

CHAMÆLIONTIDÆ.

Chamæleo polleni, sp. n., Peters, l. c. p. 792, Mayotte, Comoro Islands.

AMPHISBÆNIDÆ.

Lepidosternum (Phractogonus) anchietæ, sp. n., Du Bocage, J. Sci. Lisb. 1873, p. 247, figs. 1-3, Mossamedes.

OPHIDIA.

JAN, G., & SORDELLI, F. Iconographie générale des Ophidiens. 43^{me} livr.^{n.} Paris: March, 1873. 4to, 6 plates (with 26 figures).

LEYDIG, F. Ueber die Kopfdrüsen einheimischer Ophidier. J. Mikr. Anat. ix. pp. 598-652, pls. xxii. & xxiii.

Describes the glands of the head in *Tropidonotus natrix* and *tessellatus*, *Coronella levis*, *Coluber viridiflavus*, *Vipera berus* and *ammodytes*.

— —. Ueber die äusseren bedeckungen der Reptilien und Amphibien. Erster Artikel: Die Haut einheimischer Ophidier. *Op. cit.* pp. 753-800, pl. xxxii.

A description of the structure of the skin in the above-named Ophidians.

TYPHLOPIDÆ.

Onychocephalus anomalus, from Mossamedes, and *O. petersi*, from Biballa, spp. nn., Du Bocage, *l. c.* pp. 248 & 249, with figures of the first.

Sumichrast gives particulars of the geographical distribution of various forms of snakes in Mexico, and of the altitude at which they are found. Arch. Sci. Nat. 1873, pp. 233-250.

Calamaria stahlknechti, sp. n., Stoliczka, J. A. S. B. (n. s.) xlii. pt. 2, p. 119, pl. xi. fig. 2, Sumatra.

Calamaria modesta, D. & B., var. from Manado, described. Günther, P. Z. S. 1873, p. 168.

Oxycalamus oxycephalus. Note on, with fig.; *id. ibid.* p. 169.

Oxycalamus longiceps, Cant. & G., re-described by Stoliczka, *l. c.* p. 120.

Rhabdosoma leporinum, Günther (Col. Snak. p. 12), = *Stenognathus modestus*, D. & B., is probably not from Java. Günther, *l. c.* p. 169.

Oligodon notospilus, sp. n., *id. ibid.* pl. xviii. fig. A, Mindanao.

Calamelaps polylepis, sp. n. (established provisionally: closely allied to *Calamaria unicolor*), Du Bocage, *l. c.* p. 216, Angola.

Prosymna ambigua, sp. n., Angola; and synoptical table of the genus: *id. l. c.* p. 217.

Simotes catenifer, sp. n., Stoliczka, *l. c.* p. 121, pl. xi. fig. 3, Penang and Jahore.

Ablabes (Enicognathus) rhodogaster. Schleg., var. n., *mayottensis*, from the Comoro Islands; Peters, *l. c.* p. 793.

Ablabes modestus, Martin, and *A. collaris*, Ménétr. figured; Strauch, Mém. Pétersb. xxi. No. 4, pl. i.

Ablabes flaviceps, Gthr., var., described; Stoliczka, *l. c.* p. 123.

Psammophylax ocellatus, Mossamedes, *viperinus*, Benguela, spp. nn., Du Bocage, *l. c.* p. 221.

Tomodon nasutus, Cope. A short note by Sumichrast, *l. c.* p. 262.

Xenodon angustirostris. Notes on; Peters, *l. c.* p. 607.

Tropidonotus manadensis, sp. n., Günther, *l. c.* p. 169, Manado.

Tropidonotus callistus, North Celebes, *id. l. c.* pl. xvii. fig. c.

Taphrometopon lineolatum, Brandt, figured; Strauch, *l. c.* pl. v. figs. a, b, c.

Zoacys luzonensis, sp. n., Günther, *l. c.* p. 169, Luzon.

Coluber natrix. On the morphology of its auditory apparatus: C. Hasse, Anatom. Studien, I. Heft 4, 1873.

Coluber hohenackeri, sp. n., Strauch, *l. c.* p. 69, pl. ii. figs. *a, b*, Transcaucasia.

Elaphis schrenki, sp. n., *id. l. c.* p. 100, Chinggan, Japan and eastern Siberia.

Composoma melanurum (Schleg.). Note on the confusion existing with regard to this species. Günther, *l. c.* p. 169.

Spilotes. Notes on the Mexican species, especially *S. erebennus*, Cope. Sumichrast, *op. cit.* p. 259.

Zamenis karelinii. Brandt, figured; Strauch, *l. c.* pl. iii. figs. *a, b*.

Zamenis fedtschenkoii, sp. n., *id. l. c.* p. 135, pl. iv. figs. *a, b*, Turkestan, &c.

Cyclophis tricolor re-described; Stoliczka, *l. c.* p. 122.

Dendrophis caudilineatus. Stoliczka, *l. c.* p. 123, refers to some remarks made by Günther on his identification of this species.

Ithycyphus, g. n. Body compressed, abdominal scutes distinctly keeled. Scales smooth, imbricate, without apical groove, in twenty-one series. Ventral scutes less than 200; anal and subcaudals divided. Upper shields of the head normal. One undivided nasal; loreal distinct; one præthree post-oculars. Pupil round. None of the anterior or middle maxillary teeth enlarged; posterior maxillary tooth grooved. *I. caudolineatus*, sp. n., Günther, Ann. N. H. (4) xi. p. 374, S. Madagascar.

Ahatulla urosticta, sp. n., Peters, *l. c.* p. 407, Bogotá (the author remarks that several species of this genus have recently been described on individual differences).

Dipsas (Heterurus) gaimardi, Schleg. var. n., *comorensis*, from the Comoro Islands; Peters, *l. c.* p. 794.

Trimorphodon major. Cope. On its habits; Sumichrast, *op. cit.* p. 253.

Rhagerhis triteniata, Gthr.: South Western Africa established as habitat. Du Bocage, *l. c.* p. 220.

Hologerrhum philippinum, Gthr. Note on and figure of: Günther, *l. c.* p. 171, pl. xviii. fig. *b*.

Oxyrrhopus clælia. Note on: Peters, *l. c.* p. 607.

Simocephalus poensis, Gray. Remarks on this and other species of the genus: Du Bocage, *l. c.* p. 218.

Ophites subcinctus and *albifuscus*. Descriptive details: Stoliczka, *l. c.* p. 512.

Hipsirhina alternans described; *id. ibid.*

Boa occidentalis, sp. n., Philippi, Z. Ges. Naturw. (2) vii. p. 127, pl. iii. Mendoza, West Cordilleras.

Liasis fuscus, Port Bowen, and *maculosus*, Rockhampton, Ports Mackay & Bowen, spp. nn.: Peters, *l. c.* pp. 607 & 608.

Naia tripudians. Observations on its poison: Sceva, P. Bost. Soc. xiv. (1872) p. 87. T. Brunton & G. Fayerer publish the first part of a memoir on the nature and physiological action of the poison of this species, and of other Indian venomous snakes: P. R. Soc. pp. 358-373. Cf. also P. Panceri, "Expériences sur les effets du venin du Naja d'Égypte et du Céraste." Naples: 1873, 4to.

Naia haje, var. n. *viridis*, Peters, *l. c.* p. 411, pl. i. fig. 1, West Africa.

Pseudelaps psammophis, Schleg., *superciliosus*, Fisch., *beckeri* and *atro-polios*, Jan, *bimaculatus* and *calonotus*, D. & B., *diadema*, Schleg., *textilis*.

D. & B., and *rhinostomus*, Schleg., figured : Jan & Sordelli, Iconogr. génér. Oph. 43 livr. pls. iii.-vi.

Alecto bungaroides, Schleg., *bitorquata*, *fasciolata*, and *signata*, Jan, figured : *iid.* l. c. pl. vi.

Elaps collaris, Boie, *bivirgatus*, Schleg., *furcatus*, Scheid., *bibroni*, Jan, *calligaster*, Wieg., *higie*, Shaw, *occipitalis*, D. & B., *bertholdi*, Jan, and *psyche*, Daud., figured : *iid.* l. c. pls. i.-iv.

Dendraspis antinorii, sp. n., Peters, l. c. fig. 2, Ansaba.

Atractaspis irregularis, Reinh., and *bibroni*, Sm., figured : Jan, & S. l. c. pl. iii.

Atractaspis aterrima described : Du Bocage, l. c. p. 223.

Crotalus & *Crotalophorus*. The rattle is used for a sexual call, and for help in danger : S. Aughey, Am. Nat. vii. pp. 85 & 86.

Vipera euphratica, Martin, figured : Strauch, l. c. pl. vi. figs. a, b, c.

PSEUDOPHIDIA.

Siphonops thomensis, sp. n., Du Bocage, l. c. p. 224, Island of St. Thomas.

BATRACHIA.

FÜRBRINGAR, M. Zur vergleichenden Anatomie der Schultermuskeln. I. Jen. Z. Nat. 1873, pp. 237-320, pls. xiv.-xviii. [Deals especially with the *Batrachia*.]

G. GULLIVER has found the largest red blood corpuscles in the *Proteidae*, and the smallest in Frogs and Toads ; he has found also that the corpuscles are much larger in *Urodela* than in *Anura* ; *Siredon* and *Lepidosiren* have them almost of the same size ; *Amphiuma* and *Sieboldia* have them larger than *Siredon*, but they are not so large in *Sieboldia* as in *Amphiuma* and *Proteus*. These results correspond with the scattered observations of previous writers. P. Z. S. 1873, pp. 162-165.

PETERS, W. Ueber die von Dr. J. J. v. Tschudi beschriebenen Batrachier aus Peru. MB. Ak. Berl. 1873, pp. 622-699.

The results of an examination of Tschudi's types of *Batrachia* from Peru, preserved in the Neuchatel Museum, with remarks on the condition of the specimens.

W. Theobald, P. A. S. B. 1873, pp. 110-112, defends himself against a charge of having overlooked some of Mr. Blyth's types of *Batrachia* in the Asiatic Society's Museum, when compiling his catalogue.

BATRACHIA SALIENTIA.

DE L'ISLE, A. Sur l'Hybridation chez les Amphibies. Ann. Sci. Nat. (5) xvii. Art. No. 3.

Spallanzani selected for his experiments in hybridation not species nearly related, but such as corresponded in the period of their breeding :

and the result of these attempts with forms belonging to different Families and even Orders was, as is well known, unsuccessful. By prosecuting similar researches among different forms of the same genus, the following results have, however, been obtained:—Hybridation between *Rana fusca*, *agilis*, and *viridis* in a state of nature being rendered impossible by the different periods of the year at which those species generate, tadpoles of males and females of *R. agilis* were produced *inter se* by artificial impregnation, but attempts with any two of the species failed completely. In the genus *Bufo*, however, where the species (*B. calamita* and *vulgaris*) are much more dissimilar in most respects, belonging in fact to different sections, the intermixture was readily effected and produced tadpoles. These opposite results are traced to the much greater uniformity in the generative organs in Toads, even of species widely removed by other characters, than in Frogs (*Rana*), where these organs are a principal source of specific distinction.

KIRSCHBAUM states that the so-called “star-jellies” are the swollen oviducts of frogs: JB. *nass. Ver.* xxvi. (1872), p. 441. BELING asserts that Herons cast up the intestines of frogs, and looks upon these birds as the chief agents in the production of this puzzling phenomenon; crows probably assisting, although the smaller masses only could be attributed to these latter: Zool. Gart. 1872, p. 41. K. MÜLLER has observed the Pole-cat eject these “jellies” in large lumps, *op. cit.* p. 222. BELING confirms this statement: *op. cit.* p. 284.

Pseudobatrachus, g. n. Teeth in upper jaw and on palate. Margin of tongue entire, hinder half free. No tympanum, eustachian tubes with narrow opening. Large, very flat parotoids on shoulder, which do not unite on the back. Fingers free, none opposable. Toes webbed to the extremities, which are obtuse and knobbed. Sacral process not broadened towards the end. Vertebrae concave anteriorly. Arciform epicoracoid cartilages not united, the right being the lower. Sternum broad, disk-shaped, with a median posterior notch. Episternum well developed, forming a thin plate at the end. *P. jelskii*, sp. n., Peters, *l. c.* p. 415, pl. i. fig. 1, Peru.

Pseudis minuta. The skeleton is of a green colour like that of *Belone*: *id. ibid.*

Phrynopus, g. n. Habit like that of *Liuperus* [*Lihyp-*], but with shorter extremities, and teeth on the palate. Tympanum free. Sternal apparatus as in *Liuperus*, but the sternal plate forms a short irregular fork. Sacral vertebra narrow, with narrow transverse processes. *P. peruanus*, sp. n., *id. l. c.* p. 416, pl. 4, fig. 2, Peru.

Rana fusca described: Stoliczka, J. A. S. B. xlii. pt. ii. p. 115.

Rana lymnocharis. On its variations: *id. l. c.* p. 116.

Rana plicatella, sp. n., Penang, *id. ibid.* pl. xi. fig. 1.

Ranula gollmeri & *Rana affinis*, Ptrs. (MB. Ak. Berl. 1859, p. 402; 1871, p. 402) = *R. juninensis*, Tschudi (F. P. 1845, p. 64) = *R. palmipes*, Spix (An. Nov. Test. Ran. 1824, p. 29, pl. v. fig. 1): Peters, *l. c.* p. 622.

Rana liebigi, Gthr. Note on the type specimen: Theobald, P. A. S. B. 1873, p. 111.

Leiuperus [*Lihyperus*] *viridis*, Tsch., *ex. typ.*, = *L. marmoratus*, D. & B.; Peters, *l. c.* p. 623.

Ceratophrys fryi, Minas Geraes, *appendiculata*, Brazil, spp. nn., Günther, Ann. N. H. (4) xi. p. 418.

Cystignathus sylvestris, Tsch., *ex. typ.* (from the Neuchatel Museum), = *C. roseus*, D. & B. It would seem that no specimen corresponding wholly with Tschudi's description exists at present in that museum. Peters, *l. c.* p. 623.

Chiroleptes platycephalus, sp. n., Günther, Ann. N. H. (4) xi. p. 350, Fort Bourke.

Megalophrys. The rostral appendage is a specific and not a sexual character, as stated in "Reptiles of British India," p. 413. *M. nasuta* is common in Borneo, the Malayan peninsula, and Sumatra, *M. montana* is limited to Java and Ceylon. Günther, *l. c.* p. 419.

Pelobates occurs not far from Milan. The name *insubricus* is proposed provisionally for the individuals, which seem to differ from *P. fuscus*. Cornalia, Atti Soc. Pad. 1873, p. 41.

Batrachophrynus, g. n. Entirely toothless. Tongue adherent, the middle part only of the hind border projecting out of the mucous membrane. No tympanum, no tympanic cavity, and no trace of eustachian tubes. Skin of body smooth, without parotoids. Fingers free; toes with connecting well-developed membrane; extremities of fingers and toes knobbed, obtuse. Sacral process narrow, with the anterior prominences for articulation with the preceding vertebra much developed. Vertebrae concave anteriorly. Arciform epicoracoid cartilages not united, the right being the lower. Sternum consisting of a disk-shaped cartilage, notched on the posterior margin; episternum well developed. *Batrachophrynus macrostomus*, p. 412, pl. ii. fig. 1, and *brachydactylus*, p. 413, pl. iii. fig. 4, spp. nn., Peters, *l. c.*, Peru. The author appends also remarks on *Alytes obstetricans*, *Cyclorhamphus marmoratus*, D. & B., *Telmatobius peruvianus*, Wieg., and *Colodactylus carulescens*, Tsch., with illustrative figures.

Alytes obstetricans seizes the female in the manner attested by Demours in 1741, the fore limbs holding the neck in front of the shoulders. A. De l'Isle, Ann. Sci. Nat. 1873, Art. 13.

Diploelma berdmorei, Blyth. Note on the type specimen: Theobald, P. A. S. B. 1873, p. 112.

Notaden, g. n. *Bufonid*. Body thick, short, covered with large, flat glandular warts. Head very short and high, with a very obtuse snout; eye of moderate size, mouth very short, reaching to below the middle of the eye. Limbs short. No teeth; a pair of short and soft prominences between the narrow choanæ. Ear-opening covered by the skin, and visible only after the skin is removed; it is very narrow, as are the eustachian tubes. Tongue without notch, broad. Not only the skin of the parotoid region, but that of the entire back, is thickened by numerous glands. Fingers free; toes with a narrow web and fringe. A large shovel-like metatarsal prominence; no other tubercle. Clavicle present. Transverse process of sacral vertebra much dilated. *Notaden bennetti*, sp. n., Günther, Ann. N. H. (4) xi. p. 350, Castlereagh River and Fort Bourke.

Bufo cinereus. On its embryonic development. Cf. G. Romiti, Z. wiss. Zool. xxiii. pp. 451-456 pl. xxv. figs. 1 & 2.

Bufo poeppigi, Tsch., *ex. typ.*, = *B. molitor*, Tsch., *juv.*; *B. trifolium*, Tsch.?, = *B. spinulosus*, Wieg., var.; Peters, *l. c.* p. 623.

Bufo molitor, Tsch., = *marinus*, Peters, = *andianus*, Cope. There are discrepancies between the typical specimen and Tschudi's description and figure: *id. l. c.* p. 624.

Trachycara fusca, Tsch., = *Bufo typhonius* (*B. margaritifer*, Laurenti): *id. ibid.*

Anaxyrus melancholicus, Tsch. The synonymy of this species is as follows: *Bufo compactilis*, Wieg., Isis, 1833, p. 661; *B. spectabilis*, Gir., 1854; *B. anomalus*, Gthr., Cat. Batr. Sal., 1858, p. 57; *B. compactilis*, Ptrs., MB. Ak. Berl. 1863, p. 80. *Id. ibid.*

Polypedates similis, sp. n., Günther, P. Z. S. 1873, p. 171, Laguna del Bay.

Hyperolius huillensis, sp. n., Bocage, *l. c.* p. 226, Huilla, W. Africa.

Phyllobates chalceus, sp. n., Peters, *l. c.* p. 609, Pastassathal.

Hylodes cruentus & *rugosus*, spp. nn., *id. l. c.* p. 610, Chiriqui.

Hylodes martinicensis. A. Bavay re-states the results of his observations on the development of this species: Ann. Sci. Nat. (5) xvii. Art. 16. Cf. also Ann. N. H. (4) xi. p. 1, and C. R. lxxvi. p. 1340, lxxvii. p. 788.

Platymantis plicifera, Günth. (Cat. Batr. Sal. 1858, p. 95, pl. 8, fig. B.) = *Hylodes corrugatus*, Dum. (Ann. Sci. Nat. 3 sér. xix. 1853, p. 176): Peters, *l. c.* p. 611.

Platymantis meyeri, sp. n., Günther, P. Z. S. 1873, p. 171, Laguna del Bay.

Hyla lesueuri, Keferst. (Arch. f. Nat. 1868, pl. vii. figs. 24 & 25). = *Litoria copii*, Steind. (Novara Amph. 1867, p. 56, pl. iii. figs. 14-17) = *L. wilcoxi*, Günth. (P. Z. S. 1864, p. 48), = *Hyla lesueuri*, D. & B. (viii. p. 595), *ex. typ.*: Peters, *l. c.* p. 612.

Litoria jervisiensis has the connecting membrane of the fingers not more developed than in others of the genus, and Duméril & Bibron (viii. p. 543) erroneously represent it as reaching half way on the fingers: *id. ibid.*

Hyla doumercii, D. & B. (viii. p. 551), *ex. typ.*, and ? *H. levaillanti*, D. & B. (p. 550), = *H. crepitans*, Wied.: *H. vermiculata*, D. & B. (p. 563), = *H. venulosa*, Laurenti: *H. cynocephala*, D. & B. (p. 558), extremely resembles *H. rubra*, and *H. xerophylla*, D. & B. (p. 549), has an extraordinary resemblance to *H. punctata*, Schneider. *Id. l. c.* pp. 612 & 613.

Hyla pulverata, Chiriqui, p. 614, *H. auraria*, S. America, p. 615, *id. l. c.* spp. nn.

Hylambates anchietæ, sp. n., Bocage, *l. c.* p. 226, Mossamedes.

Microphryne, subg. n., type *Paludicola pustulosa*, Cope, (P. Ac. Philad. 1864, p. 180); Peters, *l. c.* p. 616 (Note on *P. notata* and *Gomphobates biligonigerus*, Cope).

Pelodyras granulata, sp. n., *id. l. c.* p. 417, pl. i. fig. 4, Port Bowen.

Dendrobates trivittatus (Spix), var. n., *maculata*, Chiriqui: *id. ibid.*

BATRACHIA GRADIENTIA.

HEINCKE, F. Untersuchungen über die Zähne niederer Wirbelthiere. Z. wiss. Zool. xxiii. 4, pp. 495-591, pls. xxvii.-xxix.

On the structure and development of the teeth in different forms of Fish and in the Tritons.

Spelerpes (Edipus) lignicolor, sp. n., Peters, l. c. p. 617, Chiriqui.

Salamandra maculosa. On the skin of its larva, cf. P. Langerhans, Arch. mikr. Anat. ix. p. 745-752, pl. xxxi.

Sieboldia japonica, from Shanghai, and *S. davidiana*, Blanch. (C. R. 1871, lxxiii. p. 79) : J. E. Gray, Ann. N. H. (4) xii. p. 188.

Triton cristatus. Observations on its cutaneous exudation : E. Ormerod, J. L. S. xi. pp. 493-496.

Siredon pisciformis. On the structure of its auditory apparatus, and the comparative anatomy of its maxillary suspensorium, cf. C. Hasse, Anatom. Studien, I. Heft 4, 1873, xv. pl. xxix.

Siredon. The spermatozoa are very similar to those of *Triton* : Malbranc, Verh. Ges. Würz. iii. (1872) p. 136.

H. Gervais has procured a hybrid between a female Axolotl and male Triton. J. Zool. 1873, p. 245.

BUGNION, E. Recherches sur les organes sensitifs qui se trouvent dans l'épiderme du Protée et de l'Axolotl. Bull. Soc. Vaud. xii. pp. 259-316, pls. xi.-xvi.

PISCES

BY

A. W. E. O'SHAUGHNESSY.

THE GENERAL SUBJECT.

GÜNTHER, A. Erster ichthyologischer Beitrag nach Exemplaren aus dem Museum Godeffroy. J. Mus. Godeffr. ii. pp. 98-103. Zweiter Beitrag, u. s. w. *op. cit.* iv. pp. 89-92.

CLASSIFICATION.

FITZINGER, L. Versuch einer natürlichen Classification der Fische. SB. Ak. Wien. lxxvii. pp. 1-58.

The author reviews the various ichthyological systems from Artedi to the present time, and, after stating the principles which he considers ought strictly to guide the ichthyologist in framing a "natural classification," he proposes five primary divisions, named respectively *Orthocormi*, *Heterocormi*, *Anomali*, *Ganoidei*, and *Elasmobranchii*; each of these he further subdivides into three orders, giving a merely nominal list of the families and genera belonging to them.

GILL, T. On the limits of the class of Fishes. Am. Nat. vii. pp. 71-77.

SEGOND, D. Des affinités squelettiques des Poissons. J. de l'Anat. Phys. 1873, Nos. 5 & 6.

The author recognizes four principal types, viz., *Perca*, *Mugil*, *Cyprinus*, and *Squalus*; and under these heads he arranges the different families of fish in a tabular view, either in a direct line or in lateral branches, according to the greater or less degree of departure from typical structure.

ANATOMICAL AND PHYSIOLOGICAL.

BAUDELLOT, E. Recherches sur la structure et le développement des écailles des Poissons osseux. I. Historique. II.

Types d'écailles. III. Valeur relativement à la Classification. Arch. Z. expér. 1873, Nos. 1-4, pls.

The conclusions are:—1. That all the forms of scales, however various, are to be referred to simple changes in the mode of calcification of the superficial covering of the scale, and to the greater or less degree of development of this portion. 2. That characters founded upon such particular modifications, as, for instance, *cycloid* or *ctenoid* forms of scales, are far from possessing the importance which has been attributed to them.

BAUDELOT, E. Note sur un Rameau dorsal du Nerf pathétique chez les Gades. *Tom. cit.* No. 4.

The author has found this dorsal branch in *Gadus pollachius*, *molva* and *lota*, as well as in *G. merlangus*.

——. Observations sur la structure et le développement des nageoires des poissons osseux. *Tom. cit.* No. 2.

GILL, T. On the Homologies of the Shoulder-girdle of the Dipnoans and other Fishes. Ann. N. H. (4) xi. pp. 173-178.

Abstract communicated by the author from a forthcoming work ("Arrangement of the Families of Fishes") now being printed for the Smithsonian Institution.

GRÉHANT & PICARD have made experiments from which they deduce that a peripheral excitement of the extremity of the muzzle is the cause of the respiratory movements in fishes. C. R. lxxvii. p. 646. Statistics relative to the respiration of Fishes are furnished by QUINQUAND, *l. c.* p. 1141.

HASSE, C. Das Gehörorgan der Fische. Anatom. Studien, I. Heft 3, 1872, x. pls. xix.-xxii.

——. Beobachtungen über die Schwimmblase der Fische. *Op. cit.* Heft 4, 1873, xiv. pls. xxvii. & xxviii.

KNOCH, J. Ueber Missbildungen betreffend die Embryonen des Salmonen- und Coregonus- Geschlechts. Bull. Mosc. 1873, No. 2, pp. 173-228, with plates.

On anomalous formations of the embryo of *Salmo* and *Coregonus*.

LEGOUIS, P. Recherches sur les tubes de Weber et sur le pancréas des Poissons osseux. Ann. Sci. Nat. xvii. Art. 8, & xviii. Art. 3.

LÜTKEN, C. Om Kjønnsforskjellen i Tandførholdet hos vore Rokker, særligt hos Skaden (*Raia batis*, L.) Vid. Medd. 1873, Nos. 1-4.

On sexual differences in the teeth of Rays.

MÜLLER, W. Ueber die Hypobranchialrinne der Tunikaten und deren Vorhandensein bei Amphioxus und den Cyklostomen. Jen. Z. Nat. 1873, pp. 327-332.

OELLACHER, J. Beiträge zur Entwicklungsgeschichte der Knochenfische nach Beobachtungen am Bachforelleneie. Z. wiss. Zool. xxiii. 3, pp. 1-116, pls. i.-iv.

A continuation of the contributions to the knowledge of development of osseous fishes from observations on Trout-ova, begun in 1872.

OWSIANNIKOW, P. Sur les premières évolutions de l'œuf du *Coregonus lavaretus*. Bull. Pétersb., xix. pp. 225-235, one plate.

PARKER, W. On the structure and development of the Skull in the Salmon (*Salmo salar*). Phil. Tr. clxiii. pp. 95-146, 8 pls.

PICARD, —. [See GRÉHANT.]

POUCHET, G. Rôle des nerfs dans les changements de coloration des Poissons. J. de l'Anat. Phys. 1872, pp. 71-404.

QUINQUAND, —. [See GRÉHANT.]

REICHENHEIM, M. Beiträge zur Kenntniss des elektrischen Centralorgans von Torpedo. Arch. Anat. Phys. 1873, pp. 751-759, pls. xv. & xvi.

STIEDA, L. Ueber den Bau des Rückenmarks der Rochen der Haie. Z. wiss. Zool. xxiii. 3, pp. 435-442, pl. xxv.

On the structure of the spinal marrow in the Ray and Shark.

——. Ueber die Deutung der einzelnen Theile des Fischgehirnes, *l. c.* pp. 443-450.

On the homologies of the several parts of the brain in fishes.

STEENSTRUP, J. Om Gjøllegitteret eller Gjøllebarderne hos Brugden (*Selachus maximus*, Gunn.). Overs. Dan. Selsk. 1873, No. 1.

On the appendages to the branchial apparatus in *Selache maximus*.

TODARO, F. Ricerche fatte nel laboratorio di anatomia normale della R. università di Roma nell'anno 1873.

No. I. On the gustatory organs and bucco-branchial membrane of the Selachia, by F. Todaro. Abstract given in Arch. Z. expér. 1873, pp. 534-558, pl. xxiv.

TURNER, A. A Contribution to the visceral anatomy of the Greenland Shark (*Læmargus borealis*). J. Anat. Phys. 1873, p. 233.

VROLIK, A. Studien über die Verknöcherung und die Knochen des Schädels der *Teleostei*. Niederl. Arch. Zool. 1873, pp. 219–314.

On the ossification and the bones of the skull in the *Teleostei*.

WAALEWYN, —. Bydrage tot de Histologie van den Vischdarm. Leiden: 1872, one plate.

WEIL, C. Beiträge zur Kenntniss der Entwicklung der Knochenfische. SB. Ak. Wien. lxxviii. pp. 171–178, pls. i. & ii.

PISCATORIAL AND PISCICULTURAL.

SOUDAKÈVICZ, T. Notice sur le progrès de la Pisciculture en Russie. St. Pétersbourg: 1873.

SCHULTZ, A. Notice sur les Pêcheries et la Chasse aux Phoques dans la Mer Blanche, l'Océan glacial et la Mer Caspienne. St. Pétersbourg: 1873.

THOMAS, H. The Rod in India. Mangalore: 1873, 8vo, pp. 319, 4 plates.

A popular manual of fish and fishing for purposes of sport in India.

VOUGA has presented to the public of Lausanne and Geneva three plans for the organization of piscicultural establishments. Bull. Soc. Neuch. ix. p. 422.

FAUNÆ.

Europe.

BLANCHÈRE, H. Les Chondrostomes de France. Bull. Soc. Acclim. 1873, pp. 689–699.

Turkestan.

SEVERTZOFF, N. Jevotnie Turkestanskije. Nachr. Ges. Mosc. viii. pt. 2.

The whole number of species composing the fish fauna of Turkestan exceeds 50, 26 being peculiar to Central Asia. This fauna consists partly of ancient species which existed previous to the separation of the Aral and Caspian Seas, and partly of others, which it has acquired subsequently. The author tabulates them under the following heads:— A. Ancient Central Asian fauna. B. Ponto-Caspian fauna, which is again divided into (a) Modern Central Asian species, (b) species peculiarly Ponto-Caspian.

Madagascar.

BLEEKER, P. Description de quelques espèces de poissons de l'île de la Réunion et de Madagascar. Ned. T. D. iv. pp. 92–105.

India and Indian Archipelago.

F. DAY (Calcutta, 1873 : 8vo, pp. 307) has published a "Report on the Fresh-water Fish and Fisheries of India and Burmah," a volume compiled with a view to bringing to light and arresting the wasteful destruction of these fish in the British territories; and a similar Report on the Sea Fish and Fisheries (Calcutta : 1873, 8vo). The same author, having had the opportunity of referring to Buchanan's original MSS. of "Fishes of Bengal," "which have lain so long in the India Office," publishes remarks upon them in P. Z. S. 1873, pp. 743-748. He has found six lists of Fishes, viz.: Dinajpur, 64 species; Ronggopur, 126; Puraniya, 134; Goruckpur, 79; Bhagulpur, 76; and Behar, 62.

——. On new or imperfectly known Fishes of India and Burmah. P. Z. S. 1873, pp. 107-112, 236-240, 704-710; J. L. S. xi. pp. 524-529.

BLEEKER, P. Troisième notice sur la faune ichthyologique des Iles Arou. Versl. Ak. Amst. viii. p. 35.

A list of 89 species, 36 being newly added to the Aru fauna.

——. Mededeelingen omtrent eene herziening der indisch-archipelagische soorten van *Epinephelus*, *Lutjanus*, *Dentex*, en verwante geschlachten. L. c. p. 40.

——. Description et figure d'une espèce insulindienne d'*Orthogoriscus*. L. c. p. 151, plate.

——. Révision des espèces insulindiennes des genres *Diapterus* et *Pentaprion*. L. c. p. 233.

China.

BLEEKER gives a list of Chinese fish, and characterizes 25 new species and one new genus: Ned. T. D. iv. pp. 113-154. Supplement, l. c. p. 233.

On collections of fishes from China. A. GÜNTHER, Ann. N. H. (4) xii. pp. 239-250, 377.

New or little known fishes from the Indian and Chinese seas are also described by Sauvage in N. Arch. Mus. ix. Bull. pp. 49-62, pls. i. vi. ix.

Philippines.

CARTIER describes new species of Pharyngognathi from this archipelago. Verh. Ges. Würz., 1873, pp. 96-106.

Polynesia.

GÜNTHER, A. Die Fische der Südsee (I). J. Mus. Godeffr. iii. pp. 1-24, pls. i.-xx.

This is the first of a series of parts of the above journal, which will be devoted to the description and illustration of the collection of fish from the South Seas, made during many years by Andrew Garrett, who still acts as collector to the Godeffroy Museum. The author has had the advantage of comparing specimens with the original draw-

ings of living fish made by Parkinson and Forster during Cook's voyage, and exact details as to the locality, &c., furnished by Mr. Garrett, with each specimen accompany the descriptions. The present part contains the family *Percide* (*Serranus*, *Plectropoma*, *Grammistes*, *Mesoprion*, *Aprion*, *Aphareus*, *Priacanthus*, *Ambassis*, *Apogon*, *Chilodopterus*, and *Dules*).

H. JOUAN has compiled a list of fish found in the Hawaiian Archipelago. *Mém. Soc. Cherb.* 1873, p. 89.

Australia.

CASTELNAU. "Notes on the edible fishes of Victoria." International Exhibition Essays, 1872-73, No. 5, 17 pages.

——. Contributions to the Ichthyology of Australia. Nos. iii.-viii. *P. Z. S. Vict.* ii. pp. 37-158.

F. M'COY writes on a new Australian species of *Thyrsites* in *Ann. N. H.* (4) xi. p. 338.

New Zealand.

F. W. HUTTON has published two papers in *Tr. N. Z. Inst.* v. pp. 259-272, and further notes in *Ann. N. H.* (4) xii. p. 400. *Cf.* also J. HAAST, *Tr. N. Z. Inst.* v. pp. 272-278.

North America.

COPE makes a contribution to the Ichthyology of Alaska in *P. Am. Phil. S.* xiii. pp. 24-32; and in Hayden's Preliminary Report of the U. S. Geological Survey of Montana and portions of adjacent territories (1872) p. 469, he describes 24 new species and 3 new genera.

The deep-water fauna of Lake Michigan is treated of by P. HOY in *Tr. Wiscons. Ac.* 1872, p. 98.

The Commissioners of Fisheries of New Jersey have issued a Fourth Annual Report (1873).

VAILLANT, L. *Recherches sur les poissons des eaux douces de l'Amérique septentrionale désignés par L. Agassiz sous le nom d'Éthiostomatidæ.* *N. Arch. Mus.* ix. pp. 154, 3 pls.

T. GILL has described a new American Flat-fish in *P. Ac. Philad.* 1873, p. 360.

S. F. BAIRD has compiled Questions and Memoranda of Inquiry relative to the Food-Fishes of the United States, similar to those framed with a like purpose by F. Day. *Sm. misc. coll.* (No. 234) x. Arts. 7 & 8.

South America.

C. F. LÜTKEN has described new Siluroids in *Overs. Dan. Selsk.* 1873, No. 3, pp. 29-39, and *Vid. Medd.* 1873, Nos. 13 & 14, pp. 203-220, pl. iv.

Africa.

A. GÜNTHER makes "Additions" to the Zanzibar fauna, and describes new fishes from Angola in *Ann. N. H.* (4) xii. pp. 182 & 142; and J. SMITH has a "Notice of new Fishes from Western Africa" in *P. R. Soc. Edinb.* 1872-73, pp. 89-95.

PALÆICHTHYES.

DIPNOI.

Protopterus athiopicus. Remarks on its habits, from several specimens observed on the Bahr Seraf. E. Marno, Zool. Gart. 1873, p. 44.

GANOIDEI.

Lepidosteus sinensis, sp. n., Bleeker, Ned. T. D. iv. p. 154, China.

Acipenser sturio. Peculiarities in the eye point to an affinity with *Amphibia* and *Reptilia*. Max Schultze, SB. Niedersh. Ges. Bonn, 1872, p. 193.

Psephurus, g. n., for *Polyodon gladius*, Mart., separated from *P. folium* by its comparatively short gill-rakers, in moderate number, and enormously developed fulcra, larger and in less number than in any fossil Ganoid. A. Günther, Ann. N. H. (4) xii. p. 250.

PLAGIOSTOMATA.

Selache maxima. The peculiar appendages attached to the branchial fringe in the Basking Shark, mentioned by Gunnerus and other authors, are to be considered as elongated and modified teeth, and their function is to serve as a sieve in the same manner as the well-known analogous apparatus in Whales. The nourishment of this Shark is consequently confined entirely to minute animals. Steenstrup, Overs. Dan. Selsk. 1873, No. 1.

Carcharias malabaricus, sp. n., Day, J. L. S. xi. p. 529, near Cochin and at Calicut.

Cestracion philippii. General observations, and remarks on the structure of its teeth. Zaddach, Schr. Ges. Königsb. 1872, p. 6.

Rhinobatus dumerili, sp. n., Castelnau, P. Z. S. Vict. ii. p. 148, Western Australia.

Raja. Differences dependent upon sex are observable in the dentition of *Raja batis* and *R. radiata*, as well as in *R. clavata*, in which they had hitherto been noticed; these differences are merely much less conspicuous in the two first named than in the latter, and have consequently been overlooked. *R. gaimardi*, Val., = *R. batis* (mas juv.), Lütken, Vid. Medd. 1873, Nos. 1-4.

Raja rostrata. Australia, p. 57, *trigonooides*, New Caledonia, p. 121, Castelnau, l. c. spp. nn.

Raja lemprieri = *R. nasuta*, Solander: *id.* l. c. p. 57.

TELEOSTEI.

ACANTHOPTERYGII.

PERCIDÆ.

L. VAILLANT has published a monograph on *Etheostoma* and the North America genera allied to it, in N. Arch. Mus. ix. fasc. 1-3 (subsequent to

a note on the same subject in C. R. lxxvi. p. 1304). He finds and characterizes two new genera, *Plesioperca* (*P. anceps*, sp. n., locality unknown, p. 37, pl. i. fig. 3), and *Astatiichthys* (*A. caeruleus*, Stor., p. 107, pl. iii. fig. 5; *zonalis*, Cope, p. 110; *pulchellus*, Grd., p. 113, pl. iii. fig. 6); and describes the following species of the group (a large number of doubtful species being also quoted and referred to):—

Pileoma caprodes, Raf., p. 43, pls. ii. fig. 2, iii. fig. 1; *P. zebra*, Ag., p. 48, pl. i. fig. 1.

Etheostoma blennioides, Raf., p. 57, pl. ii. fig. 5; *peltatum*, Stauf., p. 61, pl. ii. fig. 3; *macrocephalum*, Cope, p. 64, pl. ii. fig. 4; *aurantiacum*, Cope, p. 67.

Boleosoma olmstedii, Stor., p. 79, pl. ii. fig. 6; *variatum*, Kirtl., p. 84; *maculatum*, p. 87; *mutatum* (*maculatum*, Ag.), p. 88; *lepidum*, Brd. Gir., p. 90.

Hyostoma simoterum, Cope, p. 100, pl. iii. fig. 3; *cymatogramnum*, Abb., p. 102, pl. iii. fig. 2; *blennioperca*, Cope, p. 105.

Catonotus lineolatus, Ag., p. 117; *flabellatus*, Raf., p. 121, pl. iii. fig. 4; *linsleyi*, Stor., p. 125.

Hololepis baratti, Holbr., p. 127, pl. iii. fig. 7; *fusiformis*, Grd., p. 131, pl. iii. fig. 8; *erochrous*, Cope, p. 133, pl. iii. fig. 9.

Microperca punctulata, Putn., Trosch., p. 136.

Pleurolepis pellucidus, Brd., p. 138, pl. i. fig. 1.

Percichthys godeffroyi, sp. n., Günther, J. Mus. Godeffr. ii. p. 97, Iquique.

Odontolabrax, g. n., Bleeker, Ned. T. D. iv. p. 149. Corpus oblongum; pinna dorsalis unica profunde incisa, parte spinosa spinis 9; maxillæ antice dentibus caninis, præoperculum angulo spina postrorsum directa; pinna caudalis emarginata, biloba; squamæ magnæ. Type, *O. typus*, sp. n., *id. ibid.*, China.

Paralabrax fasciatus & *guttatus*, spp. nn., *id. l. c.* p. 150, China.

The *Anthianini* are revised and the following new genera proposed:—*Pseudanthias* (*Anthias pleurotænia*, *hucti*, *chiropsilus*, *lepidolepis*, *manadensis* and *cichlops*); *Dactylanthias* (*A. haplodactylus*); *Odontanthias* (*Anthias rhodopeplus* and *chrysostictus*, Gthr.); *Plectranthias* (*Plectropoma anthioides*, Gthr.). *Id. l. c.* p. 155.

Sparopsis elongatus, Kner (SB. Ac. Wien, 1868, p. 302, fig. 5), = *Aprion virescens*, C. & V.: Günther, J. Mus. Godeffr. iii. p. 16; Bleeker, Versl. Ak. Amst. vii. p. 44.

Chætopterus, Schl., *Pristipomoides*, Blkr., *Sparopsis*, Kner., and *Platynius*, Gill, are all of one generic type, viz., *Aprion*, C. & V., which ought to be substituted for them; *Mesoprion microchir*, Blkr., = *A. virescens*, C. & V.: Bleeker, Versl. Ak. Amst. vii. p. 44.

Serranus. GÜNTHER (J. Mus. Godeffr. iii. p. 1) remarks upon the comparative paucity of species known as belonging to the Polynesian fauna, these numbering 15 at most, whereas about 18 are described from the Red Sea: it is probable, however, that all the Polynesian species are deep-sea fishes, and most of them show peculiar variations of colour, on which little dependence can be placed in the substantiation of species; e.g., *S. leopardus*, *erythræus*, and *aurantius*, C. & V., are merely different states of colouring of *S. leopardus*, Lacépède (p. 4, pl. iii. fig. B). He gives

descriptions or diagnoses with synonymy and figures of the following species:—*Serranus louti*, p. 2, pl. 1, *S. sexmaculatus*, Rupp. (= *zanana* and *spilurus*, C. & V.), p. 3, pl. ii.; *S. urodelus*, p. 3, pl. iii. fig. A; *S. hædti*, p. 9, pl. viii. fig. A; and *S. hexagonatus* figured, pl. vii. A. & B.; *S. guttatus*, Bl., = *Cephalopholis argus*, Bl. = *S. myriaster*, and *argus*, C. & V., p. 5, pl. iv.; *S. miniatus*, Rüpp., = *S. cyanostigmatoides*, Blkr., p. 5, pl. v.; *S. fasciatus* (synonymy as follows:—*Perca fasciata*, Forsk., *Holocentrus oceanicus*, *forsskali*, and *rosmarus*, Lacép., *Epinephelus marginalis*, Bl., *S. oceanicus*, *marginalis*, and *variolosus*, C. & V.; *S. fasciatus*, Klunz.), p. 6, pl. iv.

Serranus dispar, Playf., is found in the Marshall group, *id. l. c.* p. 9, *Serranus socialis*, Polynesia, p. 7, pl. viii. fig. B; *S. medurensis*, Marshall Islands, p. 8, pl. ix. fig. A; and *howlandi*, Howland Island, p. 8, pl. ix. fig. B: *id. l. c.* spp. nn.

Lutjanus oligolepis, sp.n., Bleeker, Versl. Ak. Amst. vii. p. 43, Sumatra.

Lutjanus (*Serranus*, Q. & G., *Mesoprion*, Blkr.) *vitta*, Blkr., = *Mesoprion ophuyseni*, Blkr.; *L. erythropterus*, Bl., = *M. caroui*, C. & V., = *Diacope lineolata*, Rüpp., and ? = *Serranus nouleny*, C. & V. [!]; *id. ibid.*

(*Serranus*) *Holocentrus maculatus*, Bl., on account of its great variations in colour, has been described under the following names:—*H. albifuscus*, Lacép., *S. gaimardi*, *quoyanus*, and *miliaris*, C. & V., *S. sebæ* and *maculatus*, Blkr., *S. albifuscus*, Gthr., and *S. longispinis*, Kner. Bleeker, *l. c.* p. 46.

Epinephelus stellans, Rich., Blkr., is stated to have smaller scales than *Serranus hexagonatus*. *Id. ibid.*

Serranus urophthalmus, Blkr., is an *Anyperodon*; *S. (Variola) melanotenia*, Blkr., = *flavimarginatus*, Rüpp.; *S. moara*, Schl., = *Epinephelus* (*Serranus*, C. & V.) *nebulosus*, Blkr.; *E. corallicola*, Blkr., = *S. altivelioides*, Blkr.; *S. horridus*, K. V. H., = *S. fusciguttatus*, Rüpp.; *E. summana*, Blkr., = *S. polystigma*, Blkr. *Id. l. c.* pp. 45 & 46.

(*Serranus*) *Epinephelus janthinopterus*, Celebes, *miltostigma*, Amboina, *id. l. c.* p. 45, spp. nn.

Lutjanus paræmulon and *dubius*, spp. nn., Bleeker, Ned. T. D. iv. p. 150, China.

Plectropoma maculatum. Synonymy and figure given by Günther, *l. c.* p. 10, pl. x.

Grammistes punctatus. Diagnosis and figure: *id. l. c.* p. 11, pl. xi. fig. B. *G. ocellatus* distinguished from it, and figured: *id. ibid.* fig. A.; their distinctness confirmed by Bleeker, *l. c.* p. 106.

Lutjanus melanotenia, Blkr., = *Serranus lemniscatus*, C. & V.; *L. amboinensis*, Blkr., = *Diacope rufilineata*, C. & V.; *L. dodecanthus*, Blkr., = *L. (Mesoprion, C. & V.) malabaricus*, Blkr.; *D. bitæniata*, C. & V. = *L. lunulatus*, Bl.; *L. lioglossus*, Blkr., ? = *Mesoprion monostigma*, C. & V.; *M. gembra* and *tæniops*, C. & V., = *Lutjanus argentimaculatus* (Forsk.); *M. bleekeri*, Gthr., = *Lutjanus biguttatus* (C. & V.): Bleeker, Versl. Ak. Amst. vii. pp. 43 & 44.

Mesoprion gibbus (= *D. bottonensis*, C. & V., and *D. melanura*, Rupp.); complete synonymy, description, and figure: Günther, *l. c.* p. 12, pls. xii. & xiii. fig. A. *M. marginatus*, *bohar*, *monostigma*, and *semicinctus*, described and figured; *id. l. c.* pp. 13-15, pls. xiv.-xvii.

Mesoprion garretti, sp. n., *id. l. c.* p. 15, pl. xiii. fig. B, Kingsmill Islands.

Mesoprion johni, Bl. Small fry of this species have a spinous prolongation of the præoperculum; Day, J. L. S. xi. p. 524.

Diacopus adetii, sp. n., Castelnau, P. Z. S. Vict. ii. p. 111, New Caledonia.

Genyoroge melanura, Rüpp., breeds at the Andaman Islands; Day, *l. c.*

Bostockia, g. n., near *Glaucosoma*; type, *B. porosa*, sp. n., West Australia: Castelnau, *l. c.* p. 126.

Pentaceros decacanthus. On its character and range: Günther, J. Mus. Godeffr. iv. p. 90.

BLEEKER revises the *Priacanthini* of the Indian Archipelago; Ned. T. D. iv. p. 170.

Priacanthus bleekeri, sp. n., Castelnau, *l. c.* p. 100, Knob Island.

Priacanthus carolinus, C. & V., described and figured; Günther, *op. cit.* iii. p. 17, pl. xviii.

Apogon. Günther describes or notices the following species:—*A. fasciatus*, White, *l. c.* p. 19, pl. xx. figs. A & B; *A. frenatus*, Val., p. 19, pl. xix. fig. A; *A. maculiferus*, Garrett, p. 20, pl. xx. fig. C; *A. sangiensis*, Bl., p. 20; *A. hypselonotus*, Bl., p. 20; *A. nigripinnis*, C. & V., p. 21; *A. savayensis*, Günth., p. 21, pl. xix. fig. B; *A. fuscus*, Q. & G. (*A. monochrous*, Blkr.), p. 22; *A. orbicularis*, C. & V., p. 22, pl. xx. fig. D; *A. auritus*, C. & V., p. 23; *A. græffi*, sp. n., Marshall Islands, p. 22, pl. xx. fig. E.

Ania (Apogon) trivittata, sp. n., Bleeker, Ned. T. D. iv. p. 150, China.

Oligorus gigas, Ow., = *Polyprion cernuum*, Richards., = *Perca prognathus*, Forst., = *Sciæna gadoides*, Soland.; Hutton, Tr. N. Z. Inst. v. p. 259. Castelnau removes it into a new genus called *Hectoria*, and describes as a new species, *Oligorus mitchelli*, from the Murray River; P. Z. S. Vict. ii. p. 151.

Dules marginatus, C. & V., described, p. 24, and *D. argenteus* figured; Günther, *l. c.* pl. xix. c.

Edelia, g. n. (Percoid); types, *E. vittata* and *viridis*, spp. nn., Freshwaters, Western Australia. Castelnau, *l. c.* pp. 123–125.

Lacepedia, g. n., belonging either to the *Percidæ* or *Cirrhitidæ*, founded on a single imperfect specimen, *L. cataphracta*, sp. n. *Id. l. c.* p. 42.

PRISTIPOMATIDÆ.

GÜNTHER no longer separates the fishes of this family from the *Serranidæ (Percidæ)*, as the presence or absence of vomerine teeth, although affording a good character for practical distinction, is not of sufficient importance for a division into two natural families. J. Mus. Godeffr. iii. p. 1.

BLEEKER has revised the species of *Therapon* of the Indian Archipelago, and unites the genera *Datnia*, *Pelates*, *Helotes*, and *Pteragon*, C. & V., and *Mesopristes*, Blkr., into one; separating subgenerically *Datnia*, *Pelates*, and *Helotes* by characters derived from the teeth. Ned. T. D. iv. p. 372. The same author (*op. cit.* p. 273) has also revised the species of *Diagramma* and *Pristipoma* of the Indian Archipelago, describing

at length many species, including *Plectorhynchus (Diagramma) celebicus*, sp. n., from Celebes.

Scolopsis. On the species of the Indian Archipelago: *id. op. cit.* p. 345.

Gnathodentex, g. n., type, *Pentapus aurilineatus*. *Heterognathodon bifasciatus* and *xanthopleura*, Blkr., = *Scolopsides caninus*, C. & V., which is a *Pentapus*, with which genus *Heterognathodon* is united. *Id. Versl. Ak. Amst.* vii. p. 43.

(*Dentex*) *Gymnocranius frenatus*, sp. n., *id. ibid.*, Indian Archipelago.

Synagris, Klein, has priority over *Dentex*, Cuv., and the typical species of each being the same, ought to be preferred, and the name *Dentex* applied to the species ranged under *Synagris* by Günther. *Id. l. c.* p. 41.

Dentex (Synagris. Gthr.) hypselognathus, Java, Celebes, and *isacanthus*, Java, Sumatra. *id. ibid.*; *D. sundanensis (tambulus, Blkr., olim, nec C. & V.)* and *gracilis (ruber, Blkr., olim, nec C. & V.)*. Java, &c., *id. l. c.* p. 42: spp. nn.

Pentaprion gerreoides, Blkr., re-described: *id. l. c.* p. 254.

SQUAMIPINNES.

Neochaetodon vittatus, g. & spp. nn., Castelnau, P. Z. S. Vict. ii. p. 130, Western Australia.

Scatophagus argus, L., when very young, has a bony ridge from the orbit to the shoulder. Day, J. L. S. xi. p. 524.

Scorpiis hectori, Hutt., re-described and figured; Hutton, Tr. N. Z. Inst. v. p. 259. pl. vii.

NANDIDÆ.

Ru[e]ppelia prolongata, g. & sp. nn., Castelnau, l. c. p. 51, Victoria.

SPARIDÆ.

Chrysophrys novæ-caledoniæ, sp. n., Castelnau, l. c. p. 110, New Caledonia.

Lethrinus hypselopterus and *insulindicus*, spp. nn., Bleeker, Ned. T. D. iv. p. 318, Indian Seas (revision of the Indopelagic *Lethrini*, 15 spp. described: *id. ibid.*).

Sphærodon heterodon, Blkr., = *S. grandoculis*, Rüpp.: *id. Versl. Ak. Amst.* vii. p. 46.

(*Girella*) *Melanichthys blacki*, sp. n., Castelnau, l. c. p. 41, Victoria.

Haplodactylus donaldi, sp. n., Haast, Tr. N. Z. Inst. v. p. 272. pl. xvi. New Zealand.

CIRRHITIDÆ.

Neocirrhites armatus, g. & sp. nn., Castelnau, l. c. p. 101, Knob Island.

Cirrhitichthys bleekeri, sp. n., Day, P. Z. S. 1873, p. 705, Madras.

Chilodactylus spectabilis, Hutt., figured and re-described; Hutton, Tr. N. Z. Inst. v. p. 259, pl. vii. fig. 11.

Mendosoma lineatum, Forst., described and figured: *id. l. c.* p. 260, pl. vii. fig. 13a.

SCORPÆNIDÆ.

Centropogon australis, Cast., olim, nec White, = *Neosebastes scorpenoides*, Guichenot; Castelnau, *l. c.* p. 40.

Sebastes alporti, sp. n., *id. l. c.* p. 41, Hobson's Bay and Tasmania.

Sebastes nigrimaculatus, sp. n., Günther, Ann. N. H. (4) xii. p. 377, Chefoo.

Sebastes percoides, Sol. fig. 14, and *Scorpena cruenta*, Sol. fig. 15, figured by Hutton, Tr. N. Z. Inst. v. pl. viii.

Sebastopsis, g. n., type, *Sebastes minutus*, Cuv.; Sauvage, Ann. Sci. Nat. (5) xvii. Art. 5.

Scorpena armata, sp. n., *id. N. Arch. Mus.* 1873, Bull. p. 49, pl. vi. fig. 1, E. Indies.

Scorpena gibbosa, confounded by Cuv. & Val. under *S. nesogallica*, is described and figured: *id. l. c.* p. 50, pl. vi. fig. 2.

Scorpenopsis oxycephala, Blkr., described and figured: *id. l. c.* p. 52, pl. vi. fig. 3.

Tanianotus filamentosus, Steindachner, corroborated as synonymous with *Trichonotus setigerus*, Bl. [Zool. Rec. iv. p. 165]: Günther, J. Mus. Godeffr. iv. p. 90.

Prosopodasys (Centropogon) urostigma and *sinensis*, sp. nn., Bleeker, Ned. T. D. iv. p. 151, China.

[H]*Aploactisoma schomburgki*, g. & sp. nn., Castelnau, *l. c.* p. 63, S. Australia.

Hemitripterus sinensis, sp. n., Sauvage, *l. c.* p. 53, China.

Pelor sinense, C. & V., described and figured; *id. ibid.* pl. vii. fig. 2.

BERYCIDÆ.

Myripristis. Species of the Indian Archipelago revised. *M. pralinus*, Gthr., nec Cuv., is re-named *indicus*. Bleeker, Ned. T. D. iv. p. 178.

The *Holocentri* of the Indian Archipelago revised, and sixteen species and one *Rhynchichthys* re-described. *Id. t. c.* p. 198.

Neomyripristis amœnus, g. & sp. nn., Castelnau, *l. c.* p. 98, Knob Island.

SCIÆNIDÆ.

Otolithus brunneus, sp. n., Day, J. L. S. xi. p. 524, Bombay.

XIPHIIDÆ.

Xiphias and *Histiophorus* in the young stage. The author's figures in J. Mus. Godeffr. ii. p. 98, of the young of *Xiphias* are now referred by him to *Histiophorus*. The young of *Xiphias* has a very long *Belone*-like beak; the supraorbital edge with conical prominences, no occipital spine, and with two short pointed teeth at the angle of the præoperculum. The young of *Histiophorus* has the jaws comparatively shorter, the supraorbital edge very finely or not denticulated, a bony spine on each side of

the occiput and at the angle of the præoperculum. A. Günther. J. Mus. Godeffr. iv. p. 89.

Histiophorus dubius, sp. n., Bleeker, Ned. T. D. iv. p. 151, China.

TRICHIURIDÆ.

Thyrsites micropus, sp. n., McCoy, Ann. N. H. (4) xi. p. 338, Tasmania.

ACRONURIDÆ.

Acronurus formosus, sp. n., Castelnau, l. c. p. 104, Knob Island.

CARANGIDÆ.

Caranx valenciennii, sp. n., *id.* l. c. p. 102, Knob Island.

Caranx bidii, sp. n., Day, P. Z. S. 1873, p. 237, Madras.

(*Caranx*) *Decapterus fasciatus*, sp. n., Bleeker, l. c. p. 151, China.

CYTTIDÆ.

Cyttus traversi, Hutt., figured; Hutton, Tr. N. Z. Inst. v. pl. ix. fig. 29.

NOMEIDÆ.

Neptomenus bilineatus, sp. n., *id.* l. c. p. 261, pl. viii. fig. 31a, Wellington Harbour.

SCOMBRIDÆ.

Cybium gracile, sp. n., Günther, Ann. N. H. (4) xii. p. 378, Chefoo.

TRACHINIDÆ.

Uranoscopus maculatus, Forst., is different from *U. maculosus*, Soland., and *U. maculatus*, Rich.: Hutton, Ann. N. H. (4) xii. p. 400.

Synnema, g. n., Haast, Tr. N. Z. Inst. v. p. 274. Type, *Anema monopterygium*, Bl.

Cathetostoma giganteum, sp. n., *id.* *ibid.* pl. xvi. New Zealand.

Leptoscopus angusticeps, Hutton, l. c. p. 401, and *L. huttoni*, Haast, l. c. p. 275, pl. xvi. spp. nn., New Zealand.

Sillago ciliata, C. & V. ? (or *S. insularis*, sp. n.), Castelnau, l. c. p. 113, New Caledonia.

Bovichthys variegatus, Rich.: description corrected. Hutton, Tr. N. Z. Inst. v. p. 262.

Bovichthys sp., described by J. S. Webb, Tr. N. Z. Inst. v. p. 480.

Notothenia maoriensis, sp. n., Haast, l. c. p. 276, pl. xvi., New Zealand.

PEDICULATI.

Chironectes filamentosus, Cast., re-described; Castelnau, l. c. p. 65.

COTTIDÆ.

Blepsias bilobus, C. & V., said to have been caught flying off Sitkha. Cope, Pr. Am. Phil. Soc. xiii. p. 26.

Cottus (Aspicottus) sinensis, sp. n., Sauvage, N. Arch. Mus. ix. Bull. p. 55, China.

Cottus pollux, sp. n., Günther, Ann. N. H. (4) xii. p. 240, Japan.

On the sound emitted by *Cottus scorpius* and *bubalus*: Dufossé, R. Z. 1872, p. 360.

Cottopsis semiscaber, sp. n., Cope, in F. V. Hayden's Report of the Geological Survey of Montana, 1872, p. 476, Idaho.

SAUVAGE, C. R. lxxvii. pp. 723-726, arranges the *Trigluid* fishes as follows:—

I. *Scorpenide*. The infraorbital bone articulating movably with the præoperculum, never covering the entire cheek. Ventrals supported by a long pelvic bone, the two bones being in contact and fused together.

II. *Platycephalide*. Ventrals far apart; pelvic bones never in contact.

III. *Triglidae*. Infraorbital articulating with the præoperculum, almost fixed and covering all the cheek. Ventrals in contact.

KAUP works out a classification of the *Triglidae* according to transcendental principles, giving in full an arrangement of the subfamily *Triglineæ*, with characters of genera and species, amongst which are *Trigla (Chelidonichthys) pictipinnis*, sp. n., from Barbadoes, and a species not known at present, but of which the author prophesies the existence, stating that it is probably already to be found in collections, and describing the shape of its head [*cf.* Zool. Rec. viii. p. 258]. Arch. f. Nat. 1873, pp. 71-94.

Triglopsis sp., provisionally named *stimpsoni*; Hoy, Tr. Wiscons. Ac. 1872, p. 98.

Platycephalus isacanthus, C. & V., described and figured; Sauvage, N. Arch. Mus. ix. Bull. p. 55, pl. vii. fig. 1; *P. scaber*, Gthr., = *P. rodericensis*, C. & V.; *P. suppositus*, Trosch., Gthr., = *P. scaber*, L. & Bl.; *id. l. c.* pp. 58 & 60.

Platycephalus grandidieri, Zanzibar and Madagascar, p. 56, *prionotus*, p. 57, *micracanthus*, p. 60: *id. t. c.* spp. nn.

Lepidotrigla microptera, sp. n., Günther, Ann. N. H. (4) xii. p. 241, Shanghai.

Lepidotrigla brachyptera, Hutt., figured; Tr. N. Z. Inst. v. pl. xv. fig. 41.

Trigla amœna, sp. n., Castelnau, *l. c.* p. 131, Western Australia.

CATAPHRACTI.

Peristedion rieffeli, Kp., re-characterized and figured; Sauvage, *l. c.* p. 61, pl. vii. fig. 3.

COMEPHORIDÆ.

Comephorus baicalensis described at length, with details respecting its habits in its native conditions. It is nearly allied to the *Cottidae*. Dybowsky, Verh. z. b. Wien. xxiii. p. 475, pl. v.

DISCOBOLI.

Liparis vulgaris has been dredged in Massachusetts Harbour. Putnam, P. Bost. Soc. xvi. p. 114.

GOBIIDÆ.

Gobius rubrimaculatus, Kriesch, Verh. z.-b. Wien. xxiii. p. 369, pl. vi. a, Hungary; *G. nuchifasciatus*, Günther, J. Mus. Godeffr. iv. p. 90, Bowen; *G. masoni*, *ocellatus*, and *planifrons*, Day, P. Z. S. 1873, pp. 107 & 108, Bombay; *G. caudatus*, Castelnau, l. c. p. 47, Australia: spp. nn.

(*Gobius*) *Valenciensia elegans*, *sinensis*, *notophthalmus*, *macropterus*, spp. nn., Bleeker, Ned. T. D. iv. p. 152, China.

Euctenogobius cristatus, sp. n., Day, l. c. p. 109, Bombay.

Paragobius sinensis, sp. n., Bleeker, l. c., China.

Lophiogobius, g. n., *Gobiini*. Body rather elongate, covered with scales of moderate size; gill-openings rather wide. Head large, depressed; cleft of the mouth wide; jaws with a series of rather large subhorizontal teeth, distant from each other, and not covered by the lips. A series of very small teeth within the outer series. Palate smooth. The spinous is separate from the soft dorsal, and composed of seven spines, of which the first is stiff and pungent. Ventrals united, not adherent to belly. Pseudobranchiæ. *L. ocell[at]icauda*, sp. n., Günther, Ann. N. H. (4) xii. p. 241, Shanghai.

Apocryptes macrophthalmus, sp. n., Castelnau, l. c. p. 87, Port Darwin.

Apocryptes madurensis. ? Blkr., from Madras, Bombay, &c., Day, l. c. p. 109.

Eleotris swinhonis[-hoii], Günther, l. c. p. 242, Shanghai; *E. modesta*, Port Darwin, p. 85, and *obscura*, Western Australia, p. 134, Castelnau, l. c.; *E. brachysoma*, Bleeker, l. c. p. 152, China: spp. nn.

Eleotris gobioides, C. & V., figured, pl. xv., and *E. radiata*, Quoy, described and figured, p. 263, pl. ix. fig. 45a; Hutton, Tr. N. Z. Inst. v.

Eleotris madagascariensis, C. & V., described; Bleeker, Ned. T. D. iv. p. 102.

Amblyopus buchhanani, sp. n., Day, l. c. p. 110, Calcutta.

Platyptera sinensis, sp. n., Bleeker, l. c. p. 152, China.

Callionymus olidus, Günther, Ann. N. H. (4) xii. p. 242, Shanghai: *C. ocellifer*, Castelnau, l. c. p. 49, Victoria: spp. nn.

HETEROLEPIDINA.

Scombrocottus salmoneus, Ptrs., = *Anoplopoma fimbria* (Pall.); T. Gill, P. Cal. Ac. v. p. 56.

Chirus balias and *ordinatus*, p. 28. *C. trigrammus*, p. 29, spp. nn., Cope, P. Am. Phil. Soc. xiii. Unalaska and Alaska.

BLENNIIDÆ.

Anarrhichas fasciatus, sp. n., Bleeker, Ned. T. D. iv. p. 151, China.

Blennius steindachneri, sp. n., Day, l. c. p. 110, Scind.

Salarius unicolor, Rüpp., from Kurrachee, described; *id. ibid.*

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Sticharium rubrum and *flavescens*, Hutt., are now referred to *Clinus*; Hutton, Tr. N. Z. Inst. v. p. 264, pls. ix. & xv. figs. 53 & 54.

Heteroclinus adelaide, Cast., *Ophioclinus antarcticus*, Cast., and *Cristiceps splendens*, Cast., re-described; Castelnau, t. c. p. 68, 69, & 67.

Cristiceps amarus and *howitti*, spp. nn., *id. l. c.* p. 48, S. Australia.

Tripterygium atrigulare, sp. n., Günther, J. Mus. Godeffr. iv. p. 91, Bowen.

Tripterygium forsteri, C. & V., *fenestratum*, Bl., and *varium*, Bl. = *T. nigripenne*, C. & V., varr.; Hutton, l. c. p. 263.

Tripterygium compressum, Hutt., figured: *id. l. c.* pl. xv.

Centronotus letus, sp. n., Cope, P. Am. Phil. Soc. xiii. p. 27, Alaska.

Xiphidium cruoreum, sp. n., *id. ibid.*, Alaska.

MASTACEMBELIDÆ.

Mastacembelus (Rhynchobdella) sinensis, Blkr., characterized; Günther, Ann. N. H. (4) xii. p. 243.

Mastacembelus fasciatus, sp. n., Bleeker, Ned. T. D. iv. p. 154, China.

ATHERINIDÆ.

Atherinichthys edelensis, sp. n., Castelnau, l. c. p. 134, Western Australia.

Zantecla pusilla, g. & spp. nn., possibly the type of a new family, *id. l. c.* pp. 87 & 88, Port Darwin.

MUGILIDÆ.

Mugil occidentalis, sp. n., *id. l. c.* p. 135, Western Australia.

Mugil perusii, Val., figured, with remarks on its identification with *M. cephalotus*. Hutton, l. c. p. 264, pl. ix.

Mugil neocalidonicus, sp. n., Castelnau, l. c. p. 116, New Caledonia.

Mugil peroni, C. & V., at Victoria; *id. l. c.* p. 151.

GASTEROSTEIDÆ.

Gasterosteus aculeatus, L., var. n. *trachurus*, Cope, P. Am. Phil. Soc. xiii. p. 26, Alaska.

OPHIOCEPHALIDÆ.

Ophiocephalus micropeltes, Cuv., has been found near Cochin; Day, P. Z. S., 1873, p. 238.

Ophiocephalus obscurus described; it is from Western Africa, as well as from the Nile; Smith, P. R. Soc. Edinb. 1872-73, p. 89.

TRACHYPTERIDÆ.

Trachypierus vaagmaer, at Montrose, described and photographed; Rep. Montrose Soc. 1873, p. 4.

ACANTHOPTERYGII PHARYNGOGNATHI.

POMACENTRIDÆ.

Amphiprion rueppelli and *bicolor*, Castelnau, P. Z. S. Vict. ii. pp. 91 & 92, Port Darwin; *A. boholensis*, Cartier, Verh. Ges. Würzb. 1873, p. 96, Bohol: spp. nn.

Dascyllus reticulatus, Rich.; observations by Cartier, *l. c.* p. 97.

Pomacentrus bilineatus, Castelnau, *l. c.* p. 90, Port Darwin; *P. jerdoni*, Day, P. Z. S. 1873. p. 237, Madras; *P. ovoides* and *punctatilineatus*, Cartier, *l. c.* p. 98, Philippines: spp. nn.

Pomacentrus, sp. n., ? and varieties of *P. pavo* & *taniurus*, Blkr., from the Philippines, described; Cartier, *l. c.* pp. 99 & 100.

Glyphidodon mutabilis and *tenuiruptus* (and *G. cingulatus*, Kner., var. or sp. n., ?), *id. l. c.* pp. 100 & 101, Philippines; *G. sinensis*, Bleeker, Ned. T. D. iv. p. 149, China: spp. nn.

Heliastes amboinensis, sp. n., Bleeker, *l. c.* p. 111, Amboyna.

LABRIDÆ.

Ctenolabrus ? *knoci*, sp. n., Hutton, Tr. N. Z. Inst. v. p. 265, pl. x. fig. 66a, Cook Strait.

Chærops mæander, *unimaculatus*, and *rostratus*, spp. nn., Cartier, *l. c.* pp. 102 & 103, Philippines.

Labrichthys bothryocosmus, Rich., and *psittacula*, Rich., figured, pl. x. figs. 68 & 69; and *L. fucicola*, Rich., described; Hutton, *l. c.* p. 265.

Labrichthys cuvieri, Hobart Town and Bass's Straits, p. 53, *bostocki* and *edelsensis*, Western Australia, p. 137, Castelnau, P. Z. S. Vict. ii.: spp. nn.

PlatyGLOSSUS pseudogramma, *reticulatus*, *alternans*, and *ubayensis*, spp. nn., Cartier, *l. c.* pp. 103 & 104, Philippines.

Pseudojulis lineata, sp. n., Castelnau, *l. c.* p. 138, Western Australia.

Novacula rufa, sp. n., Day, P. Z. S. 1873, p. 238, Madras.

Julis truncatus, sp. n., Cartier, *l. c.* p. 105, Cebu.

Pseudoscarus margaritus, sp. n., and *P.* sp. n. ?, *id. ibid.*, Cebu.

Odax pusillus, sp. n., Castelnau, *l. c.* p. 72, South Australia.

Heteroscarus filamentosus and *modestus*, Cast., re-described; *id. l. c.* pp. 73-76.

EMBIOTOCIDÆ.

Ditrema violacea [-eum], sp. n., Hutton, Tr. N. Z. Inst. v. p. 261, pl. viii. fig. 316, Wellington.

GERRIDÆ.

(*Gerres*) *Diapterus*. The 12 Indo-pelagic species are arranged synoptically, and described at length (or descriptions quoted). *G. punctatus*, Day, seems more nearly allied to *G. acinaces*, Blkr., than to *G. punctatus*, C. & V.; *G. singaporensis*, Steind., = *G. kapas*, Blkr.; Bleeker, Versl. Ak. Amst. vii. pp. 233-254.

CHROMIDÆ.

Cichla temensis, Humb., described and figured; Bleeker, *l. c.* p. 32.

ANACANTHINI.

GADOIDEI.

Bathymaster, g. n., Cope, P. Am. Phil. Soc. xiii. p. 31. (*Gadopsidæ*) resembles the *Gadidæ* in the structure of its superior pharyngeal bone and pyloric cæca, but with pseudobranchiæ like some of the *Blenniidæ*. Separated from *Gadopsis* by its five-rayed pectoral ventrals and large pseudobranchiæ. Differs from *Brosmophycis*, Gill, which it resembles in form, in its much larger ventrals. *B. signatus*, sp. n., *id. l. c.* p. 32, Sitka.

Gadus periscopus and *auratus*, *id. l. c.* p. 30, Alaska; *G. pseudomorrhua*, Bleeker, Ned. T. D. iv. p. 152, China: spp. nn.

Gadus australis, Hutt., = *Merluccius gayi*, Guichen., from Chili; Hutton, *l. c.* p. 266.

Bregmaceros atripinnis has a very large air-vessel, and two pyloric appendages; Day, P. Z. S. 1873, p. 112.

Calloptilum [rectius *Calliptilum*; *Calliptilus*, Haliday, Hymenoptera], g. n. Body fusiform, compressed posteriorly; scales cycloid; three dorsal fins, the first reduced to a single ray; anal single, long; ventrals long, composed of two rays; caudal separate; teeth none; gill-openings wide, the gill membranes united below the throat, but not attached to the isthmus; pseudobranchiæ none; snout short and rounded. Comes next to *Bregmaceros*, Thomps. *C. punctatum*, sp. n., River Thomas and Cape Campbell, New Zealand. Hutton, *l. c.* p. 266, pl. xi. fig. 76a.

Brotula ensiformis. The opercular spine lies in a sheath of the skin of the suboperculum: Günther, J. Mus. Godeffr. iv. p. 91.

Ammodytes alascanus, sp. n., Cope, P. Am. Phil. Soc. xiii. p. 30, Alaska.

PLEURONECTOIDEI.

Pseudorhombus swinhonis [-*hoii*], sp. n., Günther, Ann. N. H. (4) xii. p. 379, Chefoo.

Pleuronectes (Platichthys) perarcuatus, sp. n., Cope, *l. c.* p. 32, Alaska.

Glyptocephalus (re-characterized, p. 360) *acadianus*, sp. n., Gill, P. Ac. Philad. 1873, p. 362, Eastport, Maine, U.S.A.

Ammotretis guentheri, sp. n., Hutton, *l. c.* p. 267, pl. xi., Wellington Harbour.

Rhombosolea leporina and *tapirina*, Günther, described and figured; Hutton, *l. c.* p. 268, pls. xi. & xii.

Rhombosolea reiiaria, sp. n. (distinguished from *R. tapirina*), Hutton, Ann. N. H. (4) xii. p. 401, New Zealand.

Haliglossus vulgaris. The females are much bigger than the males. Atwood, Pr. Bost. Soc. xiv. (1872), p. 135.

Ammopleurops brachysoma, sp. n., Bleeker, Ned. T. D. iv. p. 153, China.

Æsopia cornuta, obtained in Madras bazaars; Day, *l. c.* p. 238.

Cynoglossus robustus, Shanghai, p. 243, *gracilis*, p. 244, *semilævis*, p. 379, Chefoo, Günther, Ann. N. H. (4) xii.; *C. dubius*, Day, J. L. S. xi. p. 525, Gwadur: spp. nn.

Bowenia, g. n. (*Pleuronectidæ*), Haast, *l. c.* p. 276. *B. novæ-zeelandiæ*, sp. n., *id. l. c.* p. 277, pl. xvi. Lake Ellesmere.

PHYSOSTOMI.

SILURIDÆ.

Gymnallabes (*Channalabes*) *apus*, subg. & sp. nn., Günther, Ann. N. H. (4) xii. p. 142, Ambriz.

Plotosus unicolor, sp. n., Castelnau, *l. c.* p. 140, West Australia.

Cnidoglanis bostocki, sp. n., *id. l. c.* p. 141, West Australia.

Observations on the mode of hatching the ova of Indian Siluroids; *Silurus punctatus* (Day, 1868) is renamed *wynaadensis*. Day, P. Z. S. 1873. pp. 705 & 239.

Silurus dukai, sp. n., *id. t. c.* p. 237, Darjeeling.

Liocassis and *Pseudobagrus* are united under *Macrones*. *M.* (*Pseudobagrus*) *tenuis* and *M.* (*Liocassis*) *taniatus*, sp. nn., Shanghai, Günther, *t. c.* p. 244.

Macrones affinis and *leucophasis*, Blyth, described; Day, *l. c.* pp. 111 & 112.

Macrones sinensis, sp. n., Bleeker, Ned. T. D. iv. p. 153, China.

Bacropsis, g. n., *Pimelodineæ*; between *Piratinga* and *Pseudariodes*. "Cutis haud reticulata; corpus teretiusculum; caput depressum; rostrum haud productum; maxilla superior monnihil longior; oculi sursum fere spectantes; margine supraorbitali libero; galea haud granulata, tenuiter striolata, cute tenui obducta; filamenta oralia teretia sex; dentes palatini in acervos quatuor dispositi, vomerini a palatinis longe sejuncti, pinna dorsalis anterior brevis, radio primario gracili rigido, mollibus 6, posterior adiposa haud radiata, sat longa; ventrales sub radiis ultimis pinnæ dorsalis insertæ, radiis sex, analis brevis, caudalis furcata." *B. reinhardti*, sp. n., Rio das Velhas. Lütken, Overs. Dan. Selsk. 1873, No. 3. p. 32.

Pimelodus (Lac., re-characterized) *westermanni*, sp. n., *id. ibid.*, Rio das Velhas.

Pseudorrhamdia (Blkr., re-characterized) *fur*, p. 33, and *vittatus*, p. 34, spp. nn., *id. l. c.*, Rio das Velhas.

Rhamdia (Blkr., re-characterized) *microcephala* and *minuta*, spp. nn., *id. l. c.* p. 35, Rio das Velhas.

Pseudopimelodus, Blkr., re-characterized; *id. l. c.* p. 36.

Glyptosternum madraspatanum, sp. n., Day, J. L. S. xi. p. 526, Base of the Neilgherries.

Doras niger. Observations on the anterior vertebræ and dorsal fin, compared with the same parts in other fishes. Bliss, P. Bost. Soc. xiv. (1872) p. 3.

Doras marmoratus, sp. n., Lütken, *l. c.* p. 30, Rio das Velhas.

Auchenipterus lacustris, sp. n., *id. ibid.*, Rio das Velhas.

Glanidium, g. n., *Doradine*: differs from *Centromochlus*, Kner, in its non-galeated head. Type, *G. albescens*, sp. n., *id. l. c.* p. 31, Rio das Velhas.

Synodontis robbianus, sp. n., Smith, P. R. Soc. Edinb. 1872-73, p. 92, West Africa.

On *Callichthys kneri*, Gill, *C. littoralis*, Hanc., *Ancistrus guacharote*, Val., and other species from Trinidad; *cf.* Lütken, Vid. Medd. 1873, No. 18, pp. 214-217.

Plecostomus villarsi, Venezuela, *id. l. c.* p. 211, *P. lima*, Rio das Velhas, and *francisci*, St. Francisco River, *id. Overs. Dan. Selsk.* 1873, No. 3, p. 30: spp. nn.

Chatostomus stannii and *nudirostris*, Venezuela, *macrops*, Surinam, spp. nn., *id. Vid. Medd.* 1873, No. 13, p. 211.

Chatostomus gymnorhynchus, Kner, re-described: *id. l. c.* p. 204.

Xenomystus, g. n. "*Hypostomidarum*, ita distinguendum: scutella corporis minus evoluta, haud contigua, cuti pro parte immersa, 6-7 seriata; cauda subtus nuda, cute molli obtecta; genæ et pinnarum pectoralium radius primus spinosus (in maribus solis?) cute molli, tumida, spongiosa obtecti, e qua prominent aculei mobiles uncinati breves; pinna adiposa adest; pinna dorsalis anterior radiis 8 suffulta." *X. gobio*, sp. n., S. America. *Id. l. c.* No. 14, p. 217, pl. iv.

Trichomycterus brasiliensis, sp. n., *id. Overs. Dan. Selsk.* 1873, No. 3, p. 29, Rio das Velhas.

CYPRINIDÆ.

FITZINGER discusses the external characteristics of the European genera. S.B. Ak. Wien. lxxviii. pp. 145-170.

Cyprinus kunta and *chagunio*, H. Buch., are not specifically separable; information is given respecting the native names of various species, extracted from Buchanan's MSS., with remarks on that author's method of counting the dorsal rays. Day, P. Z. S. 1873, pp. 743-748.

Osteochilus malabaricus, sp. n., *id. J. L. S.* xi. p. 527, Wynaad.

Barbus (*Barbodes*) *thomassi* and *lithopidos*, spp. nn., *id. P. Z. S.* 1873, p. 707, South Canara.

Barbus (*Barbodes*) *curmuca*, H. Buch., described: *id. ibid.*

Barbus wynaadensis, sp. n., *id. J. L. S.* xi. p. 528, Wynaad.

Barbus (and *Gobiobarbus*) *labeo*, Pall., = *Hemibarbus maculatus*, Blkr., and ? = *H. dissimilis*, Blkr. (juv.), and is very closely allied to *B. schlegeli*, Gth. ; Günther, Ann. N. H. (4) xii. p. 380.

Gobio nigripinnis and *nitens*, spp. nn., Günther, *l. c.* p. 246, Shanghai.

Tinca vulgaris. The young have the caudal forked; Day, P. Z. S. 1873, p. 708.

Pseudogobio sinensis, Kn. ; *cf.* Günther, *t. c.* p. 247.

Semiplotus brevidorsalis, sp. n., Day, *l. c.* p. 239, rivers below the Neilgherry Hills in Madras.

Xenocypris tapeinosoma, p. 65, *davidi*, p. 66, *microlepis*, p. 68, spp. nn., Bleeker, Ned. T. D. iv., Yangtse Kiang.

Myloleucus, g. n., Cope, in Hayden's Rep. Geol. Surv. Montana, 1872, p. 475. *Siboma*, with developed grinding surfaces to the teeth. *M. pulverulentus*, sp. n., *id. ibid.* Utah.

Myloleucus, g. n., type *Leuciscus æthiops*, Basil; Günther, *l. c.*

Chondrostoma. H. de la Blanchère, Bull. Soc. Acclim. 1873, p. 689, gives details of the habits of the species, of which he thinks that not less than five or six belong to the fauna of France, including *C. ceresii*, sp. n. (figured), which spawns in mountain waters, at the end of January, and in rivers at the end of March.

Squalius oxyrrhis, sp. n., from the Rouergue (not as yet compared with *Leuciscus rostratus*, Agass.), *id.* C. R. lxxvi. p. 662.

Acanthorrhodeus tenianalis and *atranalis*, Günther, *l. c.* p. 247, Shanghai; *A. macropterus*, p. 71, *guichenoti*, p. 73, *hypselonotus*, p. 74, Bleeker, Ned. T. D. iv., Yangtse Kiang : spp. nn.

Achilognathus barbatulus, sp. n., *id.* *l. c.* p. 248, Shanghai.

Opsariichthys bidens, sp. n., *id.* *l. c.* p. 249, Shanghai.

Rohtee neilli, rivers near base of Neilgherries in Madras, p. 239, *R. bakeri*, Cottayam, p. 240, spp. nn. : Day, *l. c.*

Culter, Blkr., revised, p. 77. *C. dabrii*, p. 84, *hypselonotus*, p. 85, *oxycephalus*, p. 87, Bleeker, *l. c.* spp. nn., Yangtse Kiang.

Toxabramis, g. n. ; Abramidin. Body elongate, much compressed, the entire abdominal edge being trenchant. Scales of moderate size; lateral line bent downwards behind the pectoral, and rising again to the middle of the tail behind the anal. Mouth oblique, lower jaw prominent; barbels none. Dorsal fins short, with a strong serrated spine, placed above the interval between ventral and anal; anal fin long, many rayed; caudal forked; pectorals long. Pharyngeal teeth in a double series (5, 2). *T. swinhonis* [-*hoii*], sp. n., Shanghai. Günther, *l. c.* p. 249.

Apocope, g. n., Cope, Rep. Geol. Surv. Mont. 1872, p. 472. Allied to *Ceratichthys*. *A. carringtoni*, *ibid.*, and *vulnerata*, p. 473, spp. nn., *id.* *l. c.*, Utah.

Hybopsis bivittatus, sp. n., *id.* *t. c.* p. 474, Utah.

Tigoma rhinichthyoides, sp. n., *id.* *t. c.* p. 473, Utah.

Protoporus (allied to *Tigoma*) *dominus* [*sic*], g. & sp. nn., *id.* *ibid.*, Idaho.

Clinostomus pandora, p. 475, from a tributary of the Rio Grande, *hydrophlox*, *ibid.*, *montanus*, p. 476, Idaho, *id.* *l. c.* : spp. nn.

Chela boopis, sp. n., Day, *l. c.* p. 708, South Canara.

Nemachilus pulchellus and *chryseus*, spp. nn., *id.* J. L. S. xi. p. 528, River Bowany.

CHARACINIDÆ.

Bryconathiops, g. n. Distinguished from *Brycon* by its very small toothless maxillary. The African representative of that genus. *B. microstoma*, sp. n., Congo. Günther, *l. c.* p. 143.

Alestes holargyreus, sp. n., *id.* *l. c.* p. 144, Congo.

Distichodus affinis, sp. n., *id.* *ibid.*, Congo.

GALAXIIDÆ.

Galaxias grandis, Haast, Tr. N. Z. Inst. v. p. 278, New Zealand (= *G. brevipennis*, Gthr.; Hutton, Ann. N. H. 4, xii. p. 401); *G. ornatus*, Castelnau, *t. c.* p. 153, Victoria : spp. nn.

Galaxias olidus, Gthr., re-described; Hutton, *l. c.* p. 269.

Neochanna apoda is found in damp clay. G. G. Fitzgerald, Tr. N. Z. Inst. v. p. 456.

SCOMBRESOCIDÆ.

On the flight of Flying-fishes, cf. Kneeland, P. Bost. Soc. xiv. (1872), p. 138.

Hemirramphus cirrhatus, sp. n., Day, P. Z. S. 1873, p. 709, Bombay.
Belone gaviatoides, sp. n., Castelnau, l. c. p. 142, Western Australia.

STERNOPTYCHIDÆ.

Phosichthys is correctly altered to *Photichthys*, and *P. argenteus* figured; Hutton, Tr. N. Z. Inst. v. p. 269, pl. xv. fig. 90.

SCOPELIDÆ.

Saurus indicus, sp. n., Day, J. L. S. xi. p. 526, Madras.

Scopelus nigro-ocellatus, sp. n., Günther, J. Mus. Godeffr. iv. p. 91, S. Atlantic.

Gymnoscopelus aphyæ, g. & sp. nn. A remarkable South Atlantic form, resembling *Scopelus* in general habit, but with the body whitish and naked like that of *Leptocephalus*. Id. *ibid.*

Scopelus parvimanus, Gthr. ? Described and figured by Hutton, l. c. p. 269, pl. xv. fig. 90a.

Scopelus cuvieri, sp. n., Castelnau, l. c. p. 106, Knob Island.

Neosudis vorax, g. & sp. nn., *id.* l. c. p. 118, New Caledonia.

SALMONIDÆ.

Salmo spilurus, *pleuriticus*, and *carinatus*, Cope, Geol. Surv. Mont. 1872, p. 470, Montana; *S. tudes*, *id.* P. Am. Phil. Soc. xiii. p. 24, Unalaska: spp. nn.

Mallotus villosus. Habits and sexual differences noticed. Atwood, P. Bost. Soc. xiv. (1872), p. 134.

Coregonus lavaretus. On its embryonic development: Owsianikow, Bull. Pétersb. xix. pp. 225-235.

Argyrosomus hoyi and *nigripinnis*, Gill. Observations on specimens from Lake Michigan. Hoy, Tr. Wiscons. Ac. 1872, p. 98.

MORMYRIDÆ.

Mormyrus monteiri, sp. n., Günther, Ann. N. H. (4) xii. p. 144, Angola.

CLUPEIDÆ.

Chatoessus erebi (Casteln., *olim*, nec Gthr.), is renamed *richardsoni*; Castelnau, t. c. p. 144. It inhabits rivers of the interior of Australia and not the sea; *id.* l. c. p. 38.

Meletta schlegeli, sp. n., *id.* l. c. p. 93, Port Darwin.

Spratelloides gryporus, Cope, P. Am. Phil. Soc. xiii. p. 25, coast of Alaska (the first species of herring from the Northern Pacific); *S. malabaricus*, Day, P. Z. S. 1873, p. 240, Malabar: spp. nn.

GYMNOTIDÆ.

The coracoid and clavicle are well developed in *Sternopygus*, whereas the former is rudimentary and the latter absent in the *Gymnotidæ*. Cope, P. Ac. Philad. 1872, p. 257.

SYMBRANCHIDÆ.

Notes on structure : Dareste, C. R. lxxvii. pp. 815-819, & 878.

On the complete absence of branchial laminae in three specimens of *Monopterus javanicus*, id. l. c. p. 878.

MURÆNIDÆ.

Leptocephalus spallanzanii is a young Conger ; id. op. cit. lxxvi. p. 1304.

Ophichthys callaensis, sp. n., Günther, J. Mus. Godeffr. iv. p. 92, Callao.

Muræna aquaedulcis, sp. n., Cope, Rep. Geol. Surv. Mont. 1872, p. 474, Rio Grande.

Pacilophis nocturnus, sp. n., id. *ibid.*, Rio Grande.

Gymnothorax macrosiphon, sp. n., Bleeker, Ned. T. D. iv. p. 154, China.

PEGASIDÆ.

Cope makes some remarks upon the position of this family, which he refers to the Hemibranchii. P. Am. Phil. Soc. xiii. p. 31.

LOPHOBRANCHII.

On the sexual characteristics of the *Syngnathi* ; Marenzen, SB. Ges. Isis, 1872, p. 12.

Syngnathus acusimilis, Günther, Ann. N. H. (4) xii. p. 380, Chefoo ; *S. curtirostris*, Castelnau, l. c. p. 79, S. Australia : spp. nn.

Stigmatophora olivacea, sp. n., id. l. c. p. 77, S. Australia.

Phyllopteryx elongatus, sp. n., id. l. c. p. 76, S. Australia.

Hippocampus elongatus, p. 144, *subelongatus*, p. 145, spp. nn., id. l. c., Western Australia.

PLECTOGNATHI.

Balistes garnoti, sp. n., Castelnau, l. c. p. 107, Knob Island.

Balistes caprisicus taken at Weymouth. Ann. N. H. (4) xii. p. 267.

Monacanthus margaritifera and *vittiger*, S. Australia, pp. 80-82, *brunneus*, Knob Island, p. 108, *distortus*, W. Australia, p. 145-6, *baudini* and *lesueurii*, Victoria, pp. 54-56 ; Castelnau, l. c. spp. nn.

Monacanthus freycineti, Hollard, = *M. rudis*, Rich. ; id. *ibid.*

Aracana aurita, Shaw, redescribed ; Hutton, l. c. p. 271.

Tetrodon darwini, Port Darwin, p. 95, *giganteus*, New Caledonia, p. 121, Castelnau, l. c. spp. nn.

Crayracion marmorata [*Crauracium marmoratum*], sp. n., *id. l. c.* p. 148, Western Australia.

Chilomycterus jaculiferus, Cuv., is a *Dicotylichthys*. Hutton, *l. c.* p. 271.

Orthogoriscus oxyuropterus, sp. n. (? = *O. lanceolatus*, Lién.), Bleeker, *Vers. Ak. Amst. vii. p. 152*, figured, Amboyna.

CYCLOSTOMATA.

On the auditory organ of the *Cyclostomata*; Hasse, *Anatom. Studien i. Heft 3, 1872, xi. pls. xxii. & xxiv.*; Ketel, *ibid.* pp. 489-541.

On the development of *Ammocetes* [*Ammacetes*] into *Petromyzon*; Schneider, *Ber. Oberhess. Ges. Jan. 11, 1873*.

Geotria australis, Gray, described and figured; Hutton, *l. c.* p. 272, pl. xii.

Myxine comprises only one species, according to Putnam, who has compared specimens from various parts of the globe. *P. Bost. Soc. xvi. pp. 127-135*. On the kidney in this genus; Müller, *Jen. Z. Nat. 1873, pp. 321-326*.

Bdellostoma. The same author gives the results of his examination of specimens of this genus collected by Agassiz, recognizing two species, *B. cirrhatum*, Gthr., and *polytrema*, Gir. *Op. cit. pp. 156-160*.

LEPTOCARDII.

Amphioxus. Monographed, with detailed accounts of geographical distribution and anatomical characters. Stieda, *Mém. Pétersb. 1873, No. 7*.

GENUS OF UNCERTAIN POSITION.

Ellerya unicolor, g. & sp. nn., Castelnau, *l. c.* p. 95, Eclipse Island, North Australia.

MOLLUSCA.

BY

PROF. EDUARD VON MARTENS, M.D., C.M.Z.S.

THE GENERAL SUBJECT.

- ADAMI, —. Catalogo dei molluschi terrestri e fluviatili della provincia di Catanzaro in Calabria. *Atti Soc. Pad.* ii. fasc. i.
- BERGH, R. [See SEMPER.]
- BLAND, T. On the physical geography of, and the distribution of Terrestrial Mollusca in the Bahama Islands. *Ann. Lyc. N. York*, x. 14 pp.
- BONELLI, S. Catalogo dei Molluschi raccolti nei dintorni di Siena e in qualche altra parte di Toscana. *Atti Soc. Ital.* xv. fasc. v. 24 pp.
- CARPENTER, P. P. The Mollusks of Western North America. *Sm. Misc. Coll.* (No. 252), x. pp. 1-446.
- CLESSIN, S. Ueber den Einfluss des Alpenklimas auf die Gewohnheiten einiger Mollusken-species. *Nachr. mal. Ges.* v. pp. 52-55.
- COOPER, J. G. On Shells of the West Slope of North America, No. ii. *P. Cal. Ac.* iv. (1872), pp. 171-175.
- CROSSE, H. [See FISCHER.]
- DALL, W. H. Preliminary descriptions of New Species of Mollusca from the coast of Alaska, with notes on some rarer forms. *P. Cal. Ac.* v. pp. 57-64, pl. ii.
- DESHAYES, G. P. Histoire de la Conchyliologie. Leçon d'ouverture du cours au Muséum d'histoire naturelle de Paris: 1873, 9 pp. 4to. Also in *Rev. Cours Sci.* July 5, 1873.

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FISCHER, P. Mollusques marins des îles Aleutiennes provenant du voyage de M. Alph. Pinart. J. de Conch. xxi. pp. 243-248.

— & CROSSE, H. (Mission scientifique au Mexique et dans l'Amérique centrale. Recherches zoologiques: vii. ptie.) Etudes sur les Mollusques terrestres et fluviatiles. 3^{me} livrais. pp. 305-384, pls. xiii.-xvi. Paris: 1873, fol.

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GANIN, M. Beitrag zur Lehre von den embryonalen Blättern bei den Mollusken. Warschauer Universitäts-berichte, 1873. No. i. pp. 115-171.

HUTTON, F. W. Catalogue of the Marine Mollusca of New Zealand, with diagnoses of the species. Wellington: 1873. 8vo, 116 pp. 1 pl.

——. Catalogue of the Land Mollusca of New Zealand, with descriptions of the species. Collected from various authors. Wellington: 1873. 8vo, pp. i.-xxvii.

——. Catalogue of the Tertiary Mollusca [and Echinodermata] of New Zealand, in the collection of the Colonial Museum. Wellington: 1873. 8vo, pp. 48.

The *Mollusca* occupy pp. 1-37. The following genera, new to New Zealand, are each represented by one new species:—*Typhis*, p. 2, *Bela*, p. 5, *Volvaria*, p. 8, *Cassidaria*, p. 8, *Neritella*, p. 14, *Protocardium*, p. 23, *Astarte*, p. 25, *Hinnites*, p. 32, and *Gryphæa*, p. 35. New species are also described of *Dentalium* (6), *Fusus* (2), *Pleurotoma* (8), *Triton*, *Buccinum* (2), *Purpura*, *Ancillaria* (2), *Voluta*, *Mitra* (2), *Cassis*, *Natica* (2), *Scalaria* (2), *Conus* (2), *Struthiolaria* (3), *Cerithium* (3), *Rissoa*, *Turritella* (4), *Cladopoda*, *Crypta* (2), *Pileopsis* (2), *Trochus*, *Cylichna*, *Panopæa* (2), *Corbula* (2), *Næra*, *Mactra* (4), *Thracia*, *Lutraria* (2), *Mesodesma*, *Chione* (3), *Cytherea*, *Callista*, *Dosinia*, *Cyclina*, *Tapes*, *Cardium* (3), *Venericardia*, *Crassatella* (2), *Unio*, *Crenella*, *Lithodomus*, *Pinna* (3), *Cucullæa* (3), *Pectunculus* (3), *Limopsis*, *Pecten* (12), *Placumanomia*, *Ostræa*, (3), *Waldheimia* (4), *Terebratella*, and *Rhynchonella*.

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(ISSEL, A.) Molluschi del Viaggio dei Sig. Antinori, Beccari e Issel nel mar rosso e tra i Bogos. IV. Di alcuni molluschi terrestri viventi presso Aden e sulla costa d'Abissinia. *Tom. cit.* pp. 521-530.

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— Critical list of the Mollusca of New Zealand contained in European collections, with references to descriptions and synonyms. Wellington: 1873. 8vo, 51 pp.

— Zusammenstellung der von Dr. G. Schweinfurth in Afrika gesammelten Land- und Süßwasser-Conchylien. *Mal. Bl. xxi.* pp. 37-46.

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———. Coquilles recueillies par M. le Dr. Sievers dans la Russie méridionale et asiatique. *Tom. cit.* pp. 193-230, pls. vii. & viii.

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- SEMPER, CARL. Reisen im Archipel der Philippinen. Zweiter Theil, wissenschaftliche Resultate. Wiesbaden, gr. 4to. II. Malacologische Untersuchungen von Dr. RUD. BERGH, Heft 2, Phyllobranchidæ, 1871, pp. 48-118, pls. ix.-xvi. 3, Hermæidæ, Plakobbranchidæ, 1872, pp. 137-176, pls. xvii.-xx. 4, Elysiadæ, 1872, pp. 177-203, pls. xxi.-xxiv. 5, Limapontiadæ, 1873, pp. 213-246, pls. xxv.-xxx. III. Landmollusken. Heft 2, 1873, pp. 81-128, pls. viii. & xi.-xiv.
- SOVERBIE, —, & MONTROUZIER, P. Descriptions d'espèces nouvelles de l'Archipel calédonien: 16^me article. J. de Conch. xxi. pp. 55-63.
- STEARNS, R. E. C. On the habitat and distribution of the West American species of *Cypræidæ*, *Triviidæ*, and *Amphiperasidæ* (being corrections in Mr. Roberts' Catalogues [Am. J. Conch. v.] of the *Porcellanidæ* and *Amphiperasidæ*). P. Cal. Ac. iv. (1872), pp. 186-189.
- . Descriptions of new Marine Mollusks from the West Coast of North America. *Op. cit.* v. pp. 78-82, pl. i.
- . A partial comparison of the Conchology of portions of the Atlantic and Pacific coasts of North America. *Tom. cit.* pp. 271-273.
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- TARGIONI-TOZZETTI, A. Vertebrati e Molluschi osservati o raccolti in una escursione pel Casentino. Atti Soc. Ital. xv. fasc. iv. & v., 66 pp., pl.
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- WEINKAUFF, H. C. Catalog der im europäischen Faunengebiet lebenden Meeres-Conchylien. Kreuznach: 1873. 8vo, 86 pp.
- WESTERLUND, C. A. Fauna molluscorum terrestrium et fluvialium Sueciæ, Norvegiæ et Daniæ. II. Sötvattenmollusker. Stockholm: 1873. 8vo, 354 pp.

WIEDERSHEIM, R. Beiträge zur Kenntniss der Württembergischen Höhlenfauna. Verh. ges. Würzb. (n. f.) iv. pp. 207-222, pls. vi.-vii. An abstract in Z. ges. Naturw. (2) viii. pp. 202 & 203.

Anatomy, Physiology, and Embryology.

A. SOLBRIG ("Ueber die feinere Structur der Nerven-elemente bei den Gasteropoden." Leipzig: 1872. 4to. 55 pp., 7 pls.) has examined microscopically the structure of the nerves in *Arion empiricorum*, *Limax maximus*, *Helix pomatia*, and *H. aspersa*. He reviews former publications on the same subject, and the different chemical reagents employed; and the chief results of his own observations are, that the ganglionous cells have, ordinarily, no proper membrane, but are composed of an albuminous mass mixed with granula of unequal size; all these cells have at least one process; there are no apolar cells, the bi- or multipolar are much less numerous than the unipolar cells, in about the proportion of 1 to 8; these processes pass into nervous fibres, either directly or indirectly; the nervous fibres have no sheath, are homogeneous and ribbon-shaped, and correspond only to the cylindrical axis of the nervous fibres of the *Vertebrata*.

The contractions of the primitive fibrillar elements in the muscles of the *Cephalopoda* have been observed by Professor HARTMANN. S. B. nat. Fr. 1873, p. 94.

The development of the *Gasteropoda Opisthobranchia* is discussed by P. LANGERHANS, Z. wiss. Zool. xxiii. pp. 171-180, pl. viii. Abstract in Z. ges. Naturw. (2), vii. p. 492.

E. RAY LANKESTER remarks that the first appearance of the shell is the same in Cuttle-fish, Gastropods, and Lamellibranchs; he denies the existence of an external communication of the otcysts in the Gastropods, especially in *Aplysia*, but states that it exists in the Cephalopods. Ann. N. H. (4) xi. p. 86. The identity of the two primitive layers of cells in the embryo of the Mollusks, Vermes, and Vertebrata is admitted: p. 87. This subject is more fully treated, *tom. cit.* pp. 321-338, where the Mollusca, with the Vermes, Echinodermata, Vertebrata, and Arthropoda (p. 330), form the division *Triploblastica*, having in the embryonic state three layers of primitive cells.

The existence of two primitive layers (Keim-blätter) in the first stages of the embryo, the one producing the skin and its appendages, the other the visceral organs, the interval between both becoming the cavity of the body, has been ascertained from the embryos of *Purpura lapillus*, by E. Selenka: Niederl. Arch. Zool. i. (1872), pp. 211-218, pl. 17. M. GANIN, on the contrary, distinguishes three primitive layers; the most superficial producing the epithelium of the skin, including that of the mantle, the velum, the byssal gland, the gills, and probably also the ganglia and the epithelium of the generative organs; the second producing the heart and the pericardium, the blood-vessels, the skin itself, the connective and muscular tissue, and the serous membrane of the intestine; the third (the innermost) only the epithelium of the intestine. His researches are

made on the genera *Limnæa*, *Planorbis*, *Physa*, and *Cycelas*, and he expands on the analogies of these three layers with those known in other divisions of the animal kingdom. Warschauer Universitäts-berichte. 1873, No. I. pp. 115-171; abstracted in Hoffmann and Schwalbe's Jahresberichte über die Fortschritte der Anatomie und Physiologie, i. (1872), pp. 355-360.

The first development of *Anodonta* is discussed by W. FLEMMING. "Ueber die ersten Entwicklungserscheinungen am Ei der Teichmuschel." Bonn: 1873, pl.

C. SEMPER has published more fully his experiments on the growth of *Limnæa stagnalis* in confinement (see Zool. Rec. ix. p. 112) in Verh. Ges. Würzb. iv. pp. 1-31, pls. i. & ii.; an abstract of it by W. Kobelt, Mal. Bl. xxi. pp. 125-128.

Monstrosities and Deformities.

Abnormity of *Limax schwabii* (Frauenf.) with the respiratory opening at the left instead of the right side. SEIBERT, Mal. Bl. xxi. p. 198.

An abnormity of the radula of *Helix desertorum* (Forsk.), the teeth of the middle row being variously deformed, is described by C. JICKELI, Nachr. mal. Ges. v. pp. 68 & 69.

An abnormity in the hinge of *Spatha hartmanni*, the right valve overlapping the left: *id. l. c.* pp. 69 & 70.

GEOGRAPHICAL DISTRIBUTION.

a. LAND AND FRESH-WATER MOLLUSCA.

W. KOBELT has published a list of additions and corrections to his Catalogue of European Land and Fresh-water Mollusca (see Zool. Rec. viii. p. 122), taken partly from the later researches and collections of Dr. v. Fritsch, in Morocco, and von Möllendorff, in Bosnia and Servia, and partly from a treatise on the shells of Western Asia, not published at that time, but communicated to him by the Recorder. Mal. Bl. xxi. pp. 177-190.

1. Northern and Central Europe.

Færoe Islands. *Limax agrestis* (L.), found by R. v. WILLEMOËS-SUHM; Z. wiss. Zool. xxiii. p. 351.

Scandinavia. C. WESTERLUND has completed his Fauna Mollusc. Sueciæ, &c., by a second part, containing the fresh-water mollusks (*cf.* Zool. Rec. viii. p. 123). The history of single genera and species, varieties, and geographical distribution are treated with peculiar care. There are enumerated 9 species (or sub-species) of *Limnæa*, 1 *Amphipeplea*, 2 *Physa*, 1 *Aplexa*, 25 *Planorbis*, 2 *Ancylus*, 1 *Acroloxus*, 1 *Cyclostoma* (only in Denmark), 1 *Acme*, 8 *Valvata*, 2 *Paludina*, 3 *Bythinia*, 2 *Hydrobia*, 1 *Neritina*, 7 *Sphærium*, 2 *Calyculina*, 14 *Pisidium*, 3 *Unio*, 1 *Margaritana*, 3 *Anodonta*, and 1 *Dreissena* (only in Denmark). Only

one fresh-water shell appears to be peculiar to the northern part of Scandinavia, viz., *Valvata frigida*, sp. n., from Lapland; and there are very few from Scandinavia not also known from other parts of Europe, viz.:—*Planorbis goesi*, sp. n., *gothicus*, sp. n., *malmi*, sp. n., *Physa semiglobosa*, sp. n., *Sphaerium westerlundii*, sp. n., *firmum*, sp. n., and *Pisidium parvulum*, sp. n. (all apparently due chiefly to the acute discrimination of the author and his fellow labourer Clessin). In an appendix (pp. 595–612) two *Zonites* (*Hyalina*) reported by E. Friedel from Sleswig, *Helix rufescens*, found in Sweden and Denmark, *Clausilia cruciata*, a (new) small *Pupa*, from Norway, and a new *Planorbis* are added to the Scandinavian fauna.

Holstein. Observations on the occurrence of some rather remarkable species of land snails (*Helix lamellata*, *ericetorum*, *obvoluta*, &c.) near Kiel, a list of all species found on the "Gypsberg," at Segeberg, and another of the species of *Hyalina* and *Helix* known from the northern parts of Holstein, are given by W. FACK, Schr. nat. Ver. Schlesw. Holst. i. pp. 207–214. A list of 105 species found at Bordsesholm, near Kiel, is given by KAESTNER, Nachr. mal. Ges. Frankf. v. pp. 49, 51.

Mecklenburg. 58 species of terrestrial Gastropoda, and 45 of fresh-water Mollusca, are enumerated by H. V. MALTZAN, including 10 species of *Clausilia*, 7 *Vertigo*, *Balea perversa*, *Buliminus tridens*, *Amphipeplea glutinosa* (rare), *Limnæa glabra*, 5 species of *Sphaerium*, and *Congerina* [*Dreissena*] *polymorpha* (which was first observed some twenty-five years ago): Arch. Ver. Mecklenb. xxvi. pp. 64–95. An abstract with critical notes by the Recorder in Mal. Bl. xxi. pp. 111–118. WIECHMANN gives a list of the land and fresh-water Mollusca of Klein-Pritz, a small district near Sternberg, with critical observations, directed chiefly against Maltzan's propensity to unite nearly allied species. Arch. Ver. Mecklenb. xxvii. pp. 131–147.

Pomerania. The Recorder has edited and published (1873) a posthumous work of the late R. LEHMANN, on the Mollusca observed by him in the environs of Stettin, with numerous anatomical descriptions, coloured figures of the slugs, and copies of the anatomical sketches left by the author. The fauna of Pomerania contains, according to it, 64 terrestrial, 44 fresh-water, and 6 marine Mollusca. The more remarkable among them are *Helix lamellata* (Jeffer.), *Pupa umbilicata* (Drap.), not found further southwards in Germany, and *H. vindobonensis* (C. Pfr.), acclimatized near Stettin by H. Dohrn.

Some Bivalves from the *Weser* are mentioned by S. CLESSIN, Nachr. mal. Ges. v. p. 58.

Belgium. Lists are given in P.-v. Mal. Belg. ii. of shells found in the alluvial deposits of the river Senne, by M. Collin, pp. xi. & xii.; of Mollusca found near Tongres and Hoesselt, by E. Vandenbroeck, pp. cxxxii.–cxl.; and shells found in the valley of the Ourthe, by M. Roffiaen, p. cxliii.

Southern Germany. Notes on the malacological fauna of Salzhausen (Vogelberg, Hesse), and on some rarer species found near Würzburg, by F. LANDBERGER, Nachr. mal. Ges. v. pp. 83 & 84.

A list of 74 Mollusca observed at Eberbach, on the Neckar, Baden, by H. SEIBERT, *tom. cit.* pp. 45–49.

Cave-fauna. The cave of Falkenstein, in the oolitic rocks near

Urach, Wurtemberg, has been repeatedly explored, and an eyeless *Hydrobia*, a new species of *Ancylus* with well developed eyes, and *Pisidium*, sp., found living in it. WIEDERSHEIM, Verh. Ges. Würzb. iv. pp. 7-13.

Lake Constance. 16 species, viz. :—1 *Succinea*, 4 *Limnæa*, 3 *Planorbis*, 1 *Ancylus*, 1 *Valvata*, 1 *Bythinia*, 2 *Cyclas*, 1 *Pisidium*, 1 *Anodonta*, and 1 *Unio*, are known : several of the *Limnæa* exhibit peculiar varieties, and *Planorbis deformis* (Hartm.) is very characteristic. *Valvata piscinalis* (Mull.), and its var. *contorta* (Menke) [*antiqua* (Morris)] is common. MILLER, Die Schalthiere des Bodensee's: Schriften für Geschichte des Bodensee's und seiner Umgebung; iv. Lindau: 1873, 12 pp. 2 pls.

Lake of Geneva. F. A. FORD has observed in depths of more than 30 metres two living species of Gastropods and a *Pisidium*. Arch. Sci. Nat. xlvi. p. 67.

Some remarks on *Alpine* land and fresh-water snails, by S. CLESSIN. Nachr. mal. Ges. v. pp. 52-55.

Bosnia. About 126 species of land and fresh-water mollusks are carefully treated from personal observations, with the addition of critical notes, by O. v. MÜLLENDORFF, 'Beiträge zur Fauna Bosniens,' Görlitz: 1873. 8vo, 73 pp. pl. In the northern and middle parts, the rivers of which are tributary to the Danube, the prevailing species are either those widely spread over middle Europe, or characteristic of the Danubian district from Austria and Carniola downwards; but in the south-western part (Herzegovina) the rivers of which take their course to the Adriatic, the malacological fauna agrees more with that of Dalmatia, and several peculiar species of land snails are found (Abstract by Kobelt, Mal. Bl. xxi. pp. 161-165).

Servia. Its malacological fauna has also been treated of by O. v. MÜLLENDORFF from collections made by J. Pancic in Belgrade; he enumerates 71 species of terrestrial, and 14 of fresh-water mollusks, 15 of which are peculiar to Servia; 10 common only with neighbouring countries, Transylvania, Banat, or Bosnia; 4 rather widely spread in South Eastern Europe; 3 generally South European, 12 belonging to the eastern half of the Alpine chain; and 41 generally distributed over Europe. The most characteristic are some species of the group *Campylæa* and some *Clausilia*, belonging to the divisions *Herilla* and *Idyla*. Mal. Bl. xxi. pp. 129-149, pl. iv.

2. Mediterranean Province.

Tuscany. The land and fresh-water shells living in the environs of Sienna and the neighbouring Apennines are enumerated by S. BONELLI from his own observations, with the addition of some critical notes by the Recorder. The most remarkable species are *Vitrina annularis* (Stud.), *Helix obvolvata* (Müll.), not uncommon in this part of Italy, *H. planispira* (Lam.), with some varieties, *H. ligata* (Müll.), = *gussoneana* (Shuttl.), *Pupa cinerea* (Drap.), two new species of *Clausilia* and *Melanopsis fourii*. Atti Soc. Ital. xv. fasc. v. 24 pp.

Thirty-seven species of terrestrial and three of fresh-water snails observed in the Apennines in the Casentino (Tuscany) are enumerated, and

their occurrence in other parts of Italy discussed, by TARGIONI-TOZZETTI, *tom. cit.* 66 pp. This author's nomenclature is somewhat strange; he adopts ante-Linnæan names, as *Helix neritoides*, Gualtieri, and claims priority for Müller, *Hist. Verm.* (1774), over Linnæus.

Bari. A general sketch of the terrestrial mollusks found in the environs by W. KOBELT, *Nachr. mal. Ges. v.* pp. 7-11.

Calabria. The land and fresh-water mollusks of Catanzaro are treated by ADAMI, *Att. Soc. Padov. ii. fasc. i.*; he enumerates 57 species of terrestrial, and only 9 of fresh-water shells, among which is no *Unio*, *Anodonta*, or *Neritina*. The more remarkable species are *Glandina algira*, *Zonites algirus* and *verticillus* (?), *Hyalina icterica*, sp. n., *Helix hiberna* (Benoit), *setipila* (Ziegl.), *surrentina* (A. Schmidt) [= *strigata* (Müll.) var., *teste* Kobelt], *albescens* (Jan), *rufilabris* (Benoit), and *Clausilia punctulata* (Küster). Only a few of the characteristic Sicilian species occur. An abstract is given by Kobelt, *Mal. Bl. xxi.* pp. 157-161 ('Die Fauna von Calabrien').

Sardinia. 24 species of land and fresh-water mollusks, collected by Dr. Gestro, are enumerated by A. ISSEL, *Ann. Mus. Genov. iv.* pp. 275-281. Two are new, and a few more seem peculiar to the island; but the majority are widely spread over Southern Europe.

Sicily. A malacological excursion on Monte Pellegrino by W. KOBELT, *Mal. Bl. xxi.* pp. 69-78; *Helix mazzullii* and *sicana* probably make holes in the rocks, in which they dwell. Several notes on the distribution of land shells in Sicily are added.

Greece. Some additions to the Recorder's list of land and fresh-water shells of the Peloponnesus (*Zool. Rec. ix.* p. 116), are to be found in *Mal. Bl. xxi.* p. 122.

Transcaucasia. 35 terrestrial and 11 fresh-water species of shells collected by Dr. Sievers in Transcaucasia and Armenia have been critically examined and enumerated by A. MOUSSON; he distinguishes in the Transcaucasian fauna 5 different elements:—28 generally European species, 13 South European or Mediterranean, 26 South Russian or Tauric, 51 specially Transcaucasian, and 16 more Southern, Syrian, or Mesopotamian species. Among the more characteristic forms is a species of *Cyclostus*, and the group *Serrulina* of *Clausilia*. *J. de Conch. xxi.* pp. 193-230.

Morocco. Some new land and fresh-water shells collected by Von Fritsch and Rein are described by A. MOUSSON, *Mal. Bl. xxi.* pp. 149-157 (A fuller account; *id. J. de Conch. 1874*, Nos. 1 & 2).

3. Africa.

North-Eastern Africa. C. JICKELI has given a preliminary report on his researches on the malacological fauna of this part of the world; there are at present known 96 terrestrial species, 68 of fresh-water, and 14 of brackish-water—178 in all, 43 of which are due to his own travels in Egypt and on the coast of Abyssinia. The fresh-water mollusks of the Nile, even in Egypt, are truly African, whereas the land-snails of Egypt belong to the Mediterranean fauna. Four species found by the author in Abyssinia are remarkable for their very wide geographical distribution:

Pupa umbilicata (Drap.) in many parts of Europe; *Bulimus fallax* (Say) in North America, the East Indies, and Polynesia; *B. pullus* (Gray) in the East Indies; and *Melania tuberculata* (Müll.) from the Malayan Archipelago to Morocco. S. B. nat. Fr. 1873, pp. 4-7.

Abyssinia. 18 terrestrial, 3 fresh-water, and 6 submarine species of shells, including many new, collected by Issel, Beccari, and Antinori, in the maritime parts of Abyssinia, are described by A. MORELET, Ann. Mus. Genov. iii. (1872), pp. 180-208, pl. ix. The author comments on the resemblance of the malacological fauna of Abyssinia to that of other parts of Africa, and increases the small number of species common with Europe by one, *Helix ciliata* (Venetz) [a wrong determination, as the Recorder thinks, from examination of the original specimen]; he points out correctly the wide geographical distribution of *Pupa cenopicta* (Hutton) from Hindostan to Western Africa.

Aden. Several new land- and fresh-water shells collected near Aden by A. Issel, are described by PALADILHE, Ann. Mus. Genov. iii. (1872), pp. 12-23, pl. i.

Central Africa. The shells collected by Dr. Schweinfurth during his travels in Africa are enumerated by the Recorder, Mal. Bl. xxi. pp. 37-46; they are 10 terrestrial and 22 fresh-water species, most of them well known from the Nile and its tributaries. In the country of the Njam-Njam, *Trochonanina mossambicensis* (Pfr.), a new *Achatina* and *Lanistes libycus* (Morelet)—the last hitherto only known from Western Africa—were found. The list is followed by some general remarks on the distribution of *Achatina* and *Lanistes* in Africa.

Western Africa. Some new land shells from Gaboon described by A. MORELET, J. de Conch. xxi. pp. 329-332.

Cape de Verd Islands. The known land and fresh-water shells (32 terrestrial, 1 fresh-water, and 1 brackish-water) are enumerated, and a few new species, collected by Bouvier and De Cessac, described by A. MORELET, J. de Conch. xxi. pp. 231-243. The European *Bulimus decolatus* (L.), the singular *B. subdiaphanus* (King), very near *insularis* (Ehrenb.), the West Indian *Melampus flavus* (Gmel.), the European *Limnea ovata* (Drap.), and *Hydrobia acuta* (Drap.), and the Asiatic and North African *Melanea tuberculata* (Müll.), are peculiarly remarkable as occurring on these isolated islands.

Rodriguez Island. Several land shells (*Helix*, *Gonospira*, *Pupa*, *Succinea*, *Cyclostoma*), 3 species of *Omphalotropis* and a new *Planorbis* are described by H. CROSSE, J. de Conch. xxi. pp. 137-144.

4. Eastern Asia.

China. Some land shells from the province Shantung, collected by F. F. von Richthofen, are mentioned, and two new species described, by E. v. Martens, Mal. Bl. xxi. pp. 67-69.

India. The late F. STOLICZKA has published a second paper on the land shells of Penang, discussing the inoperculated *Pulmonata*, with numerous and valuable anatomical observations; he describes 23 species (12 new). Generally, the fauna is very near that of Sumatra and Java:

the sub-genus *Trachia* alone being characteristic of Continental India and wanting in the Malayan Islands. J. A. S. B. (n. s.) xlii. pt. 2, pp. 11–38, pls. i.–iii. *Tom. cit.* pp. 169–171, he describes two new species of *Helicida* from Continental India.

Philippines. C. SEMPER has continued his work on the land mollusks of the Philippines, by a second part, treating of a portion of the *Helicida*. No true *Limax*; several new genera allied to *Vitrina*; *Trochomorpha*, 10 species (on the Pelew Islands 4 others); *Obbina*, 10 species. *Reis. Arch. Phil.* iii. pp. 81–128.

5. *Australia and Polynesia.*

Australia, Solomon and Louisiade Islands. Several new land-shells described by J. COX, P. Z. S. 1873, pp. 146–152, 564–569, pls. xvi. & lxxviii.

New Caledonia. New land and fresh-water shells described, and others figured; CROSSE, GASSIES, and LAMBERT, J. de Conch. xxi. pp. 44, 46, 136, 256, 335, 341, 346, & 356, pls. ii & xiv.

Polynesia. Some land shells from the Ellice Islands, as well as from the Norfolk and Kermadec Islands are described, and zoogeographical considerations added, by A. MOUSSON, *tom. cit.* pp. 101–116. They are all similar to, and some identical with, those from the Samoa and Fiji Islands.

New species of *Pityls* from Polynesia described by A. GARRETT, P. Cal. Ac. iv. (1872), pp. 201–204.

New Zealand. The known land and fresh-water Mollusks are enumerated in the Recorder's list of New Zealand Mollusks, published by the Colonial Museum at Wellington. About 20 of them have been also observed at Great Omaha, by T. KIRK; Tr. N. Z. Inst. v. pp. 366–368.

6. *Tropical America.*

Mexico. The third part of FISCHER & CROSSE's valuable work on the terrestrial and fresh-water Mollusks of Mexico and Central America contains the genera *Pupa*, with 3 species belonging to the group *Leucochila*; *Vertigo*, with 1 sp., *V. ovata* (Say), widely spread throughout North America; *Holospira* (Martens, Crosse & Fischer), with 11 species; *Cælocentrum* (C. & F.) with 8, and *Eucalodium* with 14 species.

The species of the genus *Helix* at present known from Mexico and Guatemala, are enumerated by Crosse & Fischer, J. de Conch. xxi. pp. 258–281; this list is merely an extract of the corresponding part of the larger work just mentioned (see Zool. Rec. ix. pp. 201 & 202), but with the addition of a few species subsequently detected and described; the authors compare the Mexican and Guatemalan faunas, with the result that only 4 species of *Helix* are common to both, and that many groups are only represented in one of them. Of 45 Mexican species of *Helix*, 11 are also found in the southern part of the United States. Guatemala has 13 species, the two most characteristic of which, *H. ghiesbreghti* and *trigonostoma*, occur also in Honduras, a place very little known conchologically. In the Mexican fauna, *Helix* and *Bulimus* nearly counter-balance each other; and, as the first prevails very distinctly in North

and the other in South America, the authors regard this combination as an encroachment of South American forms upon this part of North America, as is also the case in other classes of the animal kingdom.

A number of Mexican fresh-water Gastropods and operculated land-shells have been described and figured by H. STREBEL (who has resided for many years at Vera Cruz), Abh. Ver. Hamb. vi. part i. pp. 1-69, pls. i. ia, ii. iii. iiiia, iv.-vii. This paper is very valuable on account of the exact descriptions, numerous figures of varieties, and judicious remarks from personal observation; but the author has not ventured to name evidently new species, although his descriptions and figures are much fuller than those of many authors.

Hayti. Several new land shells described by H. CROSSE, J. de Conch. xxi. pp. 352-356.

Bahama Islands. About 80 species of terrestrial Mollusca are known, a fourth of which belong to the operculated *Pulmonata*, the rest to the inoperculated; among the former, *Schasicchila bahamensis* (Pfr.) is one of the most interesting; among the latter, the genus *Strophia*. There is a general resemblance between this fauna and that of Cuba. T. BLAND, Ann. Lyc. N. York, x. 14 pp.

New Granada. Some species from Bogotá described by A. MOUSSON, Mal. Bl. xxi. pp. 1-19.

Venezuela. Its land and fresh-water Mollusks are reviewed from several original collections made at different times by Moritz, Appun, Gollmer, Ernst, and others, by E. v. MARTENS, in Festschrift zur Feier des hundertjährigen Bestehens der Gesellschaft nat. Freunde in Berlin, pp. 157-225, 2 pls. He enumerates 15 operculate and 61 inoperculate terrestrial Gastropods, and 36 fresh-water, and 1 brackish-water species, and compares this fauna with that of the neighbouring countries, Trinidad, British Guiana, Surinam, and Cayenne. The number of species common to any one of the West Indian Islands and the mainland of South America, which Bland has stated to be 21, is increased to 27, but most of them are confined to one or a few of the Southern Antilles; some fresh-water shells on the contrary, viz., species of *Planorbis* and *Physa*, are spread throughout the West Indian Islands. But in the *Melania* and *Ampullaria*, the large number of *Bulimus* and *Otostomus*, and the few *Cyclostomida* which it possesses, Venezuela wholly enters into the general features of the South American fauna. Among the more common and characteristic species may be named, *Cyclotus popayanus* (Lea.), *Helix plicata* (Born), *Bulimus marmoratus* (Dunker), *moritzianus* (Pfr.), and *fulminans* (Nyst), some species of *Otostomus* and *Ampullaria luteostoma* (Swains.).

Argentine Republic. General remarks on the malacological fauna, and exact descriptions of several species of *Homalonyx* and *Succinea*, by A. Döring, Mal. Bl. xxi. pp. 49-67, pls. ii. & iii.

7. North America.

Land and fresh-water shells from Nevada, Utah, Idaho, Oregon, and Washington Territory are discussed by J. G. COOPER, P. Cal. Ac. iv. (1872) pp. 171-175 (continuing the paper mentioned in Zool. Rec. ix. p. 120, and the correct reference to which is *op. cit.* p. 150, *et seq.*) with

observations on geographical distribution and local variations. One new species (*Auriculidæ*) is described, and others are indicated.

b. MARINE MOLLUSCA.

The results of the deep-sea dredgings made by CARPENTER, JEFFREYS, and WYVILLE-THOMSON during the years 1868-70 on board the "Porcupine" and "Lightning," are given by the last in a separate work, "The Depths of the Sea," London: 1873, 8vo, with numerous illustrations and maps.

H. C. WEINKAUFF has published a catalogue of European marine Mollusca, containing the adopted name of each species and the indication of its general geographical distribution within Europe; he distinguishes 7 geographical zones: Arctic, Boreal, Germanic (Scotland, England, Southern Norway, Sweden, Denmark, Northern Germany, Holland), Celtic, Lusitanian, Mediterranean (with three subdivisions), and Pontic. It is to be regretted that those synonyms which are in more or less general use among collectors, are not indicated. The systematic arrangement is in many points below the level of the present knowledge of the organization of the animals. The author, including the Brachiopods and excluding the Tunicata, enumerates 1,312 species, some of very doubtful specific value. [Some critical notes on this list are given by the Recorder in *Nachr. mal. Ges.* ii. 1874, pp. 154-164.]

1. Northern Seas of Europe.

Arctic Sea. 11 species of sea-shells collected on the coast of Nova Zembla in 70 degrees N. lat. by the Norwegian captain Maack are enumerated by Mörch, *J. de Conch.* xxi. p. 37, including *Trichotropis dolium* (Petit), *Astarte pulchella* (Jonas), both known hitherto only from Spitzbergen, and *Margarita obscura* (Couth.), known hitherto only from Massachusetts.

Norway. 306 species of sea-shells found near Bergen by H. FRIELE, *Forh. Selsk. Chr.* 1873, 24 pp. *Galeomma turtoni* is new for Norway.

North Sea. A list of shells found at the island of Eastern Friesland, Borkum, Juist, &c., is given by A. METZGER, *Ber. Exped. Pommerania* [see titles], pp. 170-172.

Twenty-four species found on the shore of Scheveningen in Holland by VERKRÜZEN, *Nachr. mal. Ges.* v. p. 52.

Baltic Sea. The results of the researches made by a scientific commission during the cruise of the Prussian ship "Pommerania" in 1871 have now been published, the malacological part by K. MOBIUS; he enumerates 241 species of *Evertebrata* hitherto found in the Baltic, almost all of which are identical with species living in the North Sea; in the eastern part some fresh-water *Mollusca* are found in the sea, but the marine species are much fewer, only 9 species of *Mollusca* having been observed east of Rügen. The cause of this scarcity of species is not only the low amount of salt in the water, but also the considerable differences in temperature between the seasons. *Asturte borealis* [*arctica*, Gray] and *Tellina baltica* have been found at a

depth of 49 fathoms; at a greater depth, no *Mollusca* have been observed. 66 species of Mollusca are known as yet in the Baltic, viz.: 23 Bivalves, 23 Gastropoda Opisthobranchia, 19 G. Prosobranchia, 1 G. Pulmonata (*Limnea peregra*), and 2 Cephalopoda (*Loligo vulgaris* and *forbesi*; both rather accidental). Ber. Exped. Pommerania, pp. 126-135. The concluding remarks of this interesting paper are translated in Ann. N. H. (4) xii. pp. 81-89. An abstract by W. Kobelt in Mal. Bl. xxi. pp. 123-125.

A preliminary account of the *Mollusca* found in the inlet of Travemünde near Lübeck has been given by C. ARNOLD & H. LENZ ("Erster allgemeiner Bericht über die im Jahre 1872 angestellten zoologisch-botanischen Untersuchungen der Travemünder Bucht," Lübeck: 1873, 4to, pp. 4): 15 species of Gastropods and 10 of Bivalves are enumerated.

Utriculus obtusus (Mont.) found in the Baltic; WIEDEMANN, Arch. Ver. Mecklenb. xxvi. p. 100, and Mal. Bl. xxi. p. 125. *Loligo* sp., near Travemünde; LENZ, Arch. Ver. Mecklenb. xxvi. p. 104, and MÜRCH, Nachr. mal. Ges. Frankf. v. p. 70.

A note on the occurrence of fresh-water and sea shells on both sides of the light-house pier at Swinemünde by the Recorder, in Lehmann's Schneck. Musch. Pomm. p. 265, footnote.

British Channel. 22 species of *Nudibranchia* (including *Pellibranchia*) observed on the coasts of Boulogne, are enumerated from MS. notes of BOUCHARD-CHANTÉREAUX, with some corrections of former determinations, by H. E. SAUVAGE, J. de Conch. xxi. pp. 25-36. A list of 172 marine shells dredged on the south coast of Cornwall; T. A. VERKRÜZEN, Mal. Bl. xxi. pp. 203-208.

West Coast of France. 12 supposed new species of *Nudibranchia*, observed at Brest by HESSE and indicated in 1872, are now described and figured; *id.* J. de Conch. xxi. pp. 305-324, pls. xii. & xiii.

2. Mediterranean Sea.

J. GWYN JEFFREYS has given some remarks on the *Mollusca* of the Mediterranean Sea, containing many additions to Monterosato's catalogue (*cf.* Zool. Rec. ix. p. 122), many of which are due to the "Porcupine" and "Shearwater" expeditions; he is not satisfied that more than one species, *Ringicula auriculata* (Men.) is common to the Mediterranean and the Red Sea. Rep. Br. Ass. 1873, pp. 111-116.

Several small Mediterranean shells described and figured by O. G. COSTA in his "Microdoride Mediterranea," 1861, are identified with well-known species, chiefly in the juvenile stage, by the Marquess T. A. DI MONTEROSATO (and some critical remarks are added by J. G. Jeffreys), Ann. N. H. (4) xii. pp. 251 & 252. As Costa's work is very little known, and no change in the adopted names is demanded by these identifications, it seems unnecessary to enumerate them in the special part.

The Marquess DI MONTEROSATO gives a review of the Mediterranean species of *Solarium* and additions to his former list of Mediterranean shells (*cf.* Zool. Rec. ix. p. 122) in a pamphlet published at Palermo, 1873.

Prof. COSTA records *Pneumodermon violaceum* from the Mediterranean at Naples. Rendic. Acc. Nap. 1870, p. 22.

A. T. MARION enumerates a number of marine Mollusks found near Marseilles in the second zone of depth, characterized by the frequency of a phanerogamic sea-plant, *Posidonia cavolinii*. Ann. Sci. Nat. (5) xvii. pp. 3 & 4.

B. KLEČÁK (KLECIACH) has published a list of 500 Dalmatian sea shells sent by him to the Universal Exposition at Vienna in 1873, with numerous synonyms.

3. Eastern North America.

J. GWYN JEFFREYS' paper on the *Mollusca* of Europe compared with those of Eastern North America (see Zool. Rec. ix. pp. 120 & 123) is severely criticised by A. E. VERRILL, Ann. N. H. (4) xi. pp. 206-213, who shows that Jeffreys has judged the distribution of land and sea shells in North America only from the second edition of Gould's "Invertebrata of Massachusetts," neglecting the numerous other sources of information to be found in American conchological works and collections, and that he has erroneously identified very distinct species. Jeffreys replies, *op. cit.* pp. 375-377, yielding some points.

Some corrections of WHITEAVES' paper on dredgings in the Gulf of St. Lawrence (Zool. Rec. ix. p. 123), are given by the author, Ann. N. H. (4) xi. pp. 155 & 156.

Results of dredgings, chiefly at St. George's Bank and Le Have Bank, near the Coast of Nova Scotia, are reported on by A. E. VERRILL, Am. J. Sci. (3) v. pp. 98-106.

4. Tropical and Subtropical Atlantic.

Madeira. A number of marine *Mollusca*, including a new genus of *Muricide* and many species of *Rissoa*, described by R. WATSON, P. Z. S. 1873, pp. 361-391, pls. xxxiv.-xxxvi.

Florida. Several new sea shells by R. STEARNS, P. Bost. Soc. xv. (1872), pp. 21-24.

5. Red Sea.

C. JICKELI (Zool. Rec. ix. p. 123) gives interesting notes on several marine Mollusca in the Red Sea. Mal. Bl. xxi. pp. 81-109.

6. Indian Ocean.

Mauritius. Several conchological notes by ROBILLARD & H. ADAMS in Tr. R. Soc. Maur. v. (1871).

Malayan Archipelago. 24 species of *Tellina* enumerated by E. v. MARTENS, Mal. Bl. xxi. pp. 174-177, with special localities.

7. Polynesian Sea.

New species of *Mitra*, *Thala*, *Cantharus*, *Engina*, *Gibbula*, and *Fissurella* recorded by A. GARRETT, P. Cal. Ac. iv. (1872) pp. 201-204.

8. *Australian Seas.*

New Caledonia. New marine shells by MONTROUZIER and SOUVERBIE. *J. de Conch.* xxi. pp. 55-63, pl. iv. ; and by CROSSE, pp. 65 & 129, pl. v. ; supplementary notes to others by SOUVERBIE, *ibid.* p. 287.

New Zealand. F. HUTTON has published (under the care of the Colonial Museum and Geological Survey Department) a catalogue of marine Mollusca of New Zealand with diagnoses of all species (many of them new), containing 11 Cephalopods, 1 Pteropod, 1 *Dentalium*, 3 Heteropods, 270 Gastropods, and 134 Bivalves; and the Recorder, having lately received most of those species through the kindness of Dr. J. Hector, the Director of the Department, has been able to examine them, and to add a few observations in this Record. Another list of about 150 species of marine mollusks (some not specifically determined) collected in the harbour of Great Omaha, is given (with general notes on their occurrence) by T. KIRK, *Tr. N. Z. Inst.* v. pp. 365-369.

HUTTON has also compiled a supplementary catalogue comprising the indigenous land snails, viz. :—87 known species of *Janella*, *Vitrina*, *Milax*, *Daudebardia*, *Succinea*, *Helix*, *Bulinus*, *Tornatella*, *Pupa*, *Balea*, *Diplomatina*, *Cyclophorus*, *Realia*, *Hydrocena*, and *Omphalotropis*.

At Dr. Hector's request, the Recorder has endeavoured to compile a list of the known New Zealand shells, terrestrial and marine, from the existing literature and a small collection sent by Dr. F. Müller to the Museum of Stuttgart. This list, originally destined to aid Mr. Hutton in the composition of his catalogues just cited, reached him too late for that purpose, and was therefore published separately by the Director of the Colonial Museum at Wellington. It is somewhat richer in synonyms and bibliographical references than Mr. Hutton's catalogues, but wants, of course, the authenticity as to statements of locality which can only be attained by a local observer. The three pamphlets combined will furnish a tolerably satisfactory account of the conchological fauna of New Zealand.

9. *Northern Pacifici.*

Aleutian Islands and Alaska. 9 species of sea shells collected by A. Pinart on the more eastern of these islands, Tschaika, Unimak, and Unalaska, are enumerated by P. FISCHER; 6 of them are known already from the neighbouring coasts of the Asiatic and American continents, the 3 others only from America. *J. de Conch.* xxi. pp. 245-248. W. H. DALL continues to publish preliminary descriptions of new shells, and points out the importance of the Shumagin Islands as the chief boundary between the Oregonian and the Arctic faunas, in the same way as Cape Cod, on the east side of North America, is between the Virginian and the Arctic; he distinguishes, moreover, the Aleutian fauna as a third, characterized by many new or recently described species. *P. Cal. Ac.* v. pp. 57-62.

Japan. New marine shells described by LISCHKE, *Mal. Bl.* xxi. pp. 19-35.

California. General remarks on the conchological fauna of both coasts of North America, pointing out the preponderance of the *Scutibranchia*

on the West Coast, are given by R. STEARNS, P. Cal. Ac. v. pp. 271-273 (Conch. Mem. x. pp. 5 & 6); also in Ann. N. H. (4) xii. p. 185. *Purpura canaliculata* (Duclos) reaches from Unalaska to Monterey; *id.* P. Cal. Ac. v. p. 250. Several new species are described; *id. tom. cit.* pp. 78-83, pl. i. (Conch. Mem. xii. pp. 1-6).

P. P. CARPENTER has published a supplementary report on the Mollusca of the West Coast of North America, containing reprints of his former papers on the same subject in Rep. Br. Ass., P. Z. S., Ann. N. H., and J. de Conch., 1863-1866; a simple list of similar papers published in 1855-1858; and an alphabetical index of the species mentioned in all these papers (prepared by E. Taylor), Sm. Misc. Coll. (No. 252) x. pp. 1-446.

Palæontology of recent Species.

Valvata piscinalis (Müll.) was abundant in prehistoric times in the small lakes of Southern Germany, whilst the lake bottoms were sand or clay, as at present in Lake Constance; but it became very rare when peat prevailed as a bottom. MILLER, Schalthiere des Bodensees, p. 9.

Some sub-fossil shells found in limestone tufa near Sielbeck, in Holstein, are enumerated by W. FACK, Schr. Nat. Ver. Schlesw. Holst. i. p. 214.

Use by Man.

The edible land- and sea-shells sold in the markets of the principal towns of Italy, are discussed by W. KOBELT, Zool. Gart. xiv. pp. 200-211.

General remarks on the use of the genus *Pecten* by man in modern and ancient times, by R. STEARNS, in "Overland Monthly," Apr. 1873.

Classification and History.

G. P. DÉSHAYES, the Nestor of the living conchologists, has narrated in an introductory lecture at the Paris Museum, July, 1873, the history of Conchology since Lamarck and Cuvier, showing the important share taken by himself in the development of this science, with peculiar regard to palæontology. Rev. Cours Sci. July, 1873.

F. PÂTEL has published a catalogue of his collection of shells, containing a great number of species, but presenting numerous shortcomings as to systematic position and habitat. Some critical remarks on it by the Recorder, Mal. Bl. xxi. pp. 119-121.

CEPHALOPODA.

The eye of the Cephalopods has been the subject of anatomical researches by C. K. HOFFMANN, especially the *pars ciliaris retine* and the *corpus epitheliale lentis*; the peculiar pear-shaped cells of the latter bear long varicose processes directed towards the *pars ciliaris*, and the author attributes to these a specific sensorial function. The rods in the retina of *Nautilus* agree essentially with those of the Dibranchiate Cephalopods and of the Heteropods. Niederl. Arch. Zool. i. (1872) pp. 180-182, 187-193. 2 pls.

The development of *Loligo* from the egg has been observed by E. Ray Lankester, Ann. N. H. (4) xi. pp. 81-84, woodcut.

Loligo vulgaris (Lam.) has been found in the River Trave, where the water is very slightly salted, Arch. Ver. Mecklenb. xxvi. Mörch states that this is not *L. vulgaris*, but *brevipes* (Stp.); Nachr. mal. Ges. v. p. 70.

Ommastrephes ? sp., a large but mutilated specimen, the mantle of which measured in length 186 centimetres, has been examined and described by F. Hilgendorf in Yokohama. MT. Ges. Nat. Ostas. i. p. 21.

HETEROPODA.

Carinaria mediterranea (Lam.), P. Panceri has found on the surface of the tentacles globular bodies covered with cylindrical epithelium, and provided with microscopical setæ; he thinks them to be the smelling organ. Bull. Assoc. Nat. Med. Nap. 1871, pp. 83-87, pl.

GASTROPODA.

PECTINIBRANCHIA.

MURICIDÆ.

Murex (Pteronotus) eos, sp. n., Hutton, Cat. mar. Moll. N. Z. p. 8, New Zealand.

Murex thomasi (Crosse), Crosse, J. de Conch. xxi. p. 249, pl. xi. fig. 4, Nukahiva.

Murex lienardi, Crosse, J. de Conch. xxi. p. 284, and *M. crossii*, Liénard, *ibid.* p. 285, Mauritius: spp. nn.

Muricidea subangulata, sp. n., Stearns, P. Cal. Ac. v. p. 81 (Conch. Mem. xii. p. 5), pl. i. fig. 4, S. Miguel Island, off the southern coast of California [has the appearance of a *Vitularia*].

Chascax, g. n., allied to *Murex* and *Coralliophila*, with a very wide umbilicus, no varices, and an apical nucleus of the operculum. *C. madeirensis*, sp. n., Watson, P. Z. S. 1873, pp. 361-364, pl. xxxvi. fig. 30, Madeira.

Typhis expansus, sp. n., Sowerby, *op. cit.* p. 719, pl. lxix. fig. 4, locality not known.

PURPURIDÆ.

Coralliophila barelayana, sp. n., H. Adams, P. Z. S. 1873, p. 205, pl. xxiii. fig. 1, Mauritius.

Engina alternata, *gibbosa*, and *bella*, spp. nn., A. Garrett, P. Cal. Ac. iv. (1872), p. 203, Viti and Samoa Islands.

BUCCINIDÆ.

Fusus pensum, *traversi*, *corticatus*, *plebeius*, *inferus*, and *bicinctus*, spp. nn., Hutton, Cat. pp. 8-10, New Zealand [the last very near *vittatus*, Q. & G., the preceding probably = *corrugatus*, Rve.].

Fusus (Chrysodomus?) harfordi, (Stearns, 1871), re-described by the author, P. Cal. Ac. v. p. 79 (Conch. Mem. xii. p. 3), Mendocino County, California.

Heliotropis, sub.-g. n., of *Chrysodomus*; shell sinistral, apex mammillated, operculum small, ovicapsules solitary. *C. harpa* (Mörch) and *Fusus contrarius* (of authors). Dall, P. Cal. Ac. v. p. 61.

Sipho halli, sp. n., *id. l. c.* p. 59, pl. ii. fig. 3, Nagai, Coast of Alaska.

Volutopsis beringi (Midd.) var. n. *regularis*, *id. l. c.* p. 60, pl. ii. fig. 6, Unalaska. *Neptunea castanea* (Mörch) is identified with this species.

Ptychatractus occidentalis (Stearns, 1871), re-described by the author, P. Cal. Ac. v. p. 79 (Conch. Mem. xii. p. 3), Shumagin Islands.

Euthria aracanensis, sp. n., Angas, P. Z. S. 1873, p. 182, pl. xx. fig. 1, Aracan.

Buccinum luridum, sp. n., Hutton, Cat. p. 14, New Zealand.

Buccinum kennicotti (Dall) is a *Chrysodomus*; *B. baeri* (Midd.) = *cyanum*, var., and *B. fischerianum* (Dall) is a good species. W. H. Dall. P. Cal. Ac. iv. p. 271.

Amphissa lineata, Stearns (? = *versicolor*, Dall, var.), figured, P. Cal. Ac. iv. (1872), pl. i. fig. 8 (Conch. Mem. x.) [*Cf. Zool. Rec. ix. p. 178*].

Cantharus filaris, sp. n., A. Garrett, P. Cal. Ac. iv. (1872), p. 202, Samoa and Viti Islands.

NASSIDÆ.

Nassa æthiopica, Kabonda, West Africa, and *nodulosa*, locality unknown, spp. nn., Marrat, Ann. N. H. (4) xii. p. 426.

OLIVIDÆ.

Oliva signata, sp. n., Lischke, Mal. Bl. xxi. p. 20, Yeddo.

Ancillaria albicallosa, sp. n. *id. l. c.* p. 21, Nagasaki.

VOLUTIDÆ.

Voluta thatcheri (M. Coy) described from more perfect specimens by Prévost, J. de Conch. xxi. pp. 38 & 39, pl. i. fig. 1, New Caledonia.

Voluta (Scaphella) stearnsi (Dall) figured, P. Cal. Ac. iv. (1872), pl. i. fig. 1 (Conch. Mem. x.), Unalaska. Description copied in Ann. N. H. (4) xi. p. 159 [allied to *ancilla* (Solander)].

Voluta (Callipara) brazieri and *V. macgillivrayi*, spp. nn., Cox, P. Z. S. 1873, p. 568, pl. xlviii. figs 8 & 9, New South Wales and Woodlark Island.

Voluta (Alcithoe) subplicata [= *gracilis*, Swains.] and (*Cymbiola*) *kiriki*, spp. nn., Hutton, Cat. p. 18, New Zealand.

MITRIDÆ.

Mitra sulcata (Mke.) = *peregra* (Rve.); Mörch, Nachr. mal. Ges. v. p. 70.

Mitra obscura, sp. n., Hutton, Cat. p. 19, New Zealand.

Mitra (Costellaria) crispa, sp. n., A. Garrett, P. Cal. Ac. iv. (1872), p. 201, Samoa and Viti Islands.

Thala exquisita, Paumotu Isles, *violacea*, Samoa and Viti Isles, A. Garrett, P. Cal. Ac. iv. (1872), p. 202, spp. nn.

Mauritia barclayi (Ad.): anatomy described by Macdonald, radula

agreeing with the true *Mitrae*, e.g., *M. episcopalis*. Tr. R. Soc. Maur. v. (1871); abstract in J. de Conch. xxi. pp. 383 & 384.

COLUMBELLIDÆ.

Columbella compta, sp. n., Lischke, Mal. Bl. xxi. p. 20, Nagasaki.

Columbella (Atilia) rubiginosa, sp. n., Hutton, Cat. p. 20, New Zealand.

Mitrella dædata, sp. n., H. Adams, P. Z. S. 1873, p. 205, pl. xxiii. fig. 2. New Hebrides.

Zafra purpurea, sp. n., *id. l. c.* p. 20b, pl. xxiii. fig. 3, New Hebrides.

Astyris variegata, sp. n., Stearns, P. Cal. Ac. v. p. 81, pl. i. fig. 5 (Conch. Mem. xii. p. 5), S. Diego, California.

MARGINELLIDÆ.

Marginella albescens and *vittata*, Hutton, Cat. p. 19, New Zealand; *M. quadrifasciata*, Marrat, Ann. N. H. (4) xii. p. 426, Kabonda, West Africa: spp. nn.

Marginella (Glabella) opalina, p. 21, *auræincta* [*aureicincta*], p. 22, spp. nn., Stearns, P. Bost. Soc. xv. (1872), or Conch. Mem. xi. p. 2, Florida.

RANELLIDÆ.

Triton tenuiliratus, sp. n., Lischke, Mal. Bl. xxi. p. 20, Japan.

Triton (Simpulum) acclivis, sp. n., Hutton, Cat. p. 13, New Zealand [probably = the widely spread *T. succinctus*, Lam.].

CYPRÆIDÆ.

Cypræa petitiana (Crosse & Fischer, 1872), Crosse and Fischer, J. de Conch. xxi. p. 254, pl. xi. fig. 6, Gaboon and Senegal.

Cypræa coxeni, sp. n. Cox, P. Z. S. 1873, p. 568, pl. xlviii. fig. 10, Solomon Islands.

NATICIDÆ.

Natica prietoi, sp. n., Minorca; *N. vittata*, Philippi, *nec.* Gmel., Algeçiras and Cadiz, renamed *intricatoides*: Hidalgo, J. de Conch. xxi. pp. 333 & 344.

Natica fusca (Blainv.): critical remarks by Wiechmann, Nachr. mal. Ges. v. pp. 82 & 83.

Natica vitrea, sp. n., Hutton, Cat. p. 21, New Zealand.

SOLARIIDÆ.

Solarium. T. A. di Monterosato ('Notizie intorno ai Solarii del Mediterraneo.' Palermo: 1873, 8vo, 15 pp. pl.) recognizes and figures the following recent species in the Mediterranean:—*S. discus* (Phil.), figs. 1–4, *moniliferum* (Brown), figs. 5–7, *mediterraneum* (Monter.), figs. 8 & 9, *hybridum*, (L. ?, Lam.), figs. 10 & 11, *fallaciosum* (Tiberi), figs. 12–20, and *architæ* [*archytæ*] (Costa), 1830, figs. 21–23 [= *sowerbii* (Hanl., 1862)]. *Ammonicerina mutabilis* (Costa) = *S. fallaciosum*, juv.; *S. pulchellum* (Tiberi), = *mediterraneum*, juv.

Architectonica tricarinata, sp. n., Stearns, P. Bost. Soc. xv. (1872), p. 23 (Conch. Mem. xi. p. 3), Tampa Bay, Florida.

PYRAMIDELLIDÆ.

Obeliscus. The plaits inside of the outer lip are repeated at different ages, but do not go throughout the whorls; their presence or want is therefore no reliable distinctive character between *O. dolabratus* (L.) and *terebellum* (Müll.), nor for any other species. Jickeli, Mal. Bl. xxi. pp. 118 & 119.

Obeliscus roseus, sp. n., Hutton, Cat. p. 22, Stewart's Island.

Pyramidella canaliculata, sp. n., Sowerby, P. Z. S., 1873, p. 720, pl. lxix. fig. 7, Sandwich Islands?

Chemnitzia zealandica, sp. n., Hutton, l. c. Stewart's Island.

Odostomia carinata, sp. n., H. Adams, P. Z. S., 1873, p. 206, pl. xxiii. fig. 4, Persian Gulf.

EULIMIDÆ.

Eulima paivensis [rectius *paivæ*], Watson, P. Z. S. 1873, p. 365, pl. xxxvi. fig. 29, Salvages, near Madeira; *E. chathamensis*, Hutton, l. c. p. 23. Chatham Islands: spp. nn.

Liostraca montrouzieri (Souverbie, 1872), re-described by the author, J. de Conch. xxi. p. 63, pl. iv. fig. 7, New Caledonia.

CONIDÆ.

Conus fulvicinctus (Crosse), Crosse, J. de Conch. xxi. p. 248, pl. xi. fig. 5, Western Africa.

Conus dalli, Stearns, P. Cal. Ac. v. p. 78, pl. i. fig. 1, Gulf of California; *C. fergusoni*, Panama, *tenuisulcatus* and *articulatus*, Mauritius, *altispiratus*, Agulhas bank, and *cuneatus*, locality unknown, Sowerby, P. Z. S. 1873, pp. 145 & 146, pl. xv. figs. 1-5; *C. racemosus*, id. l. c. p. 721, pl. lxix. fig. 11 (really 1874), Sandwich Islands?; *C. zealandicus*, Hutton, Cat. p. 23, New Zealand: spp. nn.

PLEUROTOMIDÆ.

Pleurotoma trailli, *lævis*, and *albula*, Hutton, l. c. pp. 11 & 12, New Zealand; *P. circinata*, Dall, P. Cal. Ac. v. p. 61, pl. ii. fig. 5, Unalaska: spp. nn.

Pleurotoma (*Drillia*) *montereyensis* and *hemphilli*, Stearns, re-described, P. Cal. Ac. v. p. 80 (Conch. Mem. xii. p. 4), pl. i. fig. 2.

Pleurotoma (*Drillia*) *brunneimaculata*, California?, and *strigata*, locality unknown, Sowerby, P. Z. S. 1873 [really 1874], p. 720, pl. lxix. figs. 8 & 9: spp. nn.

Drillia ostrearum, sp. n., Stearns, P. Bost. Soc. xv. (1872), p. 32 (Conch. Mem. xi. p. 2), Tampa Bay, Florida.

Pleurotoma (*Clathurella*) *roseincta*, (*Defrancia*) *nigritincta*, (*Cithara*) *questieri* and *biclathrata* (Montrouzier and Souverbie, 1872), re-described and figured by the author, J. de Conch. xxi. pp. 55-59, pl. iv. figs. 1-4, New Caledonia.

Cithara balansai, sp. n., Crosse, J. de Conch. xxi. pp. 65 & 131, pl. v. fig. 5, New Caledonia.

Mangelia interlirata, Stearns, P. Cal. Ac. iv. p. 226, pl. i. fig. 10 (Conch. Mem. x. p. 2), Monterey, California; *M. stellata*, id. P. Bost. Soc. xv. (1872), p. 22 (Conch. Mem. xi. p. 3), Tampa Bay, W. Florida: spp. nn.

Lachesis sulcata, sp. n., Hutton, Cat. p. 12, New Zealand.

TEREBRIDÆ.

Terebra adamsi, Japan, *australis*, Australia, *concolor* and *similis*, localities unknown, *japonica*, Japan, spp. nn.; *flava*, Sow., Thes. fig. 75, *nee* Gray, renamed *lutescens*; *pulchra* (Hinds), *cerithina* (Lam.), juv.; and critical remarks concerning some other species: E. A. Smith, Ann. N. H. (4) xi. pp. 262-266.

Impages, subg. n. of *Terebra*, for *T. cœrulescens*, *micans*, *acuminata*, *cuspidata*, *apicina*, *trailli*, and *bacillus*, on account of the callous band encircling the whorls above: *id. ibid.* p. 263.

Myurella fijiensis, Fiji Islands, *turrita*, Torres Straits, *belcheri*, Guayaquil, *macgillivrayi*, South Coast of New Guinea, *miranda*, Malacca, *contracta*, locality unknown, *granulosa*, Japan, *paucistriata*, Fiji Islands, *capensis*, Port Elizabeth, *pumilio*, locality unknown, and *tantilla*, Japan, spp. nn.; *id. ibid.* pp. 266-270.

Abretia antarctica, Antarctic region, and *brasiliensis*, Rio Janeiro, spp. nn., *id. ibid.* pp. 270 & 271.

CANCELARIIDÆ.

Cancellaria trailli, Hutton, Cat. p. 26, Stewart's Island; *C. turrita*, Sowerby, P. Z. S. 1873, p. 721, pl. lxix. fig. 12, locality unknown: spp. nn.

Cancellaria (Trigonostoma) unalaskensis and *circumcincta*, spp. nn., Unalaska and Shumagin Islands, Dall, P. Cal. Ac. v. pp. 58 & 59, pl. ii. figs. 1 & 2.

PHORIDÆ.

Xenophora [Phorus]. The apical whorls are smooth, and without agglutinated foreign bodies: Fischer, J. de Conch. xxi. p. 123.

OVULIDÆ.

Amphiperas pulchellus, sp. n., H. Adams, P. Z. S. 1873, p. 206, pl. xxiii. fig. 5, Mauritius.

PEDICULARIIDÆ.

Pedicularia lienardi, sp. n., Robillard, Tr. R. Soc. Maur. v. 1871, Mauritius; probably = *elegantissima* (Desh.), var., H. Crosse, J. de Conch. xxi. p. 383.

Pedicularia californica (Newc.) has again been taken on corals, near 1873. [VOL. X.]

the Farallones and at Monterey, and is figured by Stearns, P. Cal. Ac. iv. p. 383, pl. i. fig. 9 (Conch. Mem. x.).

CERITHIIDÆ.

Cerithium alternatum, *kirki*, *cinctum* (= *terebelloides*, Martens, MS., p. 107), and *exilis* [-e], spp. nn., Hutton, Cat. pp. 26 & 27, New Zealand.

Cerithium (Ino) minimus [-um], id. l. c. p. 27, New Zealand [= *Triforis angasi*, Cox, 1865].

Cerithidea turrita, sp. n., Stearns, P. Bost. Soc. xv. (1872), p. 24 (Conch. Mem. xi. p. 4), Tampa Bay, Florida.

MELANIIDÆ.

Melania holandri (Fér.): varieties with rather thick and smooth shell occur in the upper and more rapid parts of the rivers in Bosnia; those with thinner shell and more developed sculpture in the lower parts. O. v. Möllendorff, Beitr. Faun. Bosn. p. 60.

Melania (Pachychilus) schiediana (Phil.), *saussurii* (Brot) ?, *gassiesi* (Phil.) ? = *liebmani* (Phil.) ? = *berendti* (Dkr. MS.) and *largillierti* (Phil.) described and figured by H. Strebel, Abh. Ver. Hamb. vi. pp. 35-38, pl. vi. figs. 35, 36, 37, & 43, from Mexico; the third appears to be an undescribed species.

Melania tamsiana (Dunker) = *tuberculata* (Müll.) from the Cape Verd Islands; Morelet, J. de Conch. xx. p. 240.

Melanopsis dufourii (Fér.) observed by Soldani [vol. iv. 1798, p. 112] in the coast district of Tuscany, near Massa, has been again found. Bonelli, Atti Soc. Ital. xiv. fasc. v. p. 23.

Melanopsis lamberti (Souverbie, 1872) re-described by the author, J. de Conch. xxi. p. 64, pl. iv. fig. 8, New Caledonia.

LITTORINIDÆ.

Littorina littorea (L.), and *rudis* (Mont.); copulation between both repeatedly observed by Bouchard, Chantéreaux, and H. Sauvage; J. de Conch. xxi. p. 122.

Littorina aleutica (Dall), figured by the author, P. Cal. Ac. iv. pl. i. figs. 3 & 3a, also Stearns, Conch. Mem. x. Description copied in Ann. N. H. (4), xi. p. 159.

Littorina tristis, sp. n., Mousson, Mal. Bl. xxi. p. 155, mouth of river Rabat, Morocco.

RISSOIDÆ.

Rissoina artensis (Montrouzier, 1872) and *subconcinna* (Souverbie) re-described by the authors, J. de Conch. xxi. pp. 61 & 62, pl. iv. figs. 5 & 6, New Caledonia.

Rissoa leacocki, *aurantiaca*, *crispa*, *gibbera*, *moniziana*, *novarensis* [rectius

novaræ], *albugo*, *abjecta*, *tincta*, and *tenuisculpta*, spp. nn., and *macandrewi* (Manzoni), var. n. *spretæ*, Watson, P. Z. S. 1873, pp. 365–389, pl. xxxiv. figs. 1, 3, 6, 7, 9, 10; pl. xxxv. figs. 13, 17; pl. xxxvi. figs. 26, 23, and 28; all from Madeira. Watson also describes and figures the following known species from Madeiran specimens:—*cancellata* (Dacosta), *costata* (Adams), *macandrewi* (Manzoni), *watsoni* (Schwartz), *canariensis* (Orb.), *violacea* (Desm.), *costulata* (Alder), *similis* (Scacchi), *picta* (Jeffer.), *concinna* (Monterosato), *depicta* (Manzoni), *pulcherrima* (Jeffer.), *perminima* (Manzoni), *glabrata* (Mühlfeld), *sabulum* (Cantraine), and *coriacea* (Manzoni); l. c. pp. 367–389, pls. xxxiv.–xxxvi.

Rissoa rugulosa, *nana*, *subfusca*, *plicata*, *purpurea*, *impolita*, and *rosea*, spp. nn., Hutton, Cat. pp. 28 & 29, Stewart's Island.

Hydrobia quenstedti, sp. n., from a streamlet in the cave of Falkenstein, Wurtemberg, the shell and the living animal, its operculum and radula exactly described by R. Wiedersheim, Verh. Ges. Würzb. iv. pp. 12–18, pl. vi. figs. 7–9, 13–16; the allied *H. pellucida* (Benz.) from alluvial deposits of the Neckar at Cannstadt, fig. 12; another species from the Tauber, figs. 10 & 11. *H. quenstedti* is uniformly white, and wants all pigment, even in the place of the eyes. [It is again discussed and compared with the allied forms, and regarded as a variety of *H. vitrea*, Drap., by Fries, Württ. Nat. J. H. 1874, pp. 37–53.]

Hydrobia valvatiformis, sp. n., v. Möllendorff, Beitr. Faun. Bosn. p. 59, springs of the Bosna, near Serajevo, in Bosnia.

Hydrobia baltica (Nilss.): anatomical description by Lehmann, Schneck. Musch. Pomm. pp. 248 & 249, pl. xix. fig. 88.

Hydrobia coronata (Pfr.), = *crystallina* (Pfr.), = *Paludestrina candeana* (Orb.), = *Paludina cisternicola* and *ornata* (Morelet); shell, lateral jaws, radula, and embryonic shells described and figured: v. Martens, Moll. Venez. pp. 208 & 209, pl. ii. fig. 13a–h; the same from Mexican specimens described and figured by H. Strebel, Abh. Ver. Hamb. vi. p. 33, pl. v. fig. 34.

Hydrobia (Ammicola) ernesti, sp. n., v. Martens, l. c. p. 209, pl. ii. fig. 12, Lake of Valencia, Venezuela (sub-fossil).

[*Hydrobia*] *Bythinia siemoniana*, sp. n., Targioni-Tozzetti, Atti Soc. Ital. xv. fasc. v. p. 65, Camaldoli, in Tuscany.

Lithoglyphus pyramidatus, sp. n., v. Möllendorff, l. c. p. 59, fig. 20, River Urbas, in Bosnia.

PALUDINIDÆ.

Bithynia mostarensis, sp. n., v. Möllendorff, l. c. p. 58, fig. 19, in a shallow lake near Mostar, Bosnia.

Bithynia boissieri (Charp); on synonymy and allied species, see Jickeli, Nachr. mal. Ges. v. p. 11.

VALVATIDÆ.

Valvata frigida, sp. n., Westerlund, Faun. moll. terr. et fluv. Suec. ii. p. 436, Pite, Lapland (near *V. cristata*).

Valvata humeralis (Say) figured for the first time by H. Strebel, Abh. Ver. Hamb. vi. p. 33, pl. iv. fig. 42, Mexico.

AMPULLARIIDÆ.

Ampullaria semitecta, sp. n., Mousson, Mal. Bl. xxi. p. 18, Bogotá (near *oblonga*, Swains.).

Ampullaria luteostoma (Swains.), *castanea* (Desh.), and *glauca* (L.), from Venezuela, described, and their synonymy discussed; v. Martens, Moll. Venez. pp. 203 & 204; the first figured, pl. i. fig. 20.

Ampullaria cornu-arietis (L.). On its upper and lower face, and bands; *id. l. c.* p. 205.

Ampullaria flagellata (Say), = *malleata* (Jonas), = *reflexa* (Swains.), = *violacea* (Val.), with remarkable varieties, *A. ghiesbreghti* (Reeve), and an unnamed sp. n., fully described, from Mexico (with critical remarks on some other species figured by Reeve); H. Strebel, Abh. Ver. Hamb. vi. pp. 25-32, pls. iii. & iiiia, figs. 13-16.

TURRITELIDÆ.

Turritella (Haustator) fulminata and *vittata*, spp. nn., Hutton, Cat. p. 29, New Zealand.

Turritella (Eglisia) symmetrica, sp. n., *id. l. c.* p. 30, Stewart's Island.

VERMETIDÆ.

Siphonium lamellosum, sp. n., *id. ibid.*, New Zealand.

CALYPTRÆIDÆ.

Crepidula unguiformis and *fornicata* (L.) live as well on the inside as outside of other shells, but always distinct from each other: Verrill, Ann. N. H. (4) xi. p. 212.

SCALARIIDÆ.

Scalaria mariæi, sp. n., Crosse, J. de Conch. xxi. p. 136, New Caledonia.

Scala delicatula (H. Adams, 1869), preoccupied, is renamed *tenera* by the author, P. Z. S. 1873, p. 209.

FAMILY NOT ASCERTAINED.

Caledoniella montrouzieri (Souverbie: see Zool. Rec. vi. p. 553) is to be found only on the thoracic feet of *Gonodactylus*. Montrouzier, J. de Conch. xxi. p. 287.

SCUTIBRANCHIA.

NERITIDÆ.

Neritina stragulata (Mühlf.) var. *carinata* (Kokeil). On its variations in Bosnia; O. v. Möllendorff, Beitr. Fauna Bosn. p. 61.

Neritina punctulata (Desh.), *reclivata* (Say), and *virginea* (L.) var. *oblonga*, from Mexico; Strebel, Abh. Ver. Hamb. vi. pp. 59-63, pl. i. figs. 38-41.

TROCHIDÆ.

Turbo. P. Fischer has commenced a continuation of the well-known "Iconographie" of Kiener, by issuing a volume containing 36 pls. referring to this genus (published long ago by the latter without letter-press) with the additions of careful descriptions and 6 new plates. A sketch of the anatomy and geographical distribution of the genus is given, with a natural arrangement of the species, distributed into 9 groups, most of which correspond to genera of Gray, Mörch, and others. The genus *Calcar* (Montf.) = *Astralium* (Linck) is recognized as distinct, and many species of *Trochus* proper, figured by Kiener as *Turbo*, are well described, and their true systematic place indicated. The new figures belong to the following species:--Group *Prisogaster*: *T. elevatus* (Souleyet), pl. xli. fig. 2, Chili. Group *Callopoma*: *T. squamiger* (Reeve), pl. xxxvii. fig. 2, West Coast of Central America. *T. setosus* group: *T. artensis* (Montrouzier), pl. xxxvii. fig. 1, and pl. xxxviii. fig. 1, New Caledonia. Group *Senectus*: *T. margaritaceus* (L.) pl. xxxvii. fig. 3, and pl. xxxviii. fig. 2, Indian Seas; *cailleti* (Fischer), pl. xxxviii. fig. 2, Guadeloupe; *intercostalis* (Menke), pl. xxxix. fig. 1, Madagascar; *concinus* (Phil.), pl. xl. fig. 1, Ceylon and Cochin China; *elegans* (Philippi), pl. xli. fig. 1, New Caledonia. *T. chrysostomus* group: *T. tumidulus* (Reeve), pl. xl. fig. 2, locality unknown. Group *Lunella*: *granulatus*, var. *coreensis*, pl. xl. fig. 3, Korea, and *coronatus*, var. *minor*, pl. xl. fig. 4. Group *Leptothyra*: *T. sanguineus* (L.), pl. xxxix. fig. 3, Mediterranean; *macandrewi* (Mörch), pl. xxxix. fig. 3, Mogador, and *sangarensis* (Schrenck), pl. xxxix. fig. 4, Japan [Fischer is wrong in supposing the Californian *Leptothyra*, characterized by a thin operculum, to be identical with *T. sanguineus* and *sangarensis*, which are provided with a thick shelly operculum]. He describes as new, *T. carduus*, p. 112, pl. xlii. fig. 6, locality unknown, and *T. stenogyrus*, p. 118, pl. xli. fig. 3, Basilan Island, Philippines; both belonging to the group *Senectus*, and both also described in J. de Conch. xxi. p. 126.

Imperator (*Cookia*) *davisi*, sp. n., Stowe, Tr. N. Z. Inst. iv. p. 218, and Hutton, Cat. p. 34, Cook Strait.

Collonia munda, sp. n., H. Adams, P. Z. S. 1873, p. 206, pl. xxiii. fig. 6. Persian Gulf.

Cyclostrema carinatum, sp. n., *id. l. c.* p. 207, pl. xxiii. fig. 8, Persian Gulf.

Liotion bellula, sp. n., *id. l. c.* p. 206, pl. xxiii. fig. 7, Persian Gulf.

Liotion (*Arène*) *shandi*, sp. n., Hutton, Cat. p. 35, Chatham Islands [appears to be the young state of some *Turbo*, probably *creniferus*, Kien.].

Adeorbis varius, sp. n., *id. ibid.* Stewart's Island and Chatham Islands [belongs to *Risella*].

Chrysostoma fulminata, *simulata*, *inconspicua*, and *rosea* [-um], spp. nn., *id. l. c.* p. 36 [the three first appear to belong to *Magarita* or *Gibbula*, the last to *Cantharidus*: none to *Chrysostoma*].

Eutrochus alternatus, sp. n., Sowerby, P. Z. S. 1873, p. 719, pl. lxix. fig. 5, ? Australia.

- Polydonta chathamensis*, sp. n., Hutton, *l. c.* p. 36, Chatham Islands.
Clanculus pusillus, sp. n., H. Adams, P. Z. S. 1873, p. 207, pl. xxiii. fig. 9, New Hebrides.
Labio hectori, sp. n., Hutton, *l. c.* p. 37, New Zealand.
Euchelus bellus, sp. n., *id. ibid.* Chatham Islands.
Monilea zealandica, sp. n., Hutton, *l. c.* p. 40, New Zealand.
Minolia variabilis, sp. n., H. Adams, *l. c.* and fig. 10, Persian Gulf.
Gibbula affinis, *filosa*, and *striata*, p. 201, Viti and Samoa Islands, *prasina*, p. 202, Viti Islands, A. Garrett, P. Cal. Ac. iv. (1872), spp. nn.
Margarita vorticifera, sp. n., Dall, P. Cal. Ac. v. p. 59, pl. ii. figs. 4 a, b, c, Unalaska.

FISSURELLIDÆ.

- Fissurella squamosa* and *rubiginosa*, Hutton, Cat. p. 42, New Zealand and Chatham Islands [the latter belongs to *Patella*, probably *P. lacunosa*]; *F. foveolata*, p. 203, *fenestrata*, p. 204, Samoa and Viti Islands, A. Garrett, P. Cal. Ac. iv. (1872): spp. nn.
Lucapina monilifera, sp. n., Hutton, *l. c.* Stewart's Island.

CYCLOBRANCHIA.

TECTURIDÆ.

- Tectura testudinalis* (Müll.), white var., found also on the North British coasts; Verkrüzen, Ann. N. H. (4) xi. p. 275.

PATELLIDÆ.

- Patella vulgaris (vulgata, L.)*; notes on its locomotion and varieties, from observations of the author and of Bouchard-Chantéreaux, are given by H. E. Sauvage, J. de Conch. xxi. pp. 118-122.

Patella octoradiata, *pottsi*, and *flava*, spp. nn., Hutton, Cat. p. 44, New Zealand.

Nacella flexuosa, sp. n., *id. l. c.* p. 45, New Zealand.

Nacella (?) rosea (Dall) figured, P. Cal. Ac. iv. pl. i, fig. 2 (also Stearns, Conch. Mem. x.), Shumagin Islands. Description copied, Ann. N. H. (4) xi. p. 159.

CHITONIDÆ.

Chiton insculptus (Souverbie, 1866, *nec* A. Adams); diagnosis corrected by Souverbie, J. de Conch. xxi. p. 287.

Chiton japonicus and *rubrilineatus*, Lischke, Mal. Bl. xxi. pp. 22 & 24, Nagasaki [the former belongs to *Maugeria*, the latter to *Acanthochætes*]; *C. empleurus* and *rudis*, Hutton, Tr. N. Z. Inst. iv. pp. 178 & 179, and Cat. p. 48, New Zealand: spp. nn.

Tonicia rubiginosa and *zigzag*, spp. nn., Hutton, *l. c.* p. 180 and Cat. p. 49, New Zealand (the latter = *Acanthopleura celata*, Rve.; *id.* Cat. p. 49).

Acanthopleura complexa, sp. n., *id. l. c.* p. 180 (= *A. ciliata*, Rve., *id. Cat.* p. 49).

Acanthochætes ovatus, sp. n., *id. l. c.* p. 182, and *Cat.* p. 50, New Zealand.

TECTIBRANCHIA.

TORNATELLIDÆ.

Tornatella fabreana, Crosse, *J. de Conch.* xxi. pp. 36 & 130, pl. v. fig. 4, New Caledonia; *T. alba*, Sowerby, *P. Z. S.* 1873, p. 720, pl. lxix. fig. 6, Port Elizabeth, Cape of Good Hope: spp. nn.

Buccinulus kirki and *albus*, spp. nn., Hutton, *Cat.* p. 51, New Zealand.

BULLIDÆ.

Cylichna striata, sp. n., *id. l. c.* p. 52, New Zealand.

Utriculus obtusus (Mont.), found in the Baltic; Wiechmann, *Arch. Ver. Mecklenb.* xxvi. p. 100.

Acera bullata (Müll.). Eggs like that of *Aplysia*; the embryo is composed of cells of different size, and the intestine formed by centripetal growth of epithelial strings: the development of the young animal is described, proving it to resemble to a great extent that of the *Nudibranchia* and especially of *Elysia*; the ganglions make their first appearance only about the 16th day, a long time after the auditory capsules. Langerhans, *Z. wiss. Zool.* xxiii. pp. 171-174, pl. viii. figs. 1-9, 11-17.

APLYSIIDÆ.

Aplysia. On the development of two species at Naples; E. Ray Lankester, *Ann. N. H.* (4) xi. pp. 85 & 86.

NUDIBRANCHIA.

The development of an undetermined species of *Doris* and of *Æolis peregrina* (Cavolini) is described by P. Langerhans, *Z. wiss. Zool.* xxiii. pp. 174-179, pl. viii. figs. 10, 18-27. It resembles that of other *Nudibranchia* in most points; the nervous ganglions make their appearance rather late, but somewhat before hatching (*l. c.* pp. 174-179, figs. 10, 18-27).

On the development of *Polycera quadrilineata* and *Eolis exigua*; E. Ray Lankester, *Ann. N. H.* (4) xi. p. 86.

PLEUROPHYLLIDIIDÆ.

Pleurophyllidia semperi and *pallida* (Bergh) figured by the author in Semper's *Reis. Arch. Philipp.* ii. pl. ix. figs. 1 & 2.

PHYLLIDIIDÆ.

Phyllidia pustulosa (Cuv.), *elegans* (Bergh), and *varicosa* (Lam.) var., figured: *id. l. c.* figs. 5-7.

DORIDIDÆ.

Onchidoris tuberculatus [-a], sp. n., Hutton, Cat. p. 54, New Zealand.

Doris tuberculata (Cuv.) : observations on the living animal, its varieties in colour, change of localities according to different seasons, &c., by H. E. Sauvage, J. de Conch. xxi. pp. 26 & 27.

Doris pilosa (Müll.) varies in colour, and = *D. stellata* (Gmelin) : *id. l. c.* pp. 29 & 30 [priority is attributed wrongly to the latter name].

Chromodoris ? *pulchella* (Bergh) figured in Semper's Reis. Arch. Philipp. ii. pl. ix. fig. 16.

Goniodoris ? *flavidula* (Bergh), *ibid.* fig. 10.

Polycera ocellata (A. & H. Ad.) ; spawn described, and *P.* sp. n. ? from Boulogne, briefly indicated by Sauvage, *l. c.* p. 31.

Polycera horrida (Hesse, 1872) ; Hesse, J. de Conch. xxi. p. 306, pl. xii. figs. 1 & 2, Brest.

Ægirus hispidus (Hesse, 1872) ; *id. l. c.* p. 307, figs. 3-7, Brest.

Triopa carpenteri, sp. n., Stearns, P. Cal. Ac. v. p. 78, fig. 2 on p. 77 (Conch. Mem. xii. p. 2), Monterey, California.

Lateribranchiæa, g. n., "animal like *Triopa*, with a single series of gills on each side, central or subcentral and opposite." *L. festiva*, sp. n., *id. tom. cit.* p. 77, fig. 1 (Conch. Mem. xii. p. 1), Monterey.

Trevelyana morosa (Bergh) figured by the author, in Semper's Reis. Arch. Philipp. ii. pl. ix. fig. 9.

Ceratosoma gracillimum (Semper), *ibid.* fig. 8.

TRITONIIDÆ.

Tritonia hombergi (Cuv.). The number of gill-tufts varies according to the age of the animal, Sauvage ; J. de Conch. xxi. p. 32.

Scyllæa punctata, Bouch. Chant., = *Doto coronata* (Müll., A. & H. Ad.) ; *S. pelagica* (Bouch. Chant., nec L.) = *Dendronotus arborescens* (Müll.) ; *id. l. c.* pp. 33 & 34.

Doto uncinata, *pinnigera*, *armoricana*, *aurita*, *styligera*, *confluens*, and *onusta* (Hesse, 1872) ; Hesse, J. de Conch. xxi. pp. 313-322, pl. xiii. figs. 1-3, 4-5, 6, 7-11, 12, 13 & 14, Brest.

ÆOLIDIDÆ.

Eolis nemesis and *armoricana* (Hesse, 1872) ; Hesse, J. de Conch. xxi. pp. 312 & 313, pl. xii. figs. 13-15, Brest.

Æolidia serotina, sp. n., Bergh, Verh. z.-b. Wien. xxiii. p. 618, pls. ix. figs. 14-17, x. figs. 4-12, Valparaiso.

Janus cristatus (Chiaje) externally and anatomically described ; *id. l. c.* pp. 596-605, pls. vii. figs. 1-16, viii. fig. 1.

Fiona pinnata (Eschscholtz, as *Æolidia*) = *lepadivora* (Gräffe), from the Northern Pacific, externally and anatomically described ; *id. l. c.* pp. 605-610, pls. viii. figs. 2-11, ix. fig. 13.

Phidiana. The known species enumerated, and the anatomy of *P.*

lynceus, var. from the West Indies, given; *id. l. c.* pp. 613-618, pls. ix. figs. 3-12, x. figs. 1-3.

Heromorpha, g. n.: agreeing with *Hero* in the general structure of the head and especially of the tentacles, but with cup-shaped rhinophores, of which the club is simple; also closely allied to *Doto*, but with simple papillæ. *H. antillensis*, sp. n., St. Thomas, Antilles, *id. l. c.* pp. 610-613, pls. viii. figs. 12-20, ix. figs. 1 & 2.

Galvina. The known species enumerated, and *G. viridula*, sp. n., from the Cattegat, externally and anatomically described; *id. l. c.* pp. 620-624, pls. ix. figs. 18 & 19, x. figs. 13-20.

HERMÆIDÆ.

Hermæa polychroma (Hesse, 1872); Hesse, J. de Conch. xxi. p. 309, pl. xii. figs. 8-12, Brest; notes on *H. dendritica* (Ald. & H.) observed also at Brest, *id. l. c.* p. 311.

Stiliger (Ehrenb.) = *Calliopæa* (Orb.). R. Bergh gives the following character for this genus: form of the body like that of *Galvina*; rhinophores simple, tentacles tuberculiform; dorsal papillæ club-shaped; foot rounded in front; pharynx and radula like those of *Phyllobranchus*; genital organs nearly like those of *Elysia*; penis armed with a sting. He places the following species in this genus: *S. modestus* (Ehrenb.), Red Sea, *bellula* [-us] (Orb.), Brest, *souleyeti* (Verany), Mediterranean Sea, *fuscata* (Gould), Boston, and *mariae* (Meyer & Mobius, as *Embletonia*), Kiel. He gives an anatomical description of this last species. Semper's Reis. Arch. Philipp. ii. pp. 137-144, pl. xxvi. figs. 1-17.

PHYLLOBRANCHIDÆ.

R. BERGH has given, *l. c.*, an exact anatomical monograph of the genera *Phyllobranchus* and *Cyerce*, proposing for them a new family, the chief characters of which are:—body depressed; a quadrilateral or kidney-shaped velum; rhinophores (upper tentacles) elongated, foliaceous, folded, and bifid; lower tentacles shorter, not bifid; dorsal papillæ in several rows, crowded, very large, filled with large glandular cells, without urticatory organs; vent prominent, dextral; genital orifice double, that of the male near the lower tentacle, of the female somewhat more behind; pharynx suctorial, without jaws, surrounded by narrow muscular bands; radula short, with 2 to 3 crenulated plates in one row; a separate crop, with strong walls, joined to the œsophagus by a special tube; ventricle [proventricle?] cylindrical; lateral biliary ducts coming from the dorsal papillæ, and united into a tranverse duct [ventricle?] from which the intestine takes its origin; generative organs very complicated; a common hermaphroditic gland.

Phyllobranchus (Ald. & H.). Vent lateral, cup-shaped; foot continuous; penis long, without sting; plates of the radula short; crop elongate; hepatic follicles within the dorsal papillæ, dark coloured. *P. prasinus*, sp. n., Philippines, Bergh, *l. c.* pp. 52-87, pl. x. figs. 1-16; *P. rubicundus*, sp. n., ? = *Proctonotus orientalis* (Kelaart, 1858) ?, Red Sea, pp. 88-92, pls. x. figs. 17-22, xi. figs. 1-21; *P. viridis* (Desh., as

Hermæa, 1857), Guadeloupe and St. Thomas, pp. 92-98, pl. xi. figs. 23-26, pl. xii. Perhaps also *Caliphylla mediterranea* (Costa), from the Mediterranean Sea, belongs to this genus.

Cyerce, g. n. Vent dorsal; foot transversely bipartite; penis short, armed with sting; plates of the radula elongate; crop short; hepatic follicles within the dorsal papillæ, hyaline. *C. elegans* and *nigra*, spp. nn., Pelew Islands. Bergh, *l. c.*, pp. 98-118, pls. ix. figs. 13-17, xiii.-xvi. (1871).

PLACOBANCHIDÆ.

R. BERGH, *l. c.*, gives the following characters of this family:—body flat, front large, with short ear-shaped tentacles; eyes in the neck, approximate; double genital orifice near the right tentacle; a distinct protuberance behind the neck, containing the kidney and pericardium, and with the vent on its right side; sides of the back produced in lateral wings, usually bent upwards; upper face of the back with parallel longitudinal folds; foot not distinctly separated from the rest of the body, transversely bipartite in front. There is only one genus known, *Placobranchus* (Hasselt), containing *ocellatus* (Hasselt) = *hasselti* (Cuv.), Java and Sumatra; *argus* (Bergh), = *Elysia ocellata* (Pease, 1860), Sandwich Islands (both described, pp. 149-165); *ianthobaptus* (Gould, 1852), Sandwich Islands; *gracilis* (Pease, *Am. J. Conch.* vi. 1871), Tahiti; *variegatus* (Pease, *ibid.*), Huaheine; *comiginus*, *punctulatus*, *latus* and *priapinus*, spp. nn.; Bergh, *l. c.* pp. 167-174, pls. xviii. figs. 17 & 18, xix. & xx. figs. 1-13 (1872), Philippines.

ELYSIIDÆ.

R. BERGH, *l. c.*, characterizes this family in the following manner:—body very flat; front narrow, tentacles short, mostly ear-shaped, the edges rolled up; eyes distant; genital orifice double, behind the right tentacle; sides of the back winged, and a pericardio-renal protuberance as in *Placobranchus*: surface of the back smooth, except an elevated line branching to the wings; pharynx and radula nearly as in *Placobranchus*, but usually no crop; penis without sting. He arranges the genera as follows: *Elysia* (Risso, 1818) = *Acteon* (Oken, 1815, *nec* Montf.) = *Aplysiopterus* (Chiaje, 1828); head rounded, tentacles of moderate size, vent anterior, latero-dorsal, dorsal wings not much plaited, without bordering, not continuous on the neck. *E. viridis* (Mont.) and *minuta* (Sars) from the seas of Europe, described pp. 178-186, pls. xx. figs. 14-25, xxi. figs. 1-13, xxiv. fig. 6; *E. faustula*, sp. n., *id. l. c.* pp. 186-190, pls. ix. fig. 1, xxii. figs. 1-24, xxiii. fig. 1, Philippines; *E. grandis*, sp. n., p. 190, pl. ix. fig. 2, Pelew Islands (1872).

Tridachia (Desh., 1857) = *Pterogastron* (Pease, 1860). Wings much plaited and undulated, continuous in front; otherwise like *Elysia*. *T. crispata* (Örsted, 1863) = ? *schræmmi* (Desh.), West Indies, described, *l. c.* pp. 191-198, pls. ix. figs. 4 & 5, xxi. fig. 14, xxiii. & xxiv. figs. 1-5.

Thuridilla, g. n. Head rounded, tentacles of moderate size, vent posterior, median. *T. splendida* (Grube, 1861, as *Elysia*), Adriatic, described, *id. l. c.* pp. 199-201, pl. xxiv. figs. 7-19.

Elysiella, g. n. Head carinated at the sides ; tentacles minute, conical.
E. pusilla, sp. n., *id. l. c.* pp. 201-203, pls. ix. fig. 3, xxiv. figs. 20-25,
 Pelew Islands (1872).

PHYLLIRHOIDÆ.

Phyllirhoe bucephala (Péron). Its pulsating heart and the attached medusoid parasite, *Mnestra*, observed by E. RAY LANKESTER, *Ann. N. H.* (4) xi. p. 94. Its phosphorescence has been discussed by P. PANCERI ; it is seated equally in the peripheral nervous cells of the ordinary form and in those of the central ganglions, as well as in the special peripheral cells, which contain a refringent yellow matter soluble in alcohol ; the light is manifested during nervous excitement, but becomes exhausted by frequently repeated irritations ; electricity has no apparent action on it, but fresh-water and chemical agents make it shine, and can even provoke the light in dead and dried animals. *Atti Soc. Nap.* v. (1872) ; abstract in *Q. J. Micr. Sci.* xiii. pp. 109-116, with a woodcut.

Phyllirhoe atlantica (Bergh, 1871), *bucephala* (Péron), and *amboinensis* (Q. & G.), anatomically described by R. Bergh, in *Semper's Reis. Arch. Philipp.* ii. pp. 212-240, pls. xxvii.-xxix. *P. lanceolata*, sp. n., from a drawing by C. Semper, *id. l. c.* p. 241, pl. xxxi. fig. 5, Philippines.

Acura pelagica (H. & A. Ad.) anatomically described, *id. l. c.* pp. 241-246, pls. xxx. figs. 6-19, xxxi. figs. 3 & 4. No renal sac.

PULMONATA.

E. Dubreuil's last paper on the generative organs, in *Rev. Montp.* 1873, has not been seen by the Recorder.

S. PÉREZ has also made researches on generation in *Limax* and *Helix* : he states that fecundation does not take place during the expulsion of the egg, or even a short time before the mature egg comes into the lower portion of the oviduct, but that a part of the sperm is expelled from the stalked vesicle (*bursa copulatrix*) several hours after its entrance there, and reaches the place where the excretory duct of the hermaphroditic gland is widened into the oviduct, and that there fecundation is effected. The rest of the sperm is soon decomposed within the stalked vesicle. The spermatophore is formed by secretion from the walls of the penis ; the dart (*sagitta*) serves only for one copulation, and is very soon reabsorbed if not dropped. *Mém. Soc. Bord.* 1873, with a plate [abstract in *J. Z.* iii. 1874].

C. SEMPER has continued his classification (see *Zool. Rec.* vii. p. 150) as follows :—

Family 2, *Helicidæ*. No mucous pore at the hinder end of the foot.

Sub-family 1, *Vitrinidæ* (Binney & Bland). Under surface of the foot longitudinally divided, with distinct lateral edges ; jaw smooth ; lateral teeth of the radula either subulate or 2-3 pointed, always hook-shaped. *Limax* (including *Amalia*), *Vitrinoidea*, g. n., *Vitrinopsis*, g. n., *Vitrina*, *Parmacella*, *Vitrinoconus*, g. n., *Hyalina* (Albers).

Sub-family 2, *Helicinae*. Under surface of the foot not longitudinally divided, although sometimes with a median area and a lateral edge ;

genital orifice usually below or near the right feeler; jaw and teeth of the radula very variable, the latter mostly short, with several points. Group 1. *Oxygnatha*, Mörch; jaw smooth. Subdiv. 1: teeth of the radula smooth, 1-pointed. *Acavus* (Montf.), *Corilla* (Adams) = *Atopa* (Albers), *Caryodes* (Alb.), *Panda* (Alb.), *Caracolus*, *Labyrinthus*. Subdiv. 2: teeth of the radula broad, with several points. A, only two feelers: *Janella* (Gray). B, four feelers; jaw with a quadrate plate (which resists caustic potash): *Succinea*. C, four feelers; no such plate to the jaw: *Oopelta* (Mörch), *Trachomorpha* (Alb., *ex emend.* Mart.), with subgenera *Nigritella* (Mart.), and *Videna* (Alb.), *Planispira* (Beck), *Obbina*, g. n. (= *Obba*, b and c, Alb., Mart.), *Strophia*, *Sagda*.

The jaw-character is only adopted provisionally, as the author doubts that it will hold good in a natural classification.

VAGINULIDÆ.

Vaginulus (Fér.) and *Veronicella* (Blainv.). Stoliczka has observed two species on the island of Penang which he refers respectively to *Vaginulus birmanicus* (Theobald) and *V. tourannensis* (Eydoux & Souleyet). In the former, the jaw and radula resemble those of *Helix*, and the anal and respiratory orifice is at the posterior end of the body; in the latter, there is no jaw, the radula is composed of simple pointed teeth like those of *Testacella*, and the anal and respiratory orifice is near that of the female genitals at the lower right side of the mantle, about two-fifths of the length of the body. After a review of the literature, he suspects that the former type may answer to Blainville's *Veronicella*, the latter to Férussac's *Vaginulus*; so that these two names, hitherto regarded as synonyms, will represent two distinct genera, and even be placed in separate families. J. A. S. B. (n. s.) xlii. pt. 2, pp. 33-37.

TESTACELLIDÆ.

Testacella gestroi, sp. n., Issel, Ann. Mus. Genov. iv. p. 277, fig., Sardinia.

[*Daudebardia* ?] *Helicarion sardous*, sp. n., *id. l. c.* p. 279, fig., Sardinia. [The author records the existence of a mucous pore at the extremity of the tail; but, from the general aspect of the shell and its position near the hinder end of the animal, the Recorder cannot help thinking it either a *Daudebardia*, or much more allied to that genus than to *Helicarion*.]

Rhytida. Fischer, having examined the digestive and generative organs of the viviparous *Helix inæqualis*, comes to the conclusion that they agree with those of the most decidedly carnivorous *Pulmonata*, as *Glandina* and *Testacella*. *H. multisulcata* and *cabriti* (Gassies) have a similar radula, and also want the jaw. The distinctness of the genus *Rhytida*, and its place among the *Testacellidæ*, first pointed out by Semper, is thereby confirmed. J. de Conch. xxi. pp. 5-13, pl. iii. The history of the genus is discussed, and the species probably belonging to it enumerated by Crosse & Fischer, *op. cit.* pp. 13-20.

Diplomphalus (Crosse & Fischer, 1872) differs from *Rhytida* in the shell by the very wide umbilicus and the sunken excavation of the upper face, and in the radula by the equal size of the lateral teeth. To this genus are to be referred *Helix cabriti* (Gassies), *montrouzieri* (Souverbie), *mariei* (Crosse), and *vaysseti* (Marie). Crosse & Fischer, *l. c.* pp. 20-24.

Streptaxis suturalis (Martens, 1859) and *conoideus* (Pfr.), both from Venezuela; Martens, *Moll. Venez.* pp. 165 & 166, pl. ii. figs. 3 & 2.

Ennea isseli, Paladilhe, *Ann. Mus. Genov.* iii. (1872), p. 19, pl. i. figs. 5 & 6, Aden; *E. denticulata*, Morelet, *tom. cit.* p. 202, pl. ix. fig. 10, Bogos, Abyssinia; *E. monodon*, *bicristata*, and *doliolum*, Morelet, *J. de Conch.* xxi. pp. 330 & 331, Gaboon: spp. nn.

Cylindrella cumingiana, Pfr., *ex. typ.*, is an *Ennea*. Dohrn, *Mal. Bl.* xxi. p. 110 & 111.

Gonospira dupontiana, *rodriguezensis*, and *chloris*, spp. nn., Crosse, *J. de Conch.* xxi. pp. 138 & 139, Rodriguez Island.

Ravenia, g. n., allied to *Spiraxis* and *Pupa*, turreted, imperforate, subhyaline, columellar margin spirally twisted, outer margin bent inwards, and with a strong tooth in the middle. *R. blandi*, sp. n., $3\frac{1}{4}$ mill. in length, "Les Roques," near Curaçao. Crosse, *J. de Conch.* xxi. p. 69.

Spiraxis incerta, sp. n., Mousson, *Mal. Bl.* xxi. p. 14, Bogotá.

ZONITIDÆ.

Philomycus (Rafinesque, 1820), = *Meghimation* (Hasselt, 1823), = *Incilaria* (Bens., 1842), = *Tebemophorus* (Binney, 1842). *P. pictus*, sp. n., from Penang, living animal, jaw and radula; Stoliczka, *J. A. S. B.* (n. s.) xlii. pt. 2, pp. 29-31, pl. iii. figs. 9-14.

Oopelta (Mörch) sp. ?, anatomical notes by Semper, *l. c.* p. 111.

Limax maximus (L.) *cinereus* and *marginatus* (Müll.), *agrestis* (L.), *variegatus* (Drap.), *cinctus* and *tenellus* (Müll.); coloured figures by E. v. Martens in Lehmann's *Schneck. & Musch. Pomm.* pls. iii.-v. Critical remarks on some of them by H. Seibert, *Nachr. mal. Ges.* v. p. 88.

Limax schwabii (Frauenfeld), with eggs and young, fully described from Moravian specimens, by H. Seibert, *l. c.* pp. 61-65. *L. bielzii* and another species (perhaps new) from Moravia described; *id.* *Mal. Bl.* xxi. pp. 193-198.

Anatomical notes and figures of the teeth of the radula from *L. (Lehmannia) marginata* (Müll.), (*Malacolimax*) *tenellus* (Nilss.), and (*Amalia*) *gagates* (Drap.), by Semper, *l. c.* pp. 82-84, pl. xi. figs. 2, 11, 18, & 26.

Limax (Malacolimax) brasiliensis, sp. n., *id.* *l. c.* p. 84, radula, pl. xi. fig. 21, Brazil. *L. sandwichensis*, very near *tenellus*, *id. ibid.* p. 84, footnote.

Limax brunneus feeds on the pollen of *Chrysanthemum leucanthemum*. Clessin, *Nachr. mal. Ges.* v. p. 39.

Amalla marginata (Drap.) figured by the Recorder in Lehmann's *Schneck. & Musch. Pomm.* pl. v. fig. B (? and BB).

Vitrinoidea, g. n. Shell wholly concealed by the mantle, with cuticle and calcareous layer, forming several whorls; respiratory orifice before the middle of the mantle; all teeth of the radula 3-pointed; no accessory glands at the genital organs; no flagellum. *V. albaiensis*, sp. n., Semper, *l. c.* p. 85, pls. viii. fig. 2, xi. figs. 5 & 33, Albany, Luzon.

Parmacella dorsalis, sp. n., Mousson, *Mal. Bl.* xxi. p. 149, Valleys of Mount Atlas, Morocco.

Anatomical notes concerning *P. olivieri* (Cuv.), from Samarcand, *deshayesi*, from Algiers, and an undetermined species, perhaps *auriculata* (Mouss.), by Semper, *l. c.* pp. 89-91.

Vitrina brevis, Fér.; on its habits, eggs, &c., Seibert, *Nachr. mal. Ges.* v. pp. 37-39. This species is distinguished by a large accessory gland at the oviduct; Semper, *l. c.* p. 88. The lateral teeth of the radula in *V. brevis*, *nivalis*, and *draparnaldi* are somewhat different; *id. ibid.* footnote, pl. xi. figs. 23, 24, & 28.

Vitrina bonnellii, sp. n., Targioni-Tozzetti, *Atti Soc. Ital.* xv. fasc. v. pl. xvi. fig. 6a; also figured, but without name, by Gentiluomo, *Bull. mal. Ital.* (1868), Mount Alvernia in Tuscany. Its anatomy also given by the author.

Vitrina ruivensis (Gould) and *lamarcki* (Fér.); genitals and radula described, the former somewhat different from those of the European species. Semper, *l. c.* pp. 88 & 89, pl. xi. figs. 7, 8, 16, & 24.

Vitrina welwitschi (Morelet) = *angasi* (A. Adams), both described in the same year; Dohrn, *Mal. Bl.* xxi. p. 78. Morelet asserts the priority of his name, the voyage of Welwitsch having been published really in October, 1867, although the title page bears the date 1868; *J. de Conch.* xxi. p. 326.

Vitrina isseli and *caillaudi*, Morelet, *Ann. Mus. Genov.* iii. (1872), pp. 188 & 189, pl. ix. figs. 1 & 2, Mensas, Abyssinia; *V. nucleata*, shell, living animal, jaw, radula, and genital organs described, Stoliczka, *J. A. S. B.* (n. s.) xlii. pt. 2, pp. 23 & 24, pls. i. fig. 12, ii. figs. 4-6, Penang; *V. kermadecensis*, E. A. Smith, *Ann. N. H.* (4) xi. p. 288, Sunday or Raoul Island, Kermadecs; *V. ultima*, Mousson, *J. de Conch.* xxi. p. 110, pl. vii. fig. 1, Sunday Island: spp. nn.

Vitrinopsis, g. n.: two lobes of the mantle covering a part of the shell in front and on the left side, not on the right, as in *Vitrina*. Lateral teeth of the radula 3-pointed; in *Vitrina*, 1-2-pointed. Genital organs as simple as in that genus. *V. tuberculata* and *tigrina*, spp. nn., Semper, *l. c.* pp. 86 & 87, pls. viii. figs. 5 & 3, xi. figs. 3, 4, 6, & 25, Philippines.

Helicarion lymphascens and *pallens*, Morelet, *Ann. Mus. Genov.* iii. (1872), pp. 189 & 190, pl. ix. figs. 4 & 5, Bogos, Abyssinia; *H. permolle* [-is], shell, living animal, jaw, radula, and genital organs described, Stoliczka, *l. c.* pp. 18 & 19, pls. i. fig. 11, ii. figs. 21-23; *H. hilli*, pl. xvi. fig. 7, Lord Howe's Island, *brazieri*, Fitzroy Island, N. E. Australia, Cox, *P. Z. S.* 1873, p. 151: spp. nn.

Helicarion sardous, Issel: see *Daudebardia*, p. 156.

[*Nanina* ?] *Helix chastellii* (Fér.) occurs in Madagascar, and is provided with a mucous pore. Crosse & Fischer, *J. de Conch.* xxi. pp. 116 & 117.

Rhysota cymatium (Bens.), from Penang; shell, living animal, and radula described, Stoliczka, *l. c.* pp. 11-13, pls. i. figs. 1-3, ii. figs. 13-15.

Macrochlamys stephoides, sp. n. (shell, living animal, jaw, radula, and genital organs described), *id. l. c.* p. 17, pls. i. fig. 9, ii. figs. 19 & 20, Penang.

Microcystis palmicola, sp. n., *id. l. c.* p. 18, pl. i. fig. 10, Penang, under the bark of cocoa palms.

Stenopus lividus (Guilding) probably from Venezuela; Martens, Moll. Venez. pl. ii. fig. 4.

Trochonanina exposita, sp. n., Mousson, J. de Conch. xxi. p. 111, pl. vii. fig. 2, Sunday Island, Kermadec group. *T. insculpta* (Pfr.), from Norfolk Island described; *ibid.*

Trochomorpha: on characters, and for descriptions of shell and living animal, of *T. castra* (Bens.), *cantoriana* (Bens.), and *timorensis* (Martens), with jaw, radula, and genital organs of the first and last, *cf.* Stoliczka, *l. c.* pp. 20–22, pls. i. figs. 13–17, ii. figs. 7–12.

Trochomorpha (Alb., *emend.* Mart.): anatomical notes on (*Nigritella*) *beckiana*, (*Videna*) *metcalfei* (Pfr.), *subtrochiformis* (Mouss.), and *troilus* (Gould). No mucous pore; no longitudinal partition of the foot; lobes of the mantle varying according to the species; genital organs very simple; lateral teeth of the radula 2-pointed. Semper, *l. c.* pp. 112–114, pls. iv. figs. 2 & 3, xii. figs. 11 & 12.

Trochomorpha bohollensis, *infanda*, *splendens*, Philippines, *oleacina*, *electra*, and *pagodula*, Pelew Islands, spp. nn., *id. l. c.* pp. 116–120.

Rotula bijuga, sp. n., Stoliczka, *l. c.* 14–16, pls. i. figs. 4–7, ii. figs. 16–18, Penang (shell, living animal, radula and genital organs described).

Sitala carinifera, sp. n., *id. l. c.* p. 16, pl. i. fig. 8, Penang, on leaves of the coffee-tree. *Conulema* (Stoliczka) = *Sitala*; *id. ibid.* footnote.

Helix (*Trochomorpha* [?]) *juanita*, sp. n., Angus, P. Z. S. 1873, p. 183, pl. xx. fig. 3, Solomon Islands.

Zonites algirus. The so-called “capreolus” or spermatophore is described by E. Dubreuil, C. R. lxxv. (1872) pp. 1126 & 1127. Abstract Ann. N. H. x. (4) xi. p. 235. The cerebroid ganglion has been examined, and the origin of the optic, acoustic, and olfactory nerves found to be in front. Sicard, *op. cit.* lxxvii. pp. 275–277, and R. Z. (3) i. p. li.

Zonites carniolicus (A. Schmidt) is widely spread in Bosnia, and its distinctness from other allied species pointed out by O. v. Möllendorff, Beiträge z. Faun. Bosn. pp. 31–33.

Zonites desmazuresi (Crosse, 1872); Crosse, J. de Conch. xxi. p. 257, pl. xi. fig. 1, New Caledonia.

Helix (*Zonites*) *subnitens* (Gassies, 1872); Gassies, *op. cit.* p. 335, pl. xiv. fig. 8, New Caledonia.

Hyalina. Anatomical notes; *H. cellaria* (Müll.), *nitidula* (Drap.), *nitens* (Mich.), *filicum* (Kryn.), and *sidneyensis* (Cox), agree perfectly as to the genital organs; the last-named may perhaps have been introduced into Australia. *H. nitidula* differs as to the radula from the others, and agrees with North-American species. Semper, *l. c.* pp. 94–96, pl. 11, figs. 14, 29–31.

Hyalina icterica, sp. n. (Tiberi, MS.), Adami, Atti Soc. Pad. iv. fasc. ii. and Kobelt, Mal. Bl. xxi. p. 159, Calabria. Allied to *olivetorum* (Gmel.).

Hyalina draparnaldi (Beck) and *alliaria* (Miller); on their carnivorous and nocturnal habits, Fricdel, Nachr. mal. Ges. v. p. 26.

Hyalina gerfalchensis (Pecchioli) probably = *H. olivetorum* (Gmel.), juv. : Bonelli, Atti Soc. Ital. xiv. fasc. v. p. 5.

Hyalina petronellæ (Charp.), var. n. *subnitodosa*, Mousson, J. de Conch. xxi. p. 295, near Lake Gorktscha, Armenia.

Hyalina pura (Aldr.), and *radiatula* (Aldr.), = *hammonis* (Ström), specimens occurring with transitional sculpture ; v. Maltzan, Arch. Ver. Mecklenb. xxvi. pp. 70 & 71. This view opposed, and other differences pointed out by Wiechmann, *op. cit.* p. 134.

Hyalina crystallina (Müll.) and *subterranea* (Bourg.) are also united by v. Maltzan, *l. c.* p. 71, and again distinguished by Wiechmann, p. 135.

Hyalina oleosa (Morelet, as *Helix*, nec Pfeiffer) is re-named *abyssinica* ; Jickeli, Ann. Mus. Genov. iv. p. 530.

Macrocyclus baudoni (Petit) : jaw smooth, with median projection, very delicate ; Binney & Bland, Ann. Lyc. N. York, x. p. 305.

Sagda foremanniana (Ad.). No produced lobes of the mantle ; jaw smooth ; lateral teeth of the radula 2-pointed ; Semper, *l. c.* p. 128.

Vitrinoconus, g. n. : testa umbilicata (vel imperforata ?) conica vel trochiformis, apice obtusa ; anfr. 5-8, planulati, ultimus sæpissime carinatus vel angulatus ; apertura lunaris, obliqua ; peristoma simplex, acutum vel incrassatum. Mantle sometimes with cervical lobes, but no shell-lobe ; genital organs simple, without accessory glands ; lateral teeth of the radula 2-pointed. Near *Conulus* (Fitz.). Type, *Helix cyathellus* (Pfr.) ; other species, *H. cyathus*, *doliolum*, *winteriana*, *scalarina*, *sinaitensis* (Pfr.), *tongana* (Gray ?), and *V. discoideus* and *turritus*, spp. nn. Semper, *l. c.* pp. 91-94 ; radula of *V. cyathus*, pl. xi. fig. 26.

ODONTOGNATHA AND AULACOGNATHA.

Arion ater, L., different colour varieties, *fuscus* (Müll.), *hortensis* (Fér.), and *flavus* (Müll.) ; coloured figures by E. v. Martens, in Lehmann's Ab. Schneck. & Musch. Pomm. pls. i. & ii. Critical remarks by H. Seibert, Nachr. mal. Ges. v. pp. 79-81. *Arion rufus* [ater, L.], var. *fasciatus*, id. Mal. Bl. xxi. p. 190, Eberbach, in the Grand Duchy Baden. Considerable variations in the colour of *A. empiricorum* [ater, L.], from the young to the adult state, observed by breeding ; even *A. albus* (Müll.) cannot be maintained as a distinct species. *Id. l. c.* pp. 199-203.

Kobeltia, new generic name for *Arion hortensis* (Fér.) proposed by H. Seibert, Nachr. mal. Ges. v. p. 81 [= *Prolepsis*, Moquin-Tandon].

Geomalacus maculosus (Allman) described by D. F. Heynemann, Mal. Bl. xxi. pp. 25-32, pl. i. *G. mabillii* (Baud.) and *hiemalis* (Drouet) do not belong to this genus, but = *Arion melanocephalus* (F. B.), probably a young state of *A. empiricorum* ; no true species of *Geomalacus* has as yet been found in France. Mabile's misunderstandings concerning this genus are pointed out somewhat humorously, pp. 32-36. A translation of these critical remarks is given in Ann. N. H. (4) xi. pp. 271-274.

Jaw and radula of *G. maculosus* described and figured by Binney & Bland, Ann. Lyc. N. York, x. p. 309.

Prophysaon, g. n., jaw and radula as in *Arion*, but with an internal shell without mucous pore at the extremity of the foot ; respiratory

orifice in the anterior half of the shield, genital orifice behind the right feeler. *P. hemphilli*, sp. n., Bland & Binney, *l. c.* pp. 293-297, pl. xiii. figs. 2-8.

Ariolimax (Mürch) differs from the preceding by the position of the respiratory orifice in the hinder half, and of the genital orifice below the free part, of the shield, and the presence of a mucous pore. *Iid. l. c.* pp. 297-300; its extreme marginal teeth figured, pl. xiii. fig. 1. *A. californicus* and *niger*, spp. nn., Cooper, P. Ac. Philad. 1872, pp. 146-149, pl. iii. figs. D & E, California.

Patula ruderata (Stud.) var. n. *gorchtschana*, Mousson, J. de Conch. xxi. p. 196, Armenia.

Patula modicella (Fér.) var. n. *vicinalis*, *id. l. c.* p. 113, Sunday Island, Kermadec Group; the type also on Vai-Tupu, Ellice Islands.

Helix (*Patula*) *guatemalensis* (Crosse & Fischer, 1872) figured, J. de Conch. xxi. p. 274, pl. ix. fig. 3.

Leucochroa degenerans, sp. n., Mousson, Mal. Bl. xxi. p. 150, Mogador.

Pityis maupiensis and *tanea*, A. Garrett, P. Cal. Ac. iv. (1872) p. 204, Maupiti I., Society Isles; *P. decemplicata*, Mousson, J. de Conch. xxi. p. 105, Nukufetau and Vai-Tupu, Ellice Islands: spp. nn.

Helix. Species from Europe and adjacent countries:—

Helix (*Fruticicola*) *erjavecii* (Brasina) characterized, from Bosnia; O. v. Möllendorff, Beitr. Faun. Bosn. p. 34.

H. (*F.*) *arpatschiana*, *pseudoglobula*, and *hispidula* (L.) var. n. *hispidosa*; Mousson, J. de Conch. xxi. pp. 197-199, the two former pl. vii. figs. 4 & 5, Armenia.

H. longipila, sp. n., *id.* Mal. Bl. xxi. p. 152, Moroccan Atlas.

H. ericetorum (Müll.) is a western species, spread over Spain, France, England, and Western Germany; *H. obvia* (Ziegl.) on the contrary prevails in Eastern Germany and all the Austrian provinces; the limit between both runs from Mt. St. Gothard, along the upper course of the Rhine, along the Iller (a tributary of the Danube), the Bavarian Jura, the Fichtel mountains, the Erz- and Riesen- mountains, from south-west to north-east in Germany; in several places the two meet. South of the Alps they are represented by *H. ammonis* (Schmidt). Clessin, Nachr. mal. Ges. v. pp. 24-26, 33-37. A note on *H. obvia* near Nördlingen, by F. Sandberger, *l. c.* p. 83.

H. zelebori (Pfr.) occurs in the eastern part of Bosnia; it has two darts which resemble those of *H.* (*Xerophila*) *candicans*. O. v. Möllendorff, Beitr. Faun. Bosn. pp. 39 & 40, figs. 3 & 4.

H. (*Xerophila*) *camerata* and *subapicina*, spp. nn., Mousson, Mal. Bl. xxi. pp. 150 & 151, Mogador.

H. (*Cochlicella*) *duplicata*, sp. n., *id. l. c.* p. 151, Mogador.

H. dehnii (Rossm.) comes from Morocco; Kobelt, Nachr. mal. Ges. v. p. 27.

H. (*Campylæa*) *pouzolzi* (Payr.); on its varieties occurring in Bosnia and Servia, O. v. Möllendorff, *l. c.* p. 35 (and Mal. Bl. xxi. p. 132).

H. (*C.*) *möllendorffi* (Kobelt), *l. c.* p. 39, figs. 1 & 2.

H. trizona (Ziegl.); its varieties in Servia, *id.* Mal. Bl. xxi. p. 133.

H. preslii (Schmidt) var. *anconae* (Gentiluomo), Penna all' Alvernia in Tuscany, wrongly described before as a variety of *H. cingulata*; Bonelli & Martens, Atti Soc. Ital. xiv. fasc. v. pp. 8 & 9.

H. (Campylaea) narzanensis (Kryn.), varr. nn. *solidior* and *perlineata*; Mousson, J. de Conch. xxi. pp. 200 & 201, Armenia.

H. (Macularia) rerayana. beaumieri, atlasica, and prae-disposita, spp. nn., *id.* Mal. Bl. xxi. pp. 152-154, valleys of the Atlas in Morocco, the last subfossil.

H. strigata (Müll.); on its varieties in Southern Italy, including *H. surrentina* (A. Schmidt), Kobelt, Mal. Bl. xxi. pp. 159-160.

H. cantabrica, sp. n., Hidalgo, J. de Conch. xxi. p. 358, Peña Abis, Asturia; allied to *H. fontenillii* (Mich.).

H. nemoralis (L.) and *hortensis* (Müll.) observed in the same localities by Wiechmann, Arch. Ver. Mecklenb. xxvii. p. 145. Variations in their bands observed at Kiel by W. Fack, Schr. nat. Ver. Schlesw. Holst. i. p. 211.

H. austriaca (Mhlfld.) has been found near Bromberg in the province of Posen by A. Krause. It is widely spread in the south-eastern part of Europe, and occurs only in some districts of eastern Germany with the allied species *H. nemoralis* and *hortensis*; the former of these prevails in south-western Europe, the latter in its more northern parts. *H. silvatica* is confined to the western parts of Switzerland and south-eastern France. The geographical and orographical limits of those four species are, as far as possible pointed out by Martens, S. B. nat. Fr. 1873, pp. 128-133.

Helix. African species:—

H. isseli, sp. n., Morelet, Ann. Mus. Genov. iii. (1872), p. 193, pl. ix. fig. 3, Bogos, Abyssinia [= *H. darnaudi*, Pfr.]. *H. pilifera* (Martens) from Mensas, figured, *ibid.* fig. 11.

H. cryophila, Morelet, *nec* Martens, re-named *brocchii*; Jickeli, Ann. Mus. Genov. iv. p. 529.

H. bouvieri, sp. n., Cape Verd Islands, and notes on *H. advena* (W. B.), *myristica* (Shuttl.), &c., from the same locality, A. Morelet, J. de Conch. xxi. pp. 232-235.

H. palmarum and *seminium*, spp. nn., *id.* l. c. p. 329, Gaboon; allied respectively to *H. adansoniae* and *parvula*.

[*Ampelita*] *H. fulgurata* (Sow.) comes from Madagascar, Crosse & Fischer, J. de Conch. xxi. p. 118.

[*A.*] *H. stragulum*, sp. n., *id.* l. c. p. 158, Madagascar.

Stylodonta bewsheri (H. Ad., 1872) = *detecta* (Fér.), H. Adams, P. Z. S. 1873, p. 209.

Caldwellia, subg. n. of *Stylodonta*; type *H. philyrina* (Morelet); *id.* *ibid.*

Helix rodriguezensis, sp. n., Crosse, J. de Conch. xxi. p. 138, Rodriguez Island.

Helix. Species from Eastern Asia:—

H. tectum-sinense and *richthofeni*, spp. nn., Martens, Mal. Bl. xxi. pp. 67 & 68, Tsi-nan-fu, Province Shantung, China.

H. (Fruticicola) similaris (Fér.) from Penang, the living animal, jaw, radula, and genital organs described; Stoliczka, J. A. S. B. (n. s.) xlii. 2. p. 26, pl. ii. figs. 1-3.

H. (F.) everetti, sp. n., H. Adams, P. Z. S. 1873, p. 207, pl. xxiii. fig. 11, Borneo.

H. (Trachia) penangensis, sp. n., shell, living animal, strong-nibbed jaw, radula, and genital organs described; Stoliczka, l. c. pp. 24 & 25, pl. iii. figs. 1, 18-20.

Trachia footii, sp. n., id. l. c. p. 170, Belgaom, East Indies.

Plectopylis shanensis, sp. n., id. l. c. p. 169, Shan States, Burmah.

Corilla erronea (Alb.): its anatomy very near that of *Acavus*, which also has its head-quarters in Ceylon, and very distinct from *Plectopylis* from Trans-Gangetic India; jaw smooth, all teeth 1-pointed, no accessory glands, no bag for a dart; probably viviparous. Semper, l. c. pp. 100-102, pl. xii. fig. 18.

[*Acavus*] *Helix hæmastoma* (L.) and *skinneri* (Rv.); anatomical notes, jaw smooth, all teeth of the radula 1-pointed; no accessory glands on the genital organs: id. l. c. pp. 98-100, pl. xii. figs. 7-10.

Planispira zonaria (L.); genital organs simple, without accessory glands, a short flagellum; id. l. c. p. 120.

Obbina, g. n. Testa umbilicata, orbiculato-depressa, apice obtusissima; anfr. $4\frac{1}{2}$ -6, ultimus ante deflexus; apertura perobliqua vel horizontalis; peristoma incrassatum, reflexum, marginibus callo junctis, basi dilato, umbilicum semitegente. Jaw smooth, teeth of the radula as in true *Helix*, no dart, no multifid glands, a flagellum and a pennate gland to the penis, kidney very long. Type *H. planulata*, Lam. Corresponds to the subdivisions *b* and *c* of *Obba* in Albers' 'Heliceen,' edn. 2, p. 159. *O. listeri* (Gray) and *basidentata* (Pfr.) have also been anatomically examined. Semper, l. c. pp. 120-128, pl. viii. fig. 9, pl. xii. figs. 4-6. *O. listeri*, var. n. *costata*, id. l. c. p. 125, Luzon.

Helix. Australian and Polynesian species:—

Panda falconari (Reeve); its anatomy very near that of *Acavus*. Semper, l. c. pp. 103 & 104, pl. xii. fig. 20.

Helix (Camæna) barneyi, Cox, P. Z. S. 1873, p. 148, pl. xvi. fig. 2. Torres' Straits; *H. (C.) arthuriana* and *challisi*, Torres' Straits, and *rawnesleyi*, Queensland, N. Australia, id. l. c. pp. 564 & 565, pl. xlviii. figs. 1. 3 & 2: spp. nn.

H. (Corasia) [?] *balcombii*, sp. n., id. l. c. p. 565, pl. xlviii. fig. 4, Solomon Islands.

H. rockhamptonensis, id. l. c. p. 151, Rockhampton, Australia, allied to *H. blomfieldi*; *H. yatalensis*, id. l. c. p. 149, Yatala, Albert River, Queensland: spp. nn.

H. (Angasella) phillipsiana, sp. n., Angas, P. Z. S. 1873, p. 183, pl. xx. fig. 4, interior of S. Australia.

H. (Discus) cerealis, sp. n.. Cox. l. c. p. 147, pl. xvi. fig. 1, Solomon Islands.

H. fatigata, p. 149, pl. xvi. fig. 4. Solomon Islands; *mendanae*, *serena*.

and *crustulum*, Solomon Islands, *howinsulæ*, Lord Howe's Island, pp. 148-150, *allasteri*, p. 564, Solomon Islands, *leei*, p. 565, pl. xviii. fig. 5, Louisiade Islands (near *H. erinaceus*); Cox, *l. c.* spp. nn.

H. (Semicornu) silenus, sp. n., Angus, *l. c.* p. 182, pl. xx. fig. 2, New Ireland.

H. (Geotrochus) miser [-a], *quirosi*, *blanda*, *gelata*, and *zelina*, pp. 146, 147, 149 & 150, the two last pl. xvi. figs. 5 & 6; *redempta* and *macfarlanii*, pp. 566 & 567, the first pl. xviii. fig. 6, spp. nn., all from the Solomon Islands; *H. (G.) xanthochila* (Pfr.), var., p. 567, pl. xviii. fig. 7: Cox, P. Z. S. 1873.

H. lamberti, *decreta*, and *koutoumensis* (Gassies, 1871); Gassies, J. de Conch. xxi. pp. 46-48, pl. ii. figs. 1-3; *bourailensis*, *melaleucarum*, and *bruniana* (Gassies, 1872); *id. l. c.* pp. 336-339, pl. xiv. figs. 4, 7, & 6; *H. ostiolum* (Crosse, 1870), Crosse, *op. cit.* p. 341, pl. xiv. fig. 5; *H. bavayi* (Crosse & Marie) and *heckeliana* (Crosse) are specifically distinct; *id. l. c.* pp. 347-351, pl. xiv. figs. 1 & 2; *H. mejiu*, sp. n., Lambert. *op. cit.* pp. 136 & 356, pl. xiv. fig. 3. All from New Caledonia.

Helix. Species from Central and South America:—

Helix lychnuchus (Müll.): jaw with median projection, almost smooth, with scarcely discernible and subobsolete ribs, but marginal teeth quadrate as in *Helix*, not cuspidate as in *Zonites*. *H. orbiculata* and *perplexa* have a similar jaw, but with somewhat more discernible ribs; *H. isabella* and *dentiens* have decidedly costate jaws; the first-named cannot therefore be placed in the genus *Zonites*. Binney & Bland, Ann. Lyc. N. York, x. pp. 301-303, pl. xiv. figs. 5-8. Jaw and radula of *H. pachygastra* (Gray), jaw of *H. josephinae* (Fér.), and radula of *H. invalida* (Adams) described; *id. l. c.* pp. 305 & 306.

Caracolus caracolla (L.); no accessory glands at the genital organs, but a flagellum, jaw smooth, teeth of the radula 1-pointed. Semper, *l. c.* pp. 104 & 105, pl. xii. fig. 13. *H. marginella* (Gmel.); jaw and radula: *id. ibid.*

Helix ghiesbregti (Nyst) and *eximia* (Pfr.); jaw, radula, and genital organs figured; Fischer & Crosse, Moll. terr. & fluv. Mexic. pl. xiii.

H. (Trichia) sumichrasti (Crosse & Fischer, 1872) figured; J. de Conch. xxi. p. 265, pl. ix. fig. 4, La Huallaga, Mexico.

H. (Aglaiä) sargi (Crosse & Fischer, 1873) figured; *l. c.* p. 277, pl. ix. fig. 2, Guatemala.

H. macneili, sp. n., Crosse, *op. cit.* p. 67, Nicaragua.

H. basidens and *erecta*, spp. nn., Mousson, Mal. Bl. xxi. pp. 2 & 3, Bogota, New Granada [the former very near if not identical with *neogranadensis* (Pfr.), the latter with *subplanata* (Rve.)].

H. (Labyrinthus) plicata (Born), *bifurcata* (Desh.), *leucodon* (Pfr.), and *tamsiana* (Dkr.), from Venezuela; on their variability, Martens, Moll. Venez. pp. 168 & 169. Jaw of the first-named species smooth, with prominent beak, teeth of the radula 1-pointed; Semper, *l. c.* p. 105.

H. lactea; on its acclimatization in Monte Video and Buenos Ayres, Heynemann, Nachr. mal. Ges. v. p. 27.

Helix. North American Species:—

H. columbiana (Lea) and *germana* (Gould) are specifically distinct by the form of the jaw and genital bladder (pedunculate vesicle of authors); Binney & Bland, Ann. Lyc. N. York, x. p. 304, pl. xiv. figs. 1-4.

Cochlostyla fuliginata, sp. n., Martens, Mal. Bl. xxi. p. 46, Luzon.

Bulimus marmoratus (Dkr.), *pardalis* (Fér.), *moritzianus* (Pfr.), and *fulminans* (Nyst), the last with varr. *B. blainvillianus* (Pfr.), and *loveni* (Pfr.), all from Venezuela; their distinctive characters and variability pointed out by Martens, Moll. Venez. pp. 170-174.

Bulimus blainvillianus (Pfr.); jaw with numerous sub-perpendicular plaits, teeth of the radula in angular rows, the median angle pointing backwards: *id. l. c.* p. 173, pl. ii. fig. 16.

Bulimus vallisianus and *ampullaroides*, spp. nn., Mousson, Mal. Bl. xxi. pp. 5 & 8, Bogota [the first ? = *iris* (Pfr.), which was described from a worn specimen, the other near *gibbonius* (Lea)].

Bulimus istapensis, sp. n., Crosse & Fischer, J. de Conch. xxi. p. 286, Guatemala.

[*Pelecychilus*] *Bulimus haurwelli* (Crosse, 1872), Crosse, *op. cit.* p. 252, pl. xi. fig. 2. banks of the river Ambiyacu, a tributary of the Upper Amazon.

Bulimus (Pelecychilus) distortus (Brug.); several varieties in Venezuela, Martens, Moll. Venez. pp. 175 & 176.

Porphyrobaphe. A peculiar dimpled sculpture of the first whorls appears to be characteristic of this group, to which *B. povisianus* belongs, but *B. iostomus* (Sow.) must be excluded from it. Mousson, Mal. Bl. xxi. p. 13 [*B. iostomus* is the historical type of this group].

Bulimus (Eumecostylus) scotti, sp. n., Cox, P. Z. S. 1873, p. 152, Solomon Islands.

Bulimus turgidulus, *imbricatus*, and *asopeus* (Gassies, 1871); Gassies, J. de Conch. xxi. pp. 49-51, pl. ii. figs. 4-6, New Caledonia, the first nearly allied to *B. sinistrorsus* (Desh.), the two latter belonging to the division *Placostylus*.

Limicolaria beccarii, sp. n., Morelet, Ann. Mus. Genov. iii. (1872), p. 198, pl. ix. fig. 6, Bogos, Abyssinia [probably *sennaricensis*, Parr., var.].

Limicolaria bourguignati, sp. n., Paladilhe [see below, under *Stenogyra*].

Achatina (Limicolaria) turris (Pfr.), *flammea* (Pfr.), and *heuglini* (Martens); on their varieties, cf. Martens, Mal. Bl. xxi. pp. 38-40.

Achatina schweinfurthi, sp. n., *id. l. c.* p. 40, Central Africa, 5° N. lat., country of the Njam-Njam.

Achatina dohrniana (Pfr. 1870) = *bandeirana* (Morelet, 1866). There is a remarkable amount of variability in the ventricose form, and according to it also in the curvature of the pillar in this genus. Dohrn, Mal. Bl. xxi. pp. 79 & 80. Morelet protests against this identification, J. de Conch. xxi. pp. 327-329.

Bulimulus. This genus is reduced to the species with not very numerous, nearly perpendicular, and wholly contiguous plaits in the jaw, and transverse rows of equal teeth in the radula; the tip of the

median tooth reaches backwards to the hinder edge of the basal plate. The following species are ascertained to belong to it :—*B. guadelupensis* (Brug.) = *exilis* (Gmel.), *sporadicus* (Orb.), *dealbatus* (Say), *pallidior* (Sow.), and *constrictus* (Pfr.); jaw and radula of the last described. Martens, Moll. Venez. pp. 177–179, pl. ii. fig. 17.

Bulimus (Drymceus) rawsoni, sp. n., H. Adams, P. Z. S. 1873, p. 208, Tobago.

Caryodes (Alb.) *dufresnii* (Leach) : jaw smooth, all teeth of the radula 1-pointed, a left cervical lobe to the mantle; a very peculiar accessory gland to the vagina, perhaps homologous with the sac of the dart. Semper, Reis. Arch. Philipp. iii. pp. 102–103, pl. xii. figs. 23–25, pl. xvi. fig. 7.

[*Petræus*] *Bulimus candidus* (Lam., as *Pupa*) from Aden, figured by Paladilhe, Ann. Mus. Genov. iii. (1872), pl. i. fig. 17.

Bulimus abyssinicus, var. *moreletianus*, from the Dahlac Islands, Red Sea; Issel, Ann. Mus. Genov. iv. p. 530.

Buliminus (Napæus) umbrosus, sp. n., Mousson, J. de Conch. xxi. p. 205, pl. viii. fig. 1, Borschom, Trans-Caucasia; allied to *B. benjamiticus* (Bens.).

Buliminus cefalonicus (Mouss.) occurs in Bosnia; *B. bicallosus* (Friv.) does not occur in Bosnia, but in Roumelia; O. v. Möllendorff, Beitr. Faun. Bosn. pp. 41 & 42.

[*Buliminus*] *Bulimus samavensis* (Mouss. MS.), *yemenensis*, *vermiformis*, and *cerealis*, spp. nn., Paladilhe, l. c. pp. 12–16, pl. i. figs. 15, 16, 20–25, Aden [the first and the two last appear very near each other, and to *B. canopictus* (Hutt.)].

[*Buliminus*] *Pupa canopicta* (Hutt.), = *senegalensis* (Morelet), = *Bulimus putillus* (Shuttl.), = *P. sennaariensis* (Pfr.), Morelet, Ann. Mus. Genov. iii. (1872), pp. 200–202. C. Jickeli adds to the synonymy of this species also the North American *Bulimus fallax* (Say), the tubercle in the upper corner of the aperture being present and distinct in some specimens from Florida, and confluent with the outer lip in some specimens from the East Indies and Eastern Africa: S. B. nat. Fr. 1873, p. 5. A. Issel is inclined to keep *B. samavensis* (Mouss.) distinct from this species; it lives not only in Mesopotamia, but also on the islands of the Red Sea, and even in the highlands of Bogos (Abysinia): Ann. Mus. Genov. iv. pp. 527–529.

Chondrus sieversi, sp. n., *scapus*, var. n. *destitutus*, and *phasianus* (Dubois) described; Mousson, J. de Conch. xxi. pp. 206–209, the first and last pl. vii. figs. 6 & 7, Armenia.

Cionella (Ferussacia) pulchella (Hartm.) distinct from *lubrica* (Müll.), has also been found in Armenia: *id. l. c.* p. 217.

Cionella (Azeca) maroccana, sp. n., *id.* Mal. Bl. xxi. p. 154, Atlas, Morocco.

Cecilianella isseli, sp. n., Paladilhe, Ann. Mus. Genov. iii. (1872), p. 22, pl. i. figs. 9 & 10, Aden.

Geostilbia gundlachi (Pfr.) occurs in Haiti, and its description is amended; Crosse, J. de Conch. xxi. p. 355.

Achatinella. Gulick (P. Z. S. 1873, pp. 89–91) proposes a distinct

sub-family, *Achatinellinae*, for this genus (as usually regarded), to include the following genera, created as sub-genera by other authors:—

- A. Arboreal:—*Achatinella* (Swains.), = *Achatinellastrum* (Pfr.), type *vulpina* (Fér.), *Bulimella* (Pfr.), *Apex* (Martens), *Laminella* (Pfr.), *Partulina* (Pfr.), with sub-g. *Perdicella* and *Eburnella* (Pease), *Newcombia* (Pfr.), *Auriculella* (Pfr.), with sub-g. *Frickella* (Pfr.).
- B. Terrestrial:—*Carelia* (H. & A. Adams), *Amastra* (H. & A. Adams), and *Leptachatina* (Gould), with sub-g. *Labiella* (Pfr.).

Achatinella consanguinea, longispira, angusta, rhodorrhaphe, diluta, fuscilineata, concolor, pygmaea, tricolor, lehuiensis, fuscizona, ligata, and bellula, spp. nn., E. A. Smith, P. Z. S. 1873, pp. 73–79, pl. ix. figs. 1–14, Sandwich Islands (locality and habits of most of them more particularly stated).

Bulimella fuscibasis, sp. n., *id. l. c.* p. 77, Mount Kaala, Oahu.

Apex albispira, gulicki, albifasciatus, innotabilis, and neglectus, E. A. Smith, *A. leucorrhaphe, lilaceus, versicolor, flavidus, coniformis, tuberosus, polymorpha, turbiniiformis, tumefactus, leucophaeus, and leucozonus*, Gulick, *op. cit.* pp. 77–83, pl. ix. figs. 16–23, x. figs. 1–8, Sandwich Islands (the locality of each more particularly stated): spp. nn.

Amastra carinata, tenuilabris, elliptica, decorticata, rubida, and rustica, Gulick, *A. conifera, malleata, nucula, nigrilabris, conicispira, peasii, and amicta*, E. A. Smith, *l. c.* pp. 83–86, pl. x. figs. 9–20, Sandwich Islands (the locality of each more particularly stated): spp. nn.

Auriculella tenuis, diaphana, perpusilla, crassula, brunnea, and patula, spp. nn., E. A. Smith, *l. c.* p. 87 & 88, pl. x. figs. 22–27, and *A. uniplicata* (Pease), *id. ibid.* fig. 21, Sandwich Islands (the localities of most more particularly stated).

Rumina decollata (L.), var. *maura*, Morocco, Crosse, J. de Conch. xxi. p. 137.

[*Stenogyra*] *Achatina antinorii*, sp. n., Morelet, Ann. Mus. Genov. iii. (1872), p. 199, pl. ix. fig. 9, Mensas, Abyssinia.

[*Stenogyra*] *Bulimus hannensis* (Rang), again found on the Cape Verd Islands; *id. J. de Conch.* xxi. p. 239.

Achatina (*Stenogyra*) *decollata*, sp. n., *id. l. c.* p. 330, Gaboon.

[*Stenogyra*] *Bulimus lucidissimus* and *Limicolaria bourguignati*, spp. nn., Paladilhe, Ann. Mus. Genov. iii. (1872), pp. 17 & 18, pl. i. figs. 18, 19, & 13, 14 [the last evidently not a *Limicolaria*].

Subulina suaveolata. Note on its agreeable smell; C. Jickeli, Nachr. ges. Nat. v. p. 85.

Rhodea gigantea, sp. n., Mousson, Mal. Bl. xxi. p. 15, Bogota.

Clausilia itala (G. v. Martens), var. *brauni* (Charp.), again found at Weinheim, its only known German locality, where it was detected fifty years ago by Prof. A. Braun. It was probably introduced with vines from Italy. Martens, S. B. nat. Fr. 1873, pp. 127 & 128.

Clausilia (*Herilla*) *dacica* (Friv.). On remarkable variations in the shape of the whole shell, and the number and disposition of the palatal plaits: O. v. Möllendorff, Beitr. Faun. Bosn. p. 48, figs. 14–16. *C. (Delima) decipiens* (Rossm.) var. n. *fuscata*, Bosnia, and *C. (D.) binotata* (Ziegl.), var. n. *hercegovina*, Hercegovina, *C. (D.) satura* (Ziegl.) var.,

and *gastrolepta* (Ziegl.), var. *major*, *ibid.* pp. 50–52; the new varieties, figs. 3–7, & 8–10.

Clausilia (Delima) blavi, sp. n., Möllendorff, *l. c.* p. 52, figs. 11–13, Mostar, South-Western Bosnia.

Clausilia (Clausiliastra) transiens, sp. n., *id.* Mal. Bl. xxi. p. 135, pl. iv. fig. 1, Servia.

Clausilia (Herilla) distinguenda, *accedens*, and *costulifera*, spp. nn. *id.* *l. c.* pp. 136, 137, & 138, pl. iv. figs. 2, 3, & 4, Servia.

Carinigera, sub-g. n. of *Clausilia*: neck provided with a keel, which runs parallel to the lunella. *C. eximia*, sp. n., *id.* *l. c.* p. 140, pl. iv. fig. 5, Eastern Servia.

Clausilia (Andræa) pygmaea, sp. n., *id.* *l. c.* p. 142, pl. iv. fig. 6, Servia; *C. pancici* (Zelebor), *ibid.* fig. 7.

Clausilia (Idyla) serbica, sp. n., *id.* *l. c.* p. 144, pl. iv. fig. 8, Servia.

Clausilia (Alinda) ravanica (Zelebor), and *fallax* (Rossm.), var. n. *serbica*, *id.* *l. c.* pp. 145 & 146, the former pl. iv. fig. 8.

Clausilia bonellii and *C. amiata*, spp. nn., Tuscan Apennines, especially Mt. Amiata; E. v. Martens, Atti Soc. Ital. xiv. fasc. v. p. 18. Four varieties of *C. lineolata* (Held), and *cruciata* (Stud.) [?] from the Apennines described by Targioni-Tozzetti, *op. cit.* xv. pp. 52–47.

Clausilia (Laciniaria) sandbergeri, sp. n., Mousson, J. de Conch. xxi. p. 216, pl. viii. fig. 2, Borschem, Transcaucasia. *C. (L.) index* and (*Serrulina*) *sieversii* (Pfr.), *semilamellata* (Mouss.), and *funiculum* (Mouss.), figured, *ibid.* figs. 3–6; a var. minor of *C. index* described, p. 215.

Clausilia yokohamensis, Crosse, J. de Conch. xxi. pp. 68 & 133, pl. v. fig. 3, Yokohama (42 mill. in length); *C. penangensis* and *flicostata*, Stoliczka, J. A. S. B. xlii. 2, pp. 27–29, pl. iii. figs. 4–8, Penang (genitals, jaw, and radula of the former, *ibid.* figs. 15–17); *C. perarata*, Martens, Mal. Bl. xxi. p. 157, and Moll. Venez. p. 193, Ocana, New Granada, near the borders of Venezuela: spp. nn.

Pupa signata, sp. n., Mousson, J. de Conch. xxi. p. 211, pl. viii. fig. 7, in alluvial deposits of the Araxes, Armenia; allied to *triplicata* (Stud.).

Pupa (Sphyradium) bifilaris, sp. n., *id.* *l. c.* p. 210, pl. viii. fig. 8, Gorktscha, Armenia. *P. (S.) caspia* (Mousson), figured, *ibid.* fig. 9.

Pupa antinorii, sp. n., Paladilhe, Ann. Mus. Genov. iii. (1872), p. 21, pl. i. figs. 11 & 12, Aden.

Pupa longurio (Crosse), Crosse & Bland, J. de Conch. xxi. p. 42, pl. i. fig. 2, Curaçao.

Pupa leucodon (Morelet), Fischer & Crosse, Moll. terr. & fluv. Mex., p. 311, pl. xiv. fig. 2, Guatemala.

Pupa obstructa and *lifouana* (Gassies, 1871); Gassies, J. de Conch. xxi. pp. 52 & 53, pl. ii. figs. 7 & 8, New Caledonia.

Pupa desmazuresi and *lienardiana*, spp. nn. Crosse, *op. cit.* p. 140, Rodriguez Island.

Pupisoma, sub-g. n. of *Pupa*; shell subconic or ovate, of thin corneous texture, covered with a transversely striate cuticle; aperture edentulous, columellar lip somewhat expanded, internally twisted, often with a small tooth. Type, *P. lignicola* (Stoliczka), and *P. (Pupisoma) orcella*, sp. n.

Stoliczka, J. A. S. B. xlii. 2, pp. 32 & 33, pl. iii. fig. 2, Penang, under bark of the cocoa-palm.

Pupa (Scopelophila) palmira, sp. n., *id. l. c.* p. 32, fig. 3, Penang.

Vertigo sinuata, sp. n., Mousson, J. de Conch. xxi. p. 213, pl. viii. fig. 10, banks of the Araxes, Armenia.

[*Strophia*] *Pupa uva* (L.). Left cervical lobe of the mantle divided into two; jaw smooth, all teeth of the radula with several points; Semper, *l. c.* p. 128.

Eucalodium. General characters discussed, and the following species, from the southern provinces of Mexico or Guatemala, fully described and figured:—*E. decollatum* (Nyst), *insigne* (Crosse & Fischer), *ghiesbreghtii* (Pfr.), *mexicanum* (Cuming, Pfr.), *grande* and *splendidum* (Pfr.), *neglectum*, *blandianum*, *moussonianum*, and *walpolianum* (Crosse & Fischer), *speciosum* (Dunker), *boucardi* (Sallé), *edwardsianum* and *dehayesianum* (Crosse & Fischer): Fischer & Crosse, Moll. terr. & fluv. Mex. pp. 359–384, pls. xiv. figs. 3–12, xv. figs. 1–10, eggs, figs. 1c & 8, jaw, radula, and anatomical details, pl. xvi. figs. 11–21.

Berendtia taylori (Pfr.) shell figured; *id. l. c.* pl. xiv. fig. 1; jaw, radula, and nervous ganglions, pl. xvi. figs. 1–4.

Holospira pfeifferi (Menke), *remondi* (Gabb), *teres* (Menke), *goniostoma*, *pilocerei*, and *tryoni* (Pfr.), *gealii* (H. Ad.), *cretacea*, and *microstoma* (Pfr.), described; *id. l. c.* pp. 322–338; jaw of *H. tryoni*, and jaw and radula of *H. pfeifferi* figured, pl. xvi. figs. 5–10.

GONIOGNATHA.

Punctum. Bland & Binney, from Schacko's description of the jaw and radula of the European *Helix pygmaea*, Drap. (Zool. Rec. ix. p. 207), come to the conclusion that the North American *P. minutissimum* (Lea) is not even specifically distinct from it. Ann. Lyc. N. York x. pp. 306–308.

[*Amphibulima*] *Succinia patula* (Brug.), is now very rare, and only found in the dead state at Guadeloupe; Schramm, J. de Conch. xxi. p. 128. It probably is in process of extinction; Crosse, *ibid.* T. Bland remarks that this species has been noticed living within the last years by trustworthy observers in Dominica and St. Kitts; *op. cit.* pp. 342–346.

Rhodonyx, sub-g. n. of *Succinea*, for *S. rubescens* (Fér.) from Martinique, jaw with about thirty divergent plaits, without quadrate appendage; radula with tricuspidate teeth, resembling those of *Gaotis* and *Orthalicus*. Fischer, J. de Conch. xxi. pp. 324 & 325. [From Fischer's description, the jaw and radula appear to agree tolerably well with those of *Amphibulima patula* (Brug.), described by Bland & Binney, Ann. Lyc. N. York x. (1872) p. 225.]

Orthalicus ferussaci (Martens), = *undatus* (auctt. pt.), *O. maracaibensis* (Pfr.) and *O. varius*, sp. n., = *phlogerus*, varr. β & γ , Shuttl., all from Venezuela, *O. isabellinus*, sp. n., from Peru; shells described and figured by Martens, Moll. Venez. pp. 188–191, pl. i. figs. 6, 7, 8, & 4. Jaw of *O. obductus* (Shuttl.) composed of 15 plates, rows of the teeth in the radula angular, the angle directed backwards, *ibid.* pl. ii. fig. 15.

Otostomus (Beck, H. & A. Ad.). To this genus are referred many species formerly ranged among *Bulimulus*, with the jaw bearing numerous oblique plaits, only partially coherent, and radula showing undulating rows of teeth; the tip of the median tooth does not reach backwards so far as the hinder edge of the basal plate. This structure is observed in the following Venezuelan species:—*O. trigonostomus* (Jonas), = *Bulimus knorri* (Pfr.), *O. virginalis* (Pfr.), and *flavidus* (Menke), and *O. convexus* (Pfr.), from New Granada. Martens, Moll. Venez. pp. 179–185, pl. ii. figs. 18–21. The shells of the three first species are figured, that of the first in several varieties of colour, pl. i. figs. 5, 9–13, & 14. Shell of *O. depictus* (Reeve), and var. n. *ictericus*, also from Venezuela; *l. c.* p. 183, pl. i. figs. 15–19.

[*Otostomus*] *Bulimus violaceus*, *eversus*, *elegantissimus* and *trivittatus*, spp. nn., Mousson, Mal. Bl. xxi. pp. 9–11, Bogota [the three last respectively very near *convexus*, *linostomus* and *subinterruptus*].

[*Otostomus*] *Bulimulus multifasciatus* (Lam.) and *alternans* (Beck); jaw and radula described, Binney & Bland, Ann. Lyc. N. York, x. p. 305.

Cylindrella raveni (Bland), Curaçao, and *C. tatii* (Bland), S. Lucia. Crosse & Bland, J. de Conch. xxi. pp. 40 & 41, pl. i. figs. 4 & 3.

Cylindrella æquatoria, sp. n., Morelet, *op. cit.* p. 124, pl. v. fig. 1, Quito, Ecuador.

Cælocentrum (Crosse & Fisch., 1872) re-characterized, and the following species, described as *Cylindrellæ* by former authors, attributed to it:—*a*, costulato-striate:—*tomacella* (Morelet), *fistulare* (Morelet), *turris* (Pfr.), *clava* (Pfr.), *arctispira* (Pfr.), *irregulare* (Gabb); *b*, subclathrate:—*crossianum* (Pfr.) and *filicosta* (Shuttl.), all from Mexico and Guatemala, fully described and (all except *irregulare*) figured by Fischer & Crosse, Moll. terr. & fluv. Mex. pp. 339–352, pl. xv. figs. 11–17. Jaw and radula not yet known.

ELASMOGNATHA.

C. SEMPER disapproves of this division, stating that an equivalent to the quadrate plate exists in other *Helicidæ*, though it is not sufficiently solid to resist the action of caustic potash; the male and female openings are not more separated than in the rest of the *Pulmonata*; but, as the common orifice is somewhat wider, they are seen more distinctly. Reis. Philipp. iii. pp. 105–107.

Janella (Gray). Vent on the right side of the body, beneath the respiratory orifice, not, as Wright supposed, in front of the mantle: *id. l. c.* p. 108.

Succinea limicola and *rugulosa*, Morelet, Ann. Mus. Genov. iii. (1872), pp. 191 & 192, Bogos; *S. nevillii*, Crosse, J. de Conch. xxi. p. 141, Rodriguez Island; *S. monticula*, Semper, *l. c.* p. 110, Philippines; *S. burmeisteri*, *rosariensis*, and *porrecta*, Döring, Mal. Bl. xxi. pp. 59–67, pl. ii. figs. 15–19, 20–23, 24 & 25, interior of Argentine States: spp. nn.

Succinea labiosa (Philippi, 1860), var. *cornea*, Argentine States, Döring, *l. c.*

[H.] *Omalonyx unguis* (Fér.) and *patera*, sp. n., Döring, l. c. pp. 52-59, pl. i. figs. 1-9, 10-14, from Rosario, banks of the Parana; living animal and anatomy of the former given [the first apparently = *Succinea conveca*, Martens, 1868; the latter, *unguis*, Fér.].

Succinea [*Homalonyx*] *unguis*, Fér., from Venezuela, described; Martens, Moll. Venez. pp. 193 & 194. Some anatomical notes on *Homalonyx bruneti* (Mouss.) by C. Semper, l. c. p. 110.

LIMNOPHILA.

Melampus luteus (Q. & G.) var. from Vai-tupu, Ellice Islands; Mousson, J. de Conch. xxi. p. 106.

Melampus ehrenbergianus, *erythreus*, and *granum*, spp. nn., Morelet, Ann. Mus. Genov. iii. (1872) pp. 203-205, pl. ix. figs. 13, 12, & 14, Mas-sowah, Abyssinia [the first = *siamensis* (Martens), the second = *mas-sauensis* (Ehrenb., Pfr.)].

Alexia setifer, sp. n., Cooper, P. Cal. Ac. iv. (1872), p. 172, San Francisco.

Francesia, g. n., founded on *Carychium scalare* (Bens.) and *Achatina balanus* (Bens.); supposed to be fluviatile and allied to the *Limnæida*, but not sufficiently characterized, by Paladilhe, Ann. Mus. Genov. iii. (1872), pp. 1-11, pl. i. figs. 1-4. A. Issel, who has found the dead shell near Aden, thinks that it may be terrestrial; *op. cit.* iv. pp. 521-527.

Limnæa stagnalis, var. *bodamica* (Clessin) from the lake of Constance, [= *lacustris* (Stud.)] and *L. auricularia*, var. *tumida* (Held.), *angulata* (Hartm.), and *hartmanni* (Charp.), all from the lake of Constance, described by Miller, Schalth. Bodens. pp. 4 & 5, pl. i. figs. 2 a, b, & 3 a-f. *L. stagnalis*, var. nn. *alata*, *torsa*, and *subulata*, *L. glabra*, var. *labiata*, and *L. lagotis*, varr. *margaritacea* and *auricula*; Westerlund, Faun. Moll. terr. Suec. pp. 312, 314, 322, 334 & 335, from Sweden. *L. stagnalis*, var. n. *gorktschana*, Mousson, J. de Conch. xxi. p. 219, Lakes of Armenia.

Limnæa peregra (Müll.). Von Maltzan unites it with *auricularia* (L.); Arch. Ver. Mecklenb. xxvi. p. 83. Wiechmann points out the differences; *op. cit.* xxvii. pp. 138 & 139.

S. Clessin observes that *Limnæa* (*peregra*) attacks the shell of its fellows only if vegetable food is wanting. Nachr. mal. Ges. v. p. 28.

Limnæa attenuata (Say) = *subulata* (Dkr.), and *L. cubensis* (Pfr.), from Mexico; Strebel, Abh. Ver. Hamb. vi. pp. 57-59, pls. v. fig. 32, iv. fig. 33.

Limnæa (*Gulnaria*) *confinis*, sp. n., Mousson, J. de Conch. xxi. p. 219, Lakes of Armenia.

Physa beccarii, sp. n., Paladilhe, Ann. Mus. Genov. iii. (1872), p. 23, pl. i. figs. 7 & 8, Aden [probably = *Isidora forskali* (Ehrenb.) juv.].

Physa varicosa (Gassies, 1871), J. de Conch. xxi. p. 339, pl. xiv. fig. 9, New Caledonia.

Physa venezuelensis (Martens, 1859) figured; Martens, Moll. Venez. p. 199, pl. ii. fig. 11.

Physa. A number of Mexican species and varieties, including *P. mexicanu* (Phil.), ? *nitens* (Phil.), ? *heterostropha* (Say), and ? *spiculata*

(Morelet), and others not named, described and figured by H. Strebel, *Abh. Ver. Hamb.* vi. pp. 47-57, pls. vi. & vii. figs. 24-31.

Planorbis clessini, sp. n., Westerlund, *Faun. moll. Suec.* ii. p. 163, Öland.

Planorbis glaber (Jeffr.) = *albus* (Müll.) var.; v. Maltzan, *Arch. Ver. Mecklenb.* xxvi p. 85. Again distinguished by Wiechmann, *op. cit.* xxvii. p. 140.

Planorbis rueppelli (Dunker) province Samhar, Abyssinia, is distinct from *salinarum* (Morelet) from Angola. Morelet, *Ann. Mus. Genov.* iii. (1872) p. 207.

Planorbis sieversi, Mousson, *J. de Conch.* xxi. p. 221, pl. vii. fig. 9, Transcaucasia; *P. rodriguezensis*, Crosse, *J. de Conch.* xxi. p. 144, Rodriguez Island: spp. nn.

Planorbis guadelupensis (Sow.) = *xerampelinus* (Drouet), *lugubris* (Wagn.), *stramineus* (Dkr.), *cultratus* (Orb.), and *pronus*, sp. n., from Venezuela, the last subfossil, described and figured; Martens, *Moll. Venez.* pp. 195-199, pl. ii. figs. 5-10.

Planorbis tricolcis (Say) ? = *corpulentus* (Say), *tumidus* (Pfr.), *tenuis* (Phil.), *haldemanni* (Dkr. ?) = *liebmanni* (Dkr.), *P. (Planorbula) berendti* (Tryon), and a new species without name, all from Mexico, fully described and figured by H. Strebel, *Abh. Ver. Hamb.* vi. pp. 39-46, pl. v. figs. 19-24.

Ancylus fluviatilis (Müll.); observations on its development from the egg, continued on alternate days, are given by W. Fack, *Schr. nat. Ver. Schlesw. Holst.* i. pp. 209 & 210.

Ancylus sandbergeri, sp. n., from a streamlet in the Cave of Falkenstein, Württemberg, fully described and compared with allied species by R. Wiedersheim, *Verh. Ges. Würzb.* pp. 7-12, pl. i. figs. 1-6. Eyes well developed.

Ancylus sallai (Bourg.) ?, Strebel, *Abh. Ver. Hamb.* vi. p. 63, pl. iv. fig. 35, Mexico.

THALASSOPHILA.

Siphonaria brannani, Stearns, *P. Cal. Ac.* iv. (1872) p. 249, pl. i. figs. 4 & 4a, (*Conch. Mem.* x. p. 3), California; *S. naufragum*, id. *P. Bost. Soc.* xv. (1872) p. 23 (*Conch. Mem.* xi. p. 4), East Coast of Florida, on an old wreck: spp. nn.

PULMONATA OPERCULATA.

CYCLOPHORIDÆ (CYCLOTACEA).

Buckleya bifasciata, sp. n., Mousson, *Mal. Bl.* xxi. p. 17, Bogota.

Cyclotus sieversi (Pfr.) figured; Mousson, *J. de Conch.* xxi. pl. vii. fig. 8. Lenkoran, Caspian Sea.

Cyclotus "*dysoni* (Pfr.) var. ? *berendti* (Pfr.)," Strebel, *Abh. Ver. Hamb.* vi. p. 1, pl. i. fig. 3, Mexico [apparently = *berendti* (Pfr.)].

Cyclophorus leonensis and *lilliputianus*, spp. nn., Morelet, *J. de Conch.* xxi. pp. 331 & 332, Sierra Leone and Gaboon [as the operculum is unknown, their reference to *Cyclophorus* is rather uncertain].

Cyclophorus mexicanus (Mke.) and *sallæanus* (Martens) comparatively described by H. Strebel, *l. c.* pp. 8 & 9, pls. i. & i.a, figs. 1 & 2, 1a & 2a, Mexico.

Leptopoma hargravesi, sp. n., Cox, P. Z. S. 1873, p. 151, Solomon Islands.

PUPINEA.

Pupina grandis (Forbes), var. *minor*, id. *l. c.* p. 567, Louisiade Islands.

DIPLOMMATINACEA.

Diplommatina perroquini (Crosse), J. de Conch. xxi. p. 44, pl. i. fig. 6, New Caledonia.

CYCLOSTOMATIDÆ.

Euptychia, g. n.; shell like that of *Cyclophorus*, with repeated annular lamellæ near the aperture; operculum corneo-cartilaginous, sub-oval, of five whorls. *E. metableta*, sp. n., Crosse & Fischer, J. de Conch. xxi. p. 157, Madagascar [fully described and figured, *op. cit.* xxii. (1874)].

Cyclostoma vexillum, (*Tropidophora*) *suffusum* and *perspectivum*, Sowerby, P. Z. S. 1873, p. 452, *balteatum. filistriatum*, and *consanguineum*, id. *l. c.* p. 718 (published in 1874), pl. lxxix. figs. 1-3, all from Madagascar; *C. duponti*, Robillard, Trans. R. Soc. Maur. v. (1871), Mauritius: spp. nn.

Cyclostoma desmazuresi, sp. n., and *C. hamastomum*, var. n. *rodriguezense*, Crosse, J. de Conch. xxi. pp. 141, Rodriguez Island.

Cyclostoma (Leonia) scrobiculatum, sp. n., Mousson, Mal. Bl. xxi. p. 155, Mogador.

Choanopoma newcombii, *gabbi*, and *moreletianum*, spp. nn., Crosse, J. de Conch. xxi. pp. 352-354, Dominican portion of Hayti.

Cistula raveni (Crosse); Crosse & Bland, *op. cit.* p. 43, pl. i. fig. 5, Curaçao.

Cistula grateloupi (Pfr.); Strebel, Abh. Ver. Hamb. vi. p. 10, pl. i. fig. 1, Yucatan.

Cyclostoma (Chondropoma) aspratile, sp. n., Morelet, J. de Conch. xxi. p. 125, pl. v. fig. 2, Quito, Ecuador.

Chondropoma plicatulum (Pfr.); Martens, Moll. Venez. p. 160, pl. i. fig. 3, Puerto Cabello.

Pomatias martensianus, sp. n., O. v. Möllendorff, Beitr. Faun. Bosn. p. 56, figs. 17 & 18, South-western Bosnia, on limestone rocks: its differences from *P. gracilis* (Küster) and *croaticus* (Zeilebor) pointed out.

Omphalotropis albicarinata, Mousson, J. de Conch. xxi. p. 115, pl. vii. fig. 3, Norfolk Island; *O. taniata*, *littorinula*, and *hameliana*, Crosse, J. de Conch. xxi. pp. 142 & 143, Rodriguez Island: spp. nn.

TRUNCATELLIDÆ.

Truncatella debilis, Mousson, Mal. Bl. xxi. p. 156, mouth of river Rabat, Morocco: *T. stimpsoni*, Stearns, P. Cal. Ac. iv. (1872) p. 248, pl. i. fig. 5 (Conch. Mem. x. p. 3), S. Diego, California: spp. nn.

ASSIMINEÆ.

Assiminia [?] *recta*, sp. n., Mousson, Mal. Bl. xxi. p. 156, mouth of the Rabat, Morocco.

HELICINIDÆ.

Helicina norfolkensis (Pfr.) distinct from *plicatilis* (Mouss.), from the Samoa Islands, and *H. musiva* (Gould), var. n. *rotundata*, from the Ellice Islands; Mousson, J. de Conch. xxi. pp. 114 & 107.

Helicina schrammi (Crosse, 1872); Crosse, *op. cit.* p. 251, pl. xi. fig. 3, Guadeloupe.

Helicina gabbi, sp. n., *id. l. c.* p. 354, Dominican portion of Hayti.

Helicina turbinata (Wiegmann) = *zephyrina* (Duclos) ? = *berendti* (Pfr.), *H. flavida* (Menke), *strebelsi* (Pfr.), *rarisulcata* (Pfr.), *cinctella* (Shuttl.) ? = *botteriana* (Pfr.), and a new species without name fully described; H. Strebel, Abh. Ver. Hamb. vi. pp. 12-23, pls. i.a & ii. figs. 6 & 8-13, all from Mexico.

Helicina concentrica (Pfr.) var. *ernesti* and *columbiana* (Phil.) var. n. *appuni*; Martens, Moll. Venez. pp. 161 & 162, pl. i. figs. 2 & 1, Venezuela.

Trochatella mouhoti (Pfr.) belongs really to *Helicina*; Dohrn, Mal. Bl. xxi. p. 109.

Schasicchila alata (Menke); Strebel, Abh. Ver. Hamb. vi. p. 23, pl. iv. fig. 7, Mirador (State Vera Cruz), Mexico.

PROSERPINIDÆ.

Proserpinella berendti (Bland); *id. l. c.* p. 11, fig. 5, Mirador.

SOLENOCONCHÆ.

Dentalium pacificum, sp. n., Hutton, Cat. p. 5, New Zealand.

Dentalium occidentale (Stimps.), distinct from *striolatum* (Stimps.), and allied to *abyssorum* (Sars), dredged in the Gulf of St. Lawrence; Whiteaves, Ann. N. H. (4) xi. p. 156: *cf.* Verrill, *op. cit.* p. 212. The two latter species still regarded as identical; Jeffreys, *op. cit.* p. 376.

LAMELLIBRANCHIA.

Mya is apparently an exception to the rule that inequivalve shells lie horizontally or obliquely on the ground, whilst equivalves are perpendicularly sunk in it; J. E. Gray, Ann. N. H. (4) xii. pp. 76 & 77. *Pandora* has been observed lying in furrows of sand at very low water, indifferently on either valve, without byssus or other attachment; P. B. Mason, *op. cit.* p. 184. These were probably washed up by the tide, and not in their natural state; J. E. Gray, *op. cit.* p. 264.

PHOLADIDÆ.

Teredo antarctica, sp. n., Hutton, Cat. p. 59, Auckland.

Pholas. Panceri's observations on the luminous organs of *Pholas*

[Zool. Rec. ix. p. 165] are published fully, Atti Acc. Nap. v. (1872) 60 pp. 3 pls.

Pholas pacifica (Stearns, 1871), re-described by the author, P. Cal. Ac. v. p. 81, pl. i. figs. 6 & 6a-c (Conch. Mem. xii. p. 5), San Francisco Bay.

MYIDÆ.

Mya arenaria (L.); anatomical description by Lehmann, Schn. Musch. Pomm. pp. 283-287, pl. xx. fig. 104.

Corbula pygmaea, sp. n., H. Adams, P. Z. S. 1873, p. 208, pl. xxiii. fig. 13, Persian Gulf.

Neera trailli, sp. n., Hutton, Cat. p. 62, Stewart's Island.

ANATINIDÆ.

Lyonsia vitrea, sp. n., *id. l. c.* p. 61, New Zealand.

TELLINIDÆ.

Psammbia rossiteri. sp. n., Crosse, J. de Conch. xxi. pp. 67 & 129, pl. v. fig. 6, Lifou, Loyalty Islands, and Noumea, New Caledonia.

Tellina. The Recorder has given some critical and supplementary notes on Römer's monograph [Zool. Rec. ix. p. 215], introducing the terms *Macrosynapta*, *Mesosynapta*, and *Brachysynapta*, for various groups, according to the more or less extended contact of the pallial sinus and pallial line: discussing the synonymy and priority of several names, and giving the dimensions of some large specimens in the Zoological Museum of Berlin. A list is added of species found by himself and others in the Malayan Archipelago. Mal. Bl. xxi. pp. 166-177.

Tellina baltica (L.); notes on the animal, which has two pairs of gills. Lehmann, Schn. Musch. Pomm. pp. 268 & 269, pl. xx. fig. 95.

Tellina lintea, sp. n., Hutton, Cat. p. 67, Stewart's Island.

Tellidora pelliana, sp. n., H. Adams, P. Z. S. 1873, p. 208, pl. xxiii. fig. 14, Persian Gulf.

Thyella lamellosa and *hargravesi*, spp. nn., *id. ibid.* fig. 15, Mauritius and New Hebrides.

MACTRIDÆ.

Mactra rostrata (Spglr.), = *cumingiana* (Petit); Mörch, Nachr. mal. Ges. v. p. 70.

Mulinia notata, sp. n., Hutton, Cat. p. 64, Stewart's Island.

Darina pusilla, sp. n., *id. ibid.* [= *Mactra scalpellum*, Rve.].

Ræta perspicua, sp. n., *id. l. c.* p. 65, New Zealand.

VENERIDÆ.

Dosinia troscheli, sp. n., Lischke, Mal. Bl. xxi. p. 24, Japan.

Meroe rætersiana, sp. n., Crosse, J. de Conch. xxi. p. 284, locality unknown.

Chione erebra and *gibbosa*, spp. nn., Hutton, Cat. pp. 71 & 72, New Zealand, the latter more common in fossil state.

Tottenia gemma (Say) is very distinct from the young of *Venus mercenaria* (L.), and viviparous. Verrill. Ann. N. H. (4) xi. p. 210.

CYRENIDÆ.

Sphærium westerlundii, sp. n., Clessin, in Westerlund's Faun. Moll. Suec. ii. 508, Sweden; *firmum*, sp. n., *id. l. c.* p. 510, Jutland and Sleswig; *mammillanum*, sp. n., Westerlund, *op. cit.* p. 510, Sweden and Denmark. *Cyclas lacustris*, Drap., *nec* Müll., is re-named *draparnaldi* [having already the names *C. ovalis*, Férussac (1837 ?), *C. consobrina*, Férussac (1818), and *Sphærium deshayesianum*, Bourguignat (1853)]; Clessin, *op. cit.* p. 512.

Cyclas solida (Normand); observations on the living animal and its young, by Lehmann, Schn. Musch. Pomm. pp. 273-276.

Cyclas (Limosina) bahiensis (Leach), from Venezuela: shell described; the siphons are united at the base, then divergent. Martens, Moll. Venez. p. 212.

Pisidium pusillum (Turton, Jeffreys, *nec* Gmelin, Jenyns) is re-named *globulare*; *P. fontinale*, var. *pallidum* (Jeffr.), is treated as a good species, under that name; *P. casertanum* (Baudon, *nec* Poli), = *fontinale* (C. Pfr., *nec* Draparnaud), is re-named *fossarinum*, and *P. parvulum*, sp. n.; Clessin, in Westerlund's Faun. Moll. Suec. ii. pp. 532, 539, 544, & 553; all from Sweden. Many critical remarks on the synonymy of the European species are also given.

Pisidium abyssorum (Stimps.), new name for the species found in Lake Michigan, in the stomach of *Argyrosomus*. Tr. Wiscons. Ac. 1870-72, p. 98; abstract, Ann. N. H. (4) xi. p. 320 [*cf.* Zool. Rec. viii. p. 169].

CARDIIDÆ.

Cardium edule (L.); animal described by Lehmann, Schn. Musch. Pomm. p. 282, pl. xx. fig. 105.

Cardium arcuatulum, sp. n., Sowerby, P. Z. S. 1873, p. 721, pl. ix. fig. 10, locality unknown.

ISOCARDIIDÆ (GLOSSIDÆ).

Isocardia cor (L.); some notes on the living animal by Verkrüzen, Nachr. mal. Ges. v. pp. 22-24.

KELLIIDÆ.

Pythina stowii, sp. n., Hutton, Cat. p. 76, Cook's Strait.

ASTARTIDÆ.

Gouldia [Crassatella] isabella, sp. n., *id. ibid.*, New Zealand.

UNIONIDÆ.

J. LEA has republished (1872), from P. Ac. Philad. 1854, his rectifications of T. A. Conrad's Synopsis of the family of *Naiades* of North

America, with the sole addition of two explanatory notes, and a preface complaining that these rectifications have not been inserted in Binney's Bibliography of North American Conchology. Their chief object is the assertion of priority.

Anodonta cygnea (L.) and *piscinalis* (Nilss.), live together on the same spot in Mecklenburg, where the river Peene flows from a small lake, and are therefore to be regarded as distinct species. H. v. Maltzan, Arch. Ver. Mecklenb. xxvi. pp. 91 & 92.

Anodonta mutabilis, var. *oviformis*, in different forms from the Lake of Constance, figured by Miller, Schalthiere des Bodensees, pl. ii. fig. 15 a-h, p. 11.

Unio bosnensis, Möllendorff, Beitr. Faun. Bosn. p. 62, figs. 21 & 22, River Bosna, Bosnia; *U. ksibianus*, Mousson, Mal. Bl. xxi. p. 156, River Ksib, Mogador: spp. nn.

Unio sennariensis (Küst.), var. *schweinfurthi*, Martens, Mal. Bl. xxi. p. 43, River Tondi, Central Africa.

Unio (Prisodon) syrmatophorus (Gronov.), from Venezuela: on its variability, *id.* Moll. Venez. p. 211.

MYTILIDÆ.

Mytilus edulis (L.): a short account of its cultivation near Kiel is given by H. Möbius, Ber. Exp. Pomm. p. 126; and an anatomical description by Lehmann, Schn. Musch. Pomm. pp. 306-308, pl. xxii. fig. 112.

DREISSENIDÆ.

Dreissena polymorpha (Pall.) is not injurious to cray-fish; Wiechmann, Arch. Ver. Mecklenb. xxvi. pp. 102-104. An anatomical description of it by Lehmann, *l. c.* pp. 308-312, pl. xxii. fig. 113.

ARCIDÆ.

Anomalocardia crassicostata, sp. n., H. Adams, P. Z. S. 1873, p. 209, pl. xxiii. fig. 17, Persian Gulf.

Pectunculus gealii, sp. n., Angas, *op. cit.* p. 183, pl. xx. fig. 5, New South Wales.

Limopsis loringi, sp. n., *id. ibid.* fig. 6, Queensland.

NUCULIDÆ.

Leda hanleyi, sp. n., *id. l. c.* p. 184, pl. xx. fig. 7, Australian Seas.

PECTINIDÆ.

Pecten formosus, *id. ibid.*, fig. 8, Fiji Islands?; *P. radiatus*, Hutton, Cat. p. 82, Stewart's Island: spp. nn.

Pecten fuscus (Linsley) = *tenuicostatus* (Mighels), juv., and not *irradiatus*, juv.; Verrill, Ann. N. H. (4) xi. p. 211.

Pecten (Dentipecten) vellicatus, sp. n., Hutton, *l. c.* New Zealand [= *convexus*, Q. & G. = *roseipunctatus*, Rve.].

SPONDYLIDÆ.

Spondylus wrightianus (Crosse, 1872); Crosse, J. de Conch. xxi. p. 253, pl. ix. fig. 1, Nicol Bay, Australia.

OSTREIDÆ.

On the first stage of the oyster; S. Saunders, Q. J. Micr. Sci. xiii. p. 439. On oyster banks between 21 and 23 fathoms, at the islands of Eastern Friesland; A. Metzger, Ber. Exp. Pomm. p. 171.

Ostrea virginica, Gmel., transplanted to Californian waters, assumes some of the characteristics of the indigenous species, as *O. edulis* does those of *O. cochlear* when removed to the Mediterranean. W. H. Dall, P. Cal. Ac. iv. (1872) p. 182.

Ostrea lutaria, sp. n., Hutton, Cat. p. 84, New Zealand.

ANOMIDÆ.

Anomia stowii, sp. n., *id. l. c.* p. 83, New Zealand.

MOLLUSCOIDA.

BY

PROF. EDUARD VON MARTENS, M.D., C.M.Z.S.

THE GENERAL SUBJECT.

HUTTON, T. W. Catalogue of the Marine Mollusca of New Zealand, with diagnoses of the species. Wellington: 1873, 8vo. *Brachiopoda*, *Polyzoa*, and *Tunicata*, pp. 85-106.

MÖBIUS, K. Die wirbellosen Thiere der Ostsee. In the 'Bericht über die Expedition zur physikalisch-chemischen und biologischen Untersuchung der Ostsee im Sommer 1871, auf S. M. Aviso-dampfer Pommerania.' Kiel: 1873, fol. pp. 97-154.

CONTRIBUTIONS TO FAUNAS.

Baltic. 11 species of *Bryozoa* and 5 of *Tunicata* observed in the Baltic are enumerated, with exact indications of localities and depths; Möbius, *l. c.* pp. 113-115, 135-137.

North Sea. *Phallusia intestinalis* and some *Bryozoa* observed at the Islands of Eastern Friesland, by A. Metzger, *op. cit.* p. 172.

New Zealand. Hutton, *l. c.*, characterizes 9 species of Brachiopods, 91 of *Polyzoa* (some new), and 11 of *Tunicata*.

BRACHIOPODA.

TEREBRATULIDÆ.

Living specimens of *Terebratula vitrea* have been observed by E. Ray Lankester: the arms are individually moveable, though rarely moved; the intestine is really blind, the organ regarded by Hancock as a heart does not show any contraction, &c. Ann. N. H. (4) xi. pp. 92 & 93.

Terebratulina: on the oviducts and embryology, *cf.* E. Morse, Am. J. Sci. (3) iv. (1872), pp. 262-264, pl. viii.

Terebratula cernica, sp. n., Crosse, J. de Conch. xxi. p. 285, Mauritius.

Terebratella occidentalis, id. *op. cit.* iv. (1872), p. 182, pl. i. fig. 7, California (Stearns, Conch. Memoranda x.), sp. n.

Magasella aleutica, Dall (P. Cal. Ac. iv. 1872, p. 302), figured, *l. c.* pl. i. fig. 6 (Stearns, *l. c.*).

LINGULIDÆ.

W. KING gives an accurate account of the internal structure of *Lingula anatina*, pointing out the peculiar arrangement of the muscles, which is very different from that found in the *Terebratulidæ* (the setal band being continuous round the pallial margin in the dorsal valve, and interrupted in the ventral valve only in the region of the pedicle); the comparatively small size of the brachial chamber or brachiocele; the large extent of the splanchnocoele, which lies within the pallial margins, and contains the genital organs; and the presence of an anal opening. In all these respects *Lingula* agrees with *Discina*; hence the author proposes to divide all *Palliobranchiata* (*Brachiopoda*) into two sections:—1, *Clistenterata*, without anal opening, containing the majority; 2, *Tretenterata*, with anal opening, containing only the *Lingulidæ* and *Discinidæ*. Ann. N. H. (4) xii. pp. 1–17, pl. ii. These divisions correspond with the *Arthropomata* and *Lyopomata* of Owen (1858), the *Articulata* and *Inarticulata* of Huxley (1860), and the *Apygia* or *Testicardines* and *Pleuropygia* or *Acardines* of Brown (1862): J. E. Gray, *op. cit.* pp. 201 & 202.

TUNICATA.

W. MÜLLER discusses the morphology of the ciliated canal in the branchial sac: Arch. mikr. Anat. ix. p. 327.

ASCIDIIDÆ.

K. E. v. BÄR opposes the view of a homology of the Ascidian larva with the Vertebrates, and insists on its homology with the *Mollusca*; according to which opinion the part of the body containing the principal ganglion and pretended "chorda dorsalis" must be regarded as ventral—a situation consequently opposite to that found in the Vertebrates. Mém. Pétersb. (7) xix. No. 8, 35 pp., pl. [S. REICHERT and H. NITSCHKE have published remarks on this paper, the former agreeing with the author's final result, but criticizing some particulars, and endeavouring to support Dönitz's views (see Zool. Rec. vii. p. 184); S. B. Nat. Fr. Feb. 1874, pp. 14–16. NITSCHKE raises the objection that the chief point of von Bär's argument, viz., the morphological homology between the *Tunicata* and the true *Mollusca* is simply controversial, being as yet not supported by knowledge of development: Literarisches Centralblatt für Deutschland, No. 21, 23rd May, 1874, pp. 690 & 691].

H. A. ARSENIIEFF has examined the development of the mantle in *Ascidia intestinalis* and *mammillaris*; he comes to results similar to those of Hertwig (see Zool. Rec. ix. p. 178), and maintains that the mantle takes its origin from a homogeneous layer secreted by the superficial epithelium, but that afterwards cells from the internal cavity of the body find their way into the mantle, where they become star-shaped. Izv. Obsh. Jest. Mosk. ix. (1872) pp. 86–88; abstract in Jen. Z. Nat. iii.

Cynthia pyriformis; the larva described by Morse, P. Bost. Soc. xiv. (1871), p. 351, pl. i.

Molgula nana, sp. n., Möbius, l. c. p. 136, eastern part of the Baltic, near Colberg, at a depth of 10 fathoms.

POLYCLINIDÆ.

Amauræcium. Development observed by Kowalewsky; the larva changes itself into a simple Ascidian, the body of which consists of a thorax, abdomen, and post-abdomen, from the last of which an offshoot (*stolo*) springs, which divides itself by strictures into a number of segments, each becoming a fresh Ascidian. Z. wiss. Zool. xxii. pp. 283-304.

PYROSOMIDÆ.

P. PANCERI has published an interesting treatise on the luminous organs of *Pyrosoma*; there are two in each zooid, which prove to be the same as the organs formerly considered by Lesueur and Savigny as ovaries, and mentioned by Huxley and others as cell-masses of unknown function; they are made up entirely of spherical cells of 0.2 mm. diameter on an average, and are bathed directly by the blood of the lacuna; the light is clear azure in *P. giganteum*, and changes from red through orange and greenish to ultramarine blue in *P. atlanticum*; it is excited by a sudden shock, rubbing, or touch, but more energetically by fresh-water, which causes the light to last for several hours, until the death of the animal, after which the light cannot be excited. The photogenic substance is probably fatty matter, and is without doubt the same as in *Pholas*, *Chatopterus*, *Beroë*, *Noctiluca*, and *Thalassicolla*. The studies made for the purpose of explaining the transmission of the excitement, have led the author to the discovery of a social muscular system, by which all the zooids are united, and which contains two kinds of single muscles, differing from each other in direction and points of attachment. Atti Acc. Nap. v. (1872) No. xiii. pp. 1-51, pl. iii.; an abstract in Q. J. Micr. Sci. xiii. pp. 45-51, woodcut.

A few notes concerning the first development of the egg is given by E. Ray Lankester, Ann. N. H. (4) xi. pp. 94 & 95.

Pavesi's paper on the circulation of the blood (see Zool. Rec. ix. p. 182) was originally published in Rendic. Acc. Nap. Febr. 1872.

APPENDICULARIIDÆ.

The formation of the heart by two distinct cells, united by filamentous processes, has been observed in a young specimen of *Appendicularia furcata*; E. Ray Lankester, Ann. N. H. (4) xi. pp. 87 & 88, woodcut.

POLYZOA.

T. HINCKS corroborates his view that the so-called "dark bodies" (see Zool. Rec. viii. p. 178) are germ-capsules producing a new polypid, by several observations made on *Bicellaria ciliata* (L.) and *Bugula plumosa*

(Pall.), giving at the same time an historical account of this question, especially with regard to the observations of Smitt and Nitsche. He urges that the life of the individual polypid is comparatively ephemeral, and comes to the result, that renewal is effected in two ways: (1) by the formation of a germ-capsule, and (2) by gemmation from the endocyst or inner wall of the cell. He further maintains that the eggs are in some cases developed within the oecium itself, whilst in others they are produced and fertilized in the zoecium, and thence probably conveyed into the ovicell, where they complete their development; he gives several observations bearing on this point, made on a species of *Bugula*, but has not yet made out how the transfer is accomplished. Amongst the *Ctenostomata*, which are destitute of ovicells, the egg is developed into a ciliated embryo within the zoecium, and probably causes the death of the former polypid. The colonial nervous system of *Valkeria pustulosa* is figured and its nervous nature defended. Q. J. Micr. Sci. xiii. pp. 16-36, pl. ii. figs. 1-14.

Triticella (Dalzell). Generic characters amended: it may require a distinct family, *Triticellidae*, in the sub-order *Cellularina*. *T. bæcki*, sp. n., Christiania-fjord, 10-20 fath., on shield of *Geryon tridens*, and *T. koreni*, sp. n., Bergen, Norway, 100-300 fath., on shield of *Calocaris macandrewi*. G. O. Sars, Förh. Selsk. Chr. 1873, pp. 386-400, pls. viii. & ix.

Catenicella alata, sp. n., Hutton, Cat. N. Z. p. 89, New Zealand.

Salicornaria ? *hirsuta*, sp. n., *id. l. c.* p. 91, New Zealand.

Beania swainsoni, sp. n., *id. ibid.* New Zealand.

Muscaria, g. n., allied to *Bugula*, cells multiserial, arranged back to back on both sides of the branches. *M. armata*, sp. n., *id. l. c.* p. 93, New Zealand, on the roots of *Boltenia*.

Diachoris buskiana, sp. n., *id. l. c.* p. 94, New Zealand.

Membranipora tessellata and *brunnea*, spp. nn., *id. l. c.* p. 96, New Zealand. on shells.

Lepralia angela, *urceolata*, *cancer*, *pellucida*, *grandis*, and *vellicata*, spp. nn., *id. l. c.* pp. 96-98, New Zealand; the first with avicularia, the others without either avicularia or vibracula.

Cellepora ampliata and *agglutinans*, spp. nn., *id. l. c.* p. 92, New Zealand.

Eschara unicornis and *flexuosa*, spp. nn., *id. ibid.* New Zealand.

Hemeschara fairchildi, sp. n., *id. l. c.* p. 93, New Zealand.

Hornera squamosa, sp. n., *id. l. c.* p. 101, Chatham Islands.

Pustulipora porcellanica, sp. n., *id. l. c.* p. 102, New Zealand.

Cinctipora, g. n. Polyzoarium erect, ramose, branches dichotomous or irregularly divided, free, cylindrical; cells immersed; mouths attached to the stem and to one another, forming circles round it; cell walls thin, punctured internally. *C. elegans*, sp. n., *id. l. c.* pp. 102 & 103, New Zealand.

Alecto racemosa and *disposita*, spp. nn., *id. l. c.* p. 103, New Zealand.

Pedicellina echinata (Sars). A description of its embryo is given, and many discrepancies between it and those of other species described by Reid, Van Beneden, and Ulianin (Bull. Mosc. 1870), are stated by T. Hincks, Q. J. Micr. Sci. xiii. pp. 32-34. pl. ii. figs. 15 & 16.

CRUSTACEA.

BY

PROF. EDUARD VON MARTENS, M.D., C.M.Z.S.

THE GENERAL SUBJECT.

HESSE, M. Mémoire sur des Crustacés rares ou nouveaux des côtes de France. 21^{me} Article. Ann. Sci. Nat. (5) xvii. 35 pp. pls. i.-iii. & 16 pp. pl. iv.; 22^{me} Article, *ibid.* 18 pp. pl. xxiv.

METZGER, A. Physikalische und faunistische Untersuchungen in der Nordsee. In the 'Bericht über die Expedition zur physikalisch-chemischen und biologischen Untersuchung der Ostsee im Sommer 1871 auf S. M. Aviso-dampfer Pommerania.' Kiel: 1873, fol.; *Crustacea*, pp. 172-174.

MORPHOLOGY, ANATOMY, AND PHYSIOLOGY.

A. Dohrn's views on the morphological homologies and "phylogenetic history" of the *Crustacea* (Zool. Rec. vii. pp. 190 & 191) are elaborately criticised by C. CLAUS, who insists that the "*Zoea*-stage" is a highly developed and differentiated form, very distinct from *Nauplius*, and not present in all orders of *Crustacea*, and considers the analogies sought to be established between the dorsal spine of *Zoea* and the frontal band of *Lernæa* or the peduncle of the Cirripeds to be quite arbitrary. Abh. Ges. Götting. xvi. (1871) 'Die Metamorphose der Squilliden,' pp. 13, 49 & 50.

Megalops is the young state of *Ocypoda*; *M. inermis* (Say) belongs to *O. arenaria* (Say), young specimens of which have been taken, exhibiting evident indications that they had only recently changed from the former. S. J. Smith, Am. J. Sci. (3) vi. pp. 67 & 68, and Ann. N. H. (4) xii. pp. 186 & 187.

G. POUCHET has published some valuable observations on the blue colour sometimes seen in the common crayfish, lobster, shrimp (*Palæmon*) and *Branchipus*. This is not the effect of fluorescence, as in some *Vertebrata*, but of a true pigment, quite distinct from the red and yellow

pigments of the same species, and which assumes the form of small solid particles in the crayfish and *Branchipus*. These particles, called by the author "*cærulins*," make their appearance and are developed near the red chromoblasts. In the lobster, the pigment is in a state of dissolution and contained in a superficial layer of the shell, near and above a layer of crowded red chromoblasts. In the shrimp, it is also dissolved and spread over the whole integument, but is more intensified near the red chromoblasts, which, when the living animal is on a dark ground, are extended, and cause a dark colouration, and, when it is under the influence of light, are contracted; so that the animal assimilates itself to the colour of its surroundings [*cf.* Zool. Rec. ix. p. 187]. This blue is changed by various chemical reagents into a reddish colouration. Living examples of the common crayfish are found of a red colour in Lake Lemane and some rivers of France, the red being due to a total want of blue pigment: this state may therefore be called 'acyanism,' J. de l'Anat. Phys. viii. (1872) pp. 401-404; ix. pp. 289-307, pl. ix.

The eye of the lobster is fully described by E. T. NEWTON, who discusses the cornea, investing membrane, crystalline cone, nerve-rod, spindle-shaped body, pigment, optic ganglion, lenticular bodies of the optic nerve, and kidney-shaped ganglion. He coincides with Leydig and Schultze in the view that the nerve-rods and crystalline cones in the eye of the Arthropods correspond morphologically and functionally to the rods and cones in the eye of the *Vertebrata*, the so-called optic ganglion being the equivalent (at least in part) of the retina; but he is at a loss to explain how, in the absence of a lens, the light is refracted and the image formed within the eye. A list of fifty-nine books or papers bearing on this subject is given at the close of the paper. Q. J. Micr. Sci. xiii. pp. 325-343, pls. xvi. & xvii.

The early stages of the American Lobster, *Homarus americanus* (M.E.), are described and figured by S. J. SMITH, Tr. Conn. Ac. ii. pp. 351-381, pls. xiv.-xviii. and 4 woodcuts; abstracts being given by the author in Am. J. Sci. (3) iii. (1872) p. 1, and in Rep. U.S. Commiss. of Fish and Fisheries on the condition of the Sea Fisheries of the Southern Coast of New England in 1871 & 1872, p. 522 (1873). There are three quite different schizopodal stages in the true larval condition, and a later stage approaching the adult. These forms have no close affinities with known larvæ of other genera of *Macrura*, but approach the adult Schizopods, particularly the *Mysida*, which appear to be degraded *Macrura*, more closely allied to the *Sergistidae* than to the *Squilloidea*.

The primitive fibrillæ in the muscles of the abdominal segments of *Crangon* and in the muscle of the stalk of *Anatifa* (*Lepas*) have been observed by R. HARTMANN, S. B. nat. Fr. 1873, p. 94.

T. RICHTERS, having examined a large number of specimens of *Phyllosoma* in the Hamburg Museum, comes to the conclusion that they are the larvæ of *Palinurus* and *Scyllarus*, analogous to the "Zoea-stage" of other *Crustacea*, from which they are distinguished by the larger number of feet already developed, and that the "Phyllosomes ordinaires" of Milne-Edwards are the larvæ of *Palinurus*; the "Ph. brevicaudes" and "Ph. laticaudes" of that author being larvæ of *Scyllarus* or the allied genera *Thenus*, *Ibacus*, or *Paribacus*. It is not as yet possible to

refer the different so-called species of *Phyllosoma* to distinct species of full grown Crustaceans, and many of the former may have been founded on different periods of age. He describes and figures many new forms, giving particular attention to the development and metamorphosis of the mandibles and maxillæ. Z. wiss. Zool. xxiii. pp. 623-646, pls. xxxi.-xxxiv.

Erichthus, *Squillerichthus*, and *Alima* are proved by C. CLAUß, from a careful comparison of a large number of such animals caught in the open sea, to be only stages in the development of the family *Squillidæ*. He attempts to establish several stages of advancing development, and to make out the successive transformations of single limbs to the definite stage. The youngest form known to him somewhat resembles *Pontella*; it has only 5 pairs of feet, all alike and natatorial, and 2 antennæ, and its abdomen is not yet divided into segments; in later stages the pairs of feet become differentiated and their number increases, and new abdominal segments are formed, the original piece remaining as last abdominal segment or telson, while the others are successively intercalated before it by new formation. By successive stages it is proved that the large raptorial feet of *Squilla* correspond to the second pair of maxillipeds in the Decapods, and that the lateral appendages of the penultimate abdominal segment (the lateral blades of the caudal fin) are originally quite like the natatorial feet of the preceding segments, and therefore homologous to them (in opposition to F. Müller's opinion). The author describes and figures several forms in which he thinks the larval forms of distinct genera as *Coronis*, *Pseudosquilla*, *Gonodactylus*, *Lysiosquilla* and *Squilla* itself, are in all probability to be recognized; drawing his conclusions chiefly from the spines on the penultimate abdominal segment and from the number of claws to the raptorial feet. He comes to the conclusions that some of the so-called species of *Erichthus* (especially the rather broad forms) are larvæ of the genus *Squilla*, of which *Squillerichthus* (M. E.) is a later stage; that the more slender forms of *Erichthus* are the larvæ of *Gonodactylus* or *Pseudosquilla*; and that the animal described as *Alima* is probably the larva of *Lysiosquilla*. For intermediate forms between *Alima* and *Erichthus*, he introduces the new term *Alimerichthus*. 'Die Metamorphose der Squilliden:' Abh. ges. Götting. xvi. (1871) 55 pp. 8 pls.

The strange shovel-shaped appendages in the male of *Gammarus pulex* are mentioned by R. HARTMANN, S. B. nat. Fr. 1873, p. 94.

The anatomy and development of *Branchipus stagnalis* and *Apus cancriformis* are discussed by C. CLAUß; he describes the first larval stages of both, pointing out that in them the Nauplius is provided with 3 pairs of feet, and that in *Limnadia* and *Estheria* the 3rd pair is indicated by a long bristle situated on a sub-cuticular swelling; the 2nd pair of maxillæ make their appearance later than the 1st, which become very complicated by the formation of several lobes. The 2nd pair of feet much resemble the natatory feet of *Daphnia*. Two pairs of glandular ducts, a nidamental gland, and a loop-shaped gland opening at the base of the 2nd pair of feet, are remarkable features in these *Entomostraca*, and involve a resemblance to the Annelids. Abh. Ges. Götting. xviii. (separate prints, 48 pp. 8 pls. 4to).

Branchipus: observations on the development and habits of the young animals. The stalks of the eyes are originally lateral protuberances of the head itself, and subsequently become moveable. F. Brauer, S.B. Ak. Wien, lxxv. (1872), pp. 279-291.

Siebold's hypothesis that the males of *Apus* come from fecundated, and the females from unfecundated eggs, is confirmed by F. Brauer, *l. c.*, who observes that the males have one segment more than the females, but no feet; he describes also the copulation and the habits of the young animals. In *Lepidurus* also the males have an additional segment, sometimes only on one side. *Id.* Verh. z.-b. Wien, xxiii. p. 196.

L. LUND, Nat. Tids. (3) vii. (1870-71) pp. 129-174, pls. v.-ix. gives the result of his researches as to the morphology and classification of the *Cladocera* (infra, p. 192).

C. CLAUS records his observations on the morphology of *Cypridina* (*Ostracoda*), chiefly as to the mouth-organs and the long, annulated, bristly, penultimate foot ("patte ovifère," Milne-Edw.), which is provided at its tip with a pair of pincers, and may serve for cleaning the shell. Z. wiss. Zool. xxiii. pp. 211-220, pls. x. & xi.

The development of the Siphonostomid genera *Anchorella*, *Lernæopoda*, *Brachiella*, and *Hessia* (g. n.), has been observed by E. VAN BENEDEN. In the latter, only 2 pairs of extremities make their appearance during the 1st stage; the animal leaves the egg at a very late period, not until after attaining the *Cyclops*-like stage, and being provided with antennæ, 3 pairs of buccal limbs, and the first traces of the 2 pairs of swimming feet and an articulated post-abdomen. Bull. Ac. Belg. (2) xxix. (1870), pp. 223-254, pl.

A. MILNE-EDWARDS' researches into the anatomy of *Limulus* discuss chiefly the vascular and nervous systems: he considers that the former is more developed and perfect than in any other Arthropod, presenting distinct veins, some of which are remarkably delicate; that the centre of the nervous system and the principal nerves are included within the blood-vessels (arteries); and that the first pair of feet (mandibles or palpi of other authors) receive their nerves not from the cerebroid ganglions, but from the œsophageal collar, and are therefore not homologous to the palpi of the spiders, or antennæ of the *Crustacea*. The segmentation of the body resembles that of the Scorpions more than any other Arthropods, and the author is disposed to form a distinct class, to be called MEROSTOMATA, for *Limulus*, and some fossil genera, to be placed between the *Crustacea* and the *Arachnida*. Ann. Sci. Nat. (5) xvii. pp. 1-67, pls. v.-xvi. See also a previous note, C. R. lxxv. (1872), pp. 1486-1488; a German translation in Z. ges. Naturw. (2) viii. pp. 35-38, and an abstract in Ann. N. H. (4) xi. pp. 152-154.

A. S. PACKARD, Jr., confirms several of Milne-Edward's statements concerning the arterial system, ascertains an extensive series of closed vessels in the respiratory feet, and adds some particulars regarding the blastodermic skin. Am. Nat. vii. pp. 675-678.

E. v. BENEDEN also has given some observations on the first stages of embryonal development in *Limulus*; Tageblatt der 46^{er} Versammlung deutscher Naturforscher und Aertze in Wiesbaden, 1873, p. 58.

The Cirriped *Anelasma squalicola* (Darw.) is not in an embryonic condition, as Darwin asserts, but the result of a considerable retrogressive metamorphosis; its stalk, otherwise quite homologous to that of the other *Lepadidae*, is less muscular, because it penetrates into the substance of its host and gives off long, thin, branched, hollow processes, which serve evidently not only for fixing but also for nourishing the animal. KOSSMANN, Arb. zool. zootom. Inst. Würzb. iii. pp. 179-184, woodcut.

R. KOSSMANN has given an account of the morphology and anatomy of the Suctorian genera, *Peltogaster* and *Sacculina*, chiefly from observations made by transverse sections of the animal; he points out that they have a true mantle, analogous to that of other Cirripeds and of the Mollusks, connected only on one spot with the visceral part of the body, and that the side in which this connection is situated must be regarded morphologically as the back of the animal. *Sacculina* has been flattened laterally, so that the dorsal line becomes apparently similar to the ventral, and what seems at first sight to be the back, is really only a lateral surface; the correctness of this view is clearly seen, as soon as the mantle is opened. In *Peltogaster*, the concave side is morphologically the back. The eggs are situated in the cavity between the mantle and the visceral part of the body, and this cavity has a separate opening. A rudimentary piece of intestine has been observed within the visceral part of the body, but only in one species. Arb. zool. zootom. Inst. Würzb. ii. (1872). pp. 97-120, pls. v. & vi.

In a later paper, the author has identified the wrongly so-called mouth or proboscis of these animals with the stalk of the *Lepadidae*, and corroborates this view by the observation, that in *Anelasma*, an undoubted Cirriped, the stalk is provided with root-like prolongations, just as in *Sacculina*. He comes to the result that the *Suctorioria* are most nearly allied to the *Lepadidae*, and that both may be regarded as sub-families of the family *Pedunculata*. He characterizes the *Suctorioria* in the following manner: Capitulum formed by a muscular mantle, without calcifications, its opening very small and closed by a sphincter; the whole body bag-shaped, without any segmentation. Feelers of the larval stage not persistent (?); no limbs, organs of sense, mouth, or intestine. The peduncle is short, and gives off long, thin, root-like processes by which the animal draws its nourishment from other animals. Testicles near the peduncle, opening into the cavity of the mantle; no penis; the rest of the body occupied by the female genital organs. First stage of the larva or *Nauplius*-stage without mouth or intestine, end of the abdomen bifid. *Op. cit.* iii. pp. 179-202, pls. x. & xi.

Sacculina carcini (Thomps.). The skin thrown off in the first moult of the embryo acts as a cover for it, but the chorion perishes early. Then the 3 first pairs of extremities make their appearance; next the eyes and frontal horns; finally the young animal is hatched. E. van Beneden. Bull. Acc. Belg. (2) xxix. (1870), pp. 99-112, pl. (*cf.* Zool. Rec. vii. p. 206).

CONTRIBUTIONS TO FAUNAS.

Fauna of Caves.

Gammarus puteanus (Koch) and *Typhloniscus cavaticus* (Leydig) have been found living in the cave of Falkenstein, Württemberg: WIEDERSHEIM, Verh. Ges. Würzb. iv. pp. 4 & 5 [and FRIES, Württ. nat. J. H. 1874, pp. 29-33]. Some Crustacea belonging to the Cave Fauna of Indiana are discussed by A. S. Packard, Jr., Rep. Peab. Ac. v. pp. 94-97.

Fauna of the depths of Freshwater Lakes.

T. A. FOREL, in a general account of his researches into the fauna of different lakes in Switzerland, especially the Lake of Geneva, mentions 1 species of Amphipods, 5 *Entomostraca*, and 2 Copepods, as living there in a depth of more than 30 metres. Arch. Sci. Nat. xlviii. p. 67.

Crustaceans found in the stomach of the white fish at a depth of from 50 to 70 fathoms, in Lake Michigan, have been recognized by W. STIMPSON to be new species of *Mysis* and *Gammarus*; Tr. Winscons. Ac. 1870-72, pp. 98-102: abstract in Ann. N. H. (4) xi. p. 320.

Fauna of the Deep Sea.

Results of the Challenger Expedition; Nature, vii. p. 430, and R. v. Willemoes-Suhm, Z. wiss. Zool. xxiii. pt. 2, appendix, pp. i.-v.

The terrestrial Isopoda of Denmark have been treated by G. BUDDELUND, who enumerates 1 *Ligia*, 1 *Ligidium*, 2 *Trichoniscus*, 1 *Haplophthalmus*, 1 *Philoscia*, 1 *Oniscus*, 1 *Platyarthus*, 6 *Porcellio*, and 4 *Armadillidium*. Nat. Tids. (3) vii. (1870-71), pp. 217-245.

The known Crustacea of the Baltic are enumerated by K. MÖBIUS (with exact indication of the localities and depths in which they were found), as follows:—3 species of *Cirripedia*, 7 *Copepoda*, 3 *Cladocera*, 2 *Laemodipoda*, 13 *Amphipoda*, 10 *Isopoda*, 1 *Cuma*, 3 *Stomapoda*, 5 *Marcrua*, 1 *Pagurus*, 2 *Brachyura*, viz., *Stenorhynchus rostratus* (L.) and *Carcinus menas* (L.), and 1 Pycnogonid. Nearly all are identical with species living in the North Sea, only a few seeming peculiar to the Baltic, and as to these further examination is needed. One of the most striking species is *Idotea entomon* (L.), an arctic form, wanting in the North Sea, and found chiefly in the eastern half of the Baltic, at different depths, small specimens occurring also in the western part. Ber. Exp. Pomm. pp. 115-126; abstract in Ann. N. H. (4) xii. pp. 81-89.

Twenty-eight species (including 2 new) observed at the islands of Eastern Friesland, are enumerated by A. METZGER; *ibid.* pp. 172-174.

Forty-eight species of marine Copepods (some of which are new) observed in the West of Ireland, are enumerated by G. BRADY & D. ROBERTSON, Ann. N. H. (4) xii. pp. 126-142, pls. viii. & ix.

A list of Decapods, found near Marseilles (36 species in the second zone of depth, among prairies of *Posidonia cavolinii*, and 15 living on the beach), is given by A. F. MARION, Ann. Sci. Nat. (5) xvii. pp. 4 & 5.

G. D. NARDO's 'Illustrazione di 54 specie di Crostacei dell' Adriatico e Storia della Carcinologia Adriatica,' Venice, 1869: 4to, 4 plates, has not been seen by the Recorder.

DECAPODA.

Nephrops japonicus, sp. n., Tapparone-Canefri, Mem. Acc. Tor. (2) xxvii. p. 327, pl., Japan.

Paranephrops setosus, sp. n., Hutton, Ann. N. H. (4) xii. p. 402, New Zealand, freshwater.

Nephropsis, g. n. No antennal scale or eyes; otherwise like *Nephrops*. *N. stewarti*, sp. n., Mason, Ann. N. H. (4) xii. pp. 59-64, Eastern Coast of the Andamans (only one specimen, female, at a depth of from 260 to 300 fathoms, about 25 miles off Ross Island).

Orconectes inermis (Cope, Am. Nat. vi., 1872, p. 419), = *Cambarus pellucidus* (Tellkampf); Packard, Rep. Peab. Ac. v. p. 94.

STOMAPODA.

Mysis diluvianus [-a], is the name for the *Mysis* found in Lake Michigan in the stomach of *Leucosomus*. W. Stimpson, Tr. Wiscons. Ac. 1870-72, p. 98; abstract in Ann. N. H. (4) xi. p. 320 (cf. Zool. Rec. viii. p. 181).

AMPHIPODA.

GAMMARIDÆ.

Gammarus hoyi, *brevistilus*, and *filicornis*, spp. nn., Stimpson, Tr. Wiscons. Ac. 1870-72, p. 98; abstract in Ann. N. H. (4) xi. p. 320, Lake Michigan, in the stomach of *Argyrosomus*.

Atylus falcatus, Metzger [Zool. Rec. ix. p. 197], re-described by the author, Ber. Exp. Pomm. p. 173.

Stygodromus, g. n., E. D. Cope, Am. Nat. vi. (1872) p. 422. Eyeless; of aquatic habits; nearer *Gammarus* than *Niphargus* is. *S. vitreus*, sp. n., *id. ibid.* Mammoth Cave, Kentucky (belongs to *Crangonyx*, Sp. Bate, and lives in caves and wells in Indiana; A. S. Packard, Jr., Rep. Peab. Ac. v. p. 95).

COROPHIIDÆ.

Siphonæcetes cuspidatus, Metzger [*l. c.*] re-described by the author, *op. cit.* p. 174.

HYPERIIDÆ.

Thaum[at]ops, g. n. Eyes very large; only one pair of antennæ; the first and second pairs of feet cheliform. No metamorphosis. *T. pellucida*, sp. n. (84 millim. in length, the eyes 20 millim.), R. v. Willemoes-Suhm, Z. wiss. Zool. xxiii. pt. 2, appendix, p. v. [also in J. Zool. iii. 1874, p. 133], Atlantic.

PISCICOLÆ.

A new family proposed for the reception of *Ichthyomyzocus*, g. n.; 3 anterior pairs of feet directed forwards with hooked claws; the 4

posterior longer, with nearly straight claws; abdomen composed of 2 or 5 segments; respiratory organs in the form of a double cylindrical multi-annulated hairy rod on the under side of the abdomen; end of the abdomen two branched, each branch terminated by several leaflets. This family connects the *Amphipoda* with the *Isopoda*. *I. ornatus*, *morrhua*, *lophii*, and *squatina*, spp. nn., living as parasites on the cod, toad-fish, and angel-fish on the Atlantic coast of France. Hesse, Ann. Sci. Nat. (5) xvii. pp. 1-16, pl. iv. [The description is not quite satisfactory; according to the position of the respiratory organ, this genus should be placed rather with the Isopods than with the Amphipods.]

CYAMIDÆ.

The known species are fully described and figured by C. F. Lütken in the following order:—CYAMUS. A: a, *mysticeti* (Lütk.), on the northern "right whale," pl. i. fig. 1, and *monodontis* (Lütk.), on the narwhal, pl. i. fig. 2; b, *kessleri* (Brandt), on a whale from the Northern Pacific, pl. ii. fig. 3; c, *erraticus* (R. V.), on the southern "right whale," pl. iii. fig. 5, *boopis* (Lütk.), on *Megaptera boops*, pl. iii. fig. 6, and *pacificus* (Ltk.), from Panama, pl. iii. fig. 7. B: *ovalis* (R. V.), on *Balæna australis* and ? *japonica*, pl. ii. fig. 4. C: a, *nodosus* (Lütk.), on the narwhal, pl. iv. fig. 8; b, *globicipitis* (Lütk.), on *Globiocephalus melas*, pl. iv. fig. 9; c, *gracilis* (R. V.), on *Balæna australis* and ? *japonica*, pl. iv. fig. 10. PLATYCYAMUS (Lütk.; Zool. Rec. viii. p. 191, ix. p. 198) *thomsoni* = *Cyamus thomsoni* (Gosse), on *Hyperoodon rostratus* and *latifrons*, pl. iv. fig. 11.

Some other rather doubtful species indicated; *C. scammoni* (Dall) [Zool. Rec. ix. p. 198] is acknowledged as a distinct species, but *C. suffusus* (Dall) is supposed to be identical either with *C. pacificus* or *C. boopis*; *C. rhytina* (Brandt) = *ovalis*, and has been found on a piece of skin of a whale, not of a *Rhytina*. Dan. Selsk. Skr. (5) x. pp. 231-284, pls. i.-iv. The descriptions of Dall's 3 species [Zool. Rec. ix. p. 198] are copied, Ann. N. H. (4) xi. pp. 157 & 158.

ISOPODA.

ARCTURIDÆ.

Arcturus corniger and *lineatus*, spp. nn., T. R. R. Stebbing, Ann. N. H. (4) xii. pp. 96 & 97, pl. iii, figs. 2 & 3, Port Elizabeth, South Africa.

IDOTHEIDÆ.

Idothea entomon (L.). The young animals described by E. Brandt, Mém. Biol. vii. (1870) pp. 649-657, pl.

Idothea tricuspidata (Desm.), is variable in colour, but not according to the food of the animal. Möbius, Ber. Exp. Pomm. p. 121.*

ASELLIDÆ.

Asellus cavaticus (Leydig) [Zool. Rec. viii. p. 192] figured, without

name, by Caspary, Verh. Ver. Rheinl. vi. (1849) from a well in Elberfeld. On its habits. cf. Wiedersheim, Verh. Ges. Würzb. iv. pp. 4 & 5.

Cæcidotæa stygia (Packard, Am. Nat. v. p. 751) = *microcephala* (Cope, op. cit. vi. pp. 411 & 419), from Wyandotte and Mammoth Cave, Indiana, and also in wells: the genus belongs to the *Asellidæ* and not to the *Idotheidæ*. A. S. Packard, Jr., Rep. Peab. Ac. v. pp. 95 & 96.

Jera marina (Fabr.) = *albifrons* (Leach) = *baltica* (Fr. Müller) in different localities in the Baltic Sea, from 0-15 fathoms, variable in colour. Möbius, l. c. p. 122.

ONISCIDÆ.

A general account of the external structure of the terrestrial Isopods is given by G. Budde-Lund; he arranges them in two sub-families ("tribes"), viz.: — **LIGIÆ**; *Ligia*, *Ligidium*, *Trichoniscus*, and *Haplophthalmus* (Schöbl., Z. wiss. Zool. 1860). **ONISCI**; *Philoscia*, *Oniscus*, *Platyarthrus* (Brandt) = *Typhloniscus* (Schöbl.), *Porcellio*, and *Armadillidium*. These genera are characterized, and the Danish species (*suprà*, p. 188) described; Nat. Tids. (3) vii. pp. 217-245.

Zia saundersi, sp. n., Stebbing, Ann. N. H. (4) xi. pp. 286-288, woodcut, Copthorn, Surrey: = *Ligidium agile* (Persoon), = *Oniscus hypnorum* (Cuv.), = *Lygidium persooni* (Brandt), = *Zia agilis* (Koch), known from many parts of the European continent; Norman, *tom. cit.* pp. 419-421. It occurs in Belgium; Plateau, *op. cit.* xii. p. 75.

‡ *Euphiloscia*, g. n., allied to *Philoscia*, but the flagellum of the outer antennæ is 15-jointed, the abdomen large and rounded, and the uropods are as long as the basal abdominal segment is wide. *E. elrodi*, sp. n. (eyes well developed), Packard, Rep. Peab. Ac. v. pp. 96 & 97, in the caves of Indiana.

SPHÆROMIDÆ.

Cymodocea tuberculosa, sp. n., Stebbing, Ann. N. H. (4) xii. p. 96, pl. iiii, fig. 1, Swan River, S. W. Australia. *C. truncata* (Leach), re-described by Hesse, Ann. Sci. Nat. (5) xvii. pp. 14-17, pl. i.; he figures also the egg and other young states, and supposes that *Cymodocea* may be the male and *Sphæroma* the female of the same animal.

Nesæa bidentata (Desm.), *rubricephala*, *flaviscutata*, *subviridiscutata*, *contracta*, *pilosa*, *decorata*, *viridis*, and *angulosa*, spp. nn., Hesse, l. c. pp. 17-29, environs of Brest.

Prochonæsea (g. n., not otherwise defined than by a long description of its type) *propinqua*, sp. n., *id. l. c.* p. 21, pl. iii. figs. 1 & 2, Brest.

Campecopea lineata, sp. n., *id. ibid.* p. 29, pl. iii. figs. 22-25, Brest.

BOPYRIDÆ.

Eumetor, g. n.; the male allied to *Liriope* (Rathke), but without antennæ; the female much larger, its segmentation continuing in the mature state. *E. liriope[oides]*, sp. n., in the mantle-cavity of *Sacculina pisiformis* from the Philippines. Kossmann, Arb. zool. zootom. Inst. Würzb. ii. (1872) pp. 132 & 133, pl. vii. fig. 8 (male).

Cabira, g. n.; 8-9 distinct segments, divided by a chitinous lamella into dorsal and ventral halves; mouth in the ventral part of the first segment; pouch-like appendages of the single segments filled with embryos. *C. lernaodiscoides*, sp. n., parasitical on a *Bopyrus* from the Philippines. *Id. l. c.* p. 134, pl. vii. figs. 13 & 14.

Zeuxo, g. n.; body of the adult female bag-shaped, without segmentation, feet, or organs of sense; proboscis prominent, armed with 4 recurved hooks. *Z. porcellanae* and *alpei*, spp. nn., on *Porcellana* and *Alpheus* from the Philippines. *Id. l. c.* pp. 153 & 154, pl. vii. figs. 9-12.

PHYLLOPODA.

Shallow, muddy ditches, containing water only for some time and then becoming dry, are the favourite haunts of *Apus cancriformis*, *Branchipus stagnalis*, and *Estheria dahalacensis*; clear ponds, abounding with water plants, are preferred by *Lepidurus*, *Chirocephalus*, *Limnetis*, *Estheria cycladoides* and *tetracera*; salt lakes are inhabited by *Artemia*. F. Brauer, Verh. z.-b. Wien. xxiii. p. 200.

Lepidurus productus: *Limulus serricaudus*, Herm., = *Lepidurus productus*, Bosc. (? Lamck.); *Apus productus*, Grube, Sieb., nec Bosc., is renamed *grubii*; *Lepidurus productus*, Lubbock, = *A. productus*, Milne Edw., Desm., & ? Guérin, is renamed *lubbocki*. All three species differentially described. *Id. l. c.* pp. 195-199.

CLADOCERA.

L. LUND, Nat. Tids. (3) vii. pp. 129-174, pls. v.-ix. has made careful researches concerning the feelers, jaws, and feet in this order, and proposes the following systematic arrangement:—

1. POLYPHEMIDÆ: mandibles terminating in several branches, their maxillary process not developed into a masticatory plate, sometimes wanting; maxillæ rudimentary or wanting; maxillipeds free, prehensile; habits rapacious.

2. DAPHNIIDÆ: maxillary process of the mandibles occupying their tip, and developed into a masticatory plate; maxillæ with 3 bristles; maxillipeds enclosed by the shield of the body, not all alike, the first pair more or less prehensile; vegetable feeders.

a. *Daphniidæ genuinæ*: 4 joints on the outer, 3 on the inner branch of the oars; front edge of the shield of the body not sharply prominent. *Lathonura*, *Macrothrix*, *Scapholeberis*, *Ceriodaphnia*, *Daphnia*, *Simocephalus*, *Moina*, *Ilocryptus*, *Acantholeberis*, and *Bosmina*. The differential characters of these genera, situated in the bristles of the oars and in the shape of each pair of the maxillipeds, are indicated at length and figured.

b. *Lynceidæ*: both branches of the oars 3-jointed; front edge of the shield very prominent, like a cap over the head.

3. SIDIDÆ: mandibles as in the preceding division; maxillæ with at least 10 bristles; all maxillipeds except the last equal, flattened; vegetable feeders.

Daphnia longispina (O. Müll.) and *magna* (Str.) = *pulex* (Straus, ex O. F. Müller), varr., and *D. macrocopus* [not *macropus*] (Straus): described, their animal and vegetable ectoparasites discussed, and several particulars concerning the sculpture of the valves, joints of the locomotive arms or large antennæ, palpi or antennulæ, ephippium, ovaries, testicles and spermatozoids added, by C. ROBIN, J. de l'Anat. Phys. viii. (1872) pp. 449-467, pls. xvi.-xix.

From WEISMANN'S researches into the organization of what he considers to be a new genus of *Daphniidæ*, living in Lake Constance, it appears that the so-called shell-gland has an excretory duct, opening inwards and anteriorly, and is, according to him, a renal organ. The abdomen is articulated, the shell is constituted of one piece, too small to protect the whole animal. In other respects, it resembles *Bythotrephes*, and can only be caught at evening or night. FOCKE observed this animal many years ago at Bremen; it is *Leptodora hyalina* (Lillj.): Ber. Vers. Natur. Wiesbaden.

OSTRACODA.

Cypridina stellifera (Cl.) ? = *formosa* (Dana), Palawan, *C. mediterranea* (Costa) = *messinensis* (Cl.); C. Claus, Z. wiss. Zool. xxiii. p. 212, pl. x. figs. 1-14, and p. 221, pl. xi. figs. 16-20.

Monopia, new generic name, proposed (with some hesitation) for *Cypridina monopia*, sp. n., which perhaps = *C. punctata* (Dana); it wants the large compound lateral eye, and is provided with a peculiar T-shaped bag near the heart, which may perform the function of a gill. Claus, l. c. pp. 222-225, pl. xi. figs. 21-31.

COPEPODA.

BRADY, G. S., & ROBERTSON, D. Contributions to the Study of the Entomostraca. No. VIII. On Marine Copepoda taken in the West of Ireland. Ann. N. H. (4) xii. pp. 126-142, pls. viii. & ix.

CALANIDÆ.

Paracalanus hibernicus, sp. n., Brady & Robertson, l. c. p. 126, pl. viii. figs. 1-3, West of Ireland.

Pseudocyclops (Brady) transferred by the author to this family on account of the structure of the mouth apparatus, the biramose 2nd antennæ, and the biramose structure of the 5th pair of feet in the female. Böck is wrong in thinking it to be the male of *Misophria*. *P. obtusatus*, sp. n., Brady & Robertson, l. c. p. 128, pl. viii. figs. 4-7, Roundstone Bay, West of Ireland.

CYCLOPIDÆ.

Cyclopicera (Brady, 1872; Zool. Rec. ix. p. 201) very closely allied to, but scarcely identical with, *Ascomyzon* (Thorell); Brady, l. c. p. 140.

HARPACTIDÆ.

Microsetella, g. n.; distinct from *Setella* chiefly in the absence of the double falciform rostrum, and in the presence of a secondary branch of the lower antenna. Mouth-organs so minute as to be incapable of complete examination. *M. atlantica*, sp. n., West of Ireland. Brady & Robertson, *l. c.* p. 130, pl. ix. figs. 11-16.

Paratachidius, g. n.; anterior antennæ 7-jointed, those of the male much swollen, the last joint forming a sort of claw in front of the large vesiculiform swelling, &c. *P. gracilis*, sp. n., Connemara, W. Ireland. *Ibid. l. c.* p. 131, pl. viii. figs. 8-16.

Ilyopsyllus, g. n.; body very tumid, gibbous, ventral surface flattened, anterior antennæ very short, 5-jointed, with a sword-shaped appendage; caudal setæ short, stout, dilated. Mouth-organs not sufficiently made out. *I. coriaceus*, sp. n., amongst black peaty mud near high-water mark, Roundstone Bay, W. Ireland. *Ibid. l. c.* p. 132, pl. ix. figs. 1-5.

Harpacticus flavus, sp. n., *ibid. l. c.* p. 134, pl. ix. figs. 17-21, Westport Bay, Ireland.

Thalestris hibernica, sp. n., *ibid. l. c.* p. 135, pl. viii. figs. 17-19, Westport Bay.

Parathalestris, g. n.; near *Thalestris*, but the mandibles thin, with elongate palpi, and the inner branches of the 2nd pair of feet 2-jointed. Type, *Thalestris clausi* (Norman, 1868), West of Ireland. *Ibid. l. c.* p. 136.

Asellopsis, g. n.; body much depressed, caudal segments laminate, rounded. Both branches of 1st pair of feet 2-jointed, the inner elongate, hooked, the outer very short. Otherwise like *Laophonte*. *A. hispidus*, sp. n., Westport Bay. *Ibid. l. c.* p. 137, pl. ix. figs. 6-10.

Orthopsyllus, new name for *Lillieborgia* (Claus), which is pre-occupied. *Ibid. l. c.* p. 138.

SAPPHIRINIDÆ.

Macrochiron (Brady; Zool. Rec. ix. p. 202) united with *Lichomolgus* (Thorell) by the author; *l. c.* p. 140.

Solenostoma [Latr., *Arachnida*, 1802], g. n.; near *Ascomyzon*; 2nd branches of maxillæ obsolete, composed of 2 ciliate setæ; 2nd pair of antennæ large, 2-branched, principal branch 4-jointed, with two strong spines at the tip. *S. scutatatum*, sp. n., Clifden Bay, Ireland, on *Laminaria*, Brady & Robertson, *l. c.* p. 141.

SIPHONOSTOMA.

Hessia, g. n.; allied to *Anchorella* by all its phenomena of development, but recalling certain Chondracanth in exterior characters. Type, *H. colorata*, sp. n., parasitic in the branchial cavity of *Trigla lineata*, coasts of Brittany. E. van Beneden, Bull. Ac. Belg. (2) xxix. (1870), p. 223, eggs, figs. 1 & 2.

Colobomatus, g. n.; body of the female elongated, head with 2 spatuli-

form appendages; 4 or 5 thoracic segments, the 3rd or 4th much longer than the others, bearing 2 pairs of non-articulated appendages; abdomen 3- or 1-jointed, terminated by a pair of simple appendages; a median eye; mouth proboscidiiform, with an upper and under lip and 2 small lateral jaws. *C. lamæ*, sp. n., on the Porbeagle, and *C. bergyltæ*, sp. n., on *Labrus bergylta*, coasts of Northern France. Hesse, Ann. Sci. Nat. (5) xvii. pp. 1-18, pl. xxiv.

CIRRIPEDIA.

BALANIDÆ.

Cirripeds known to live on whales are enumerated by Steenstrup (in a footnote to Lütken's monograph of *Cyamus*) in the following manner:—*Coronula balænaris* (Gmel.), on "right whales" of the Northern and Southern Hemispheres; *C. diadema* (L.), on *Megaptera boops* from the Atlantic, and also from the Southern Hemisphere; *C. reginæ* (Darwin), from unknown whales in the South Sea; *Tubicinella trachealis* (Sav.) on Northern and Southern "right whales"; *Xenobalanus globicipitis* (Steenstrup), on *Globocephalus melas*, from the Færoe Islands; and *X. strictus* (Steenstrup), on several species of *Delphinus* from the warmer parts of the Atlantic. Dan. Selsk. Skr. (5) x. p. 244.

ABDOMINALIA.

Kochlorine [Co-], g. n.; allied to *Cryptophilus*: postabdominal appendages bi-articulate, with 3 terminal bristles; no dorsal appendages; mantle entirely covered with chitinous spines; upper opening of the mantle surrounded by 3 tubercles, the right and left of which are armed at the tip with a strong toothed spine, the odd dorsal with a big hook. *K. [C.] hamata*, sp. n., boring in the shell of *Haliotis tuberculata*, found at Cadiz. The larva and small male specimens have also been found. Noll, Ber. senck. Ges. 1873, pp. 50-58.

PELTOGASTRIDÆ (SUCTORIA).

Peltogaster is re-characterized by R. Kossmann in the following manner: body lengthened, cylindrical or compressed, mostly somewhat bent; opening of the mantle at the thicker end, rooted peduncle not opposite to it, but in the line of the greatest convexity. A pair of testicles; no nidamental gland, eggs loosely accumulated in the cavity of the mantle. Parasitic on the abdomen of *Pagurideæ*. Arb. zool. zootom. Inst. Würzb. iii. p. 202. *P. philippinensis*, id. op. cit. ii. (1872), p. 120, pl. v. fig. 19, Philippines, *curvatus* and *longissimus*, id. op. cit. iii. p. 202, pl. x. figs. 5 & 7, Naples, on *Eupagurus prideauxi*: spp. nn.

Sacculina is thus re-characterized:—body laterally compressed, the sharp edges being the dorsal and ventral line; anal opening and peduncle opposite to each other. Nidamental gland rarely wanted, eggs agglutinated in threads or leaves. Parasitic on the abdomen of brachyurous Decapods. Id. op. cit. ii. p. 121, iii. p. 203.

Sacculina corculum on *Atergatis florida*, *S. dentata* on a *Portunus*, *S. bursāpastoris* on *Lambrus turriger*, *S. pisiformis* on *Chorinus aries*, *S. pilosa* on a *Pisa*, *S. crucifera* on *Cancer savignii*, *S. papilio* on a *Porcellana* (perhaps a distinct genus, iii. p. 204), *S. pomum* on *Chlorodius areolatus*, *S. ales* on a *Macrophthalmus*, *S. flexuosa* on *Grapsus strigosus*, *S. caption* on *Myra fugax*, *S. carinata* on a *Lupea*, *S. cartieri* on *Pilumnus ursulus*, *S. bipunctata* on a *Lupea*, *S. exarcuata* on a *Cancer*, *S. margaritifera* on *Thalamita*, all from the Philippines; *S. hians* on *Thalamita*, from Java, *S. cavolinii* on *Lambrus hoplonotus*, *S. benedeni* on *Grapsus varius*, from Palma: all spp. nn. Kossmann, *op. cit.* ii. pp. 122-131, pls. v. figs. 1-18, vi. figs. 1-7. *Sacculina purpurea* (F. Müller) is a *Peltogaster*; *id. l. c.* p. 102.

Thompsonia, g. n. A long peduncle; no mantle-opening; *Cypris*-like larva, with 2 eyes. *Id. l. c.* p. 132, pl. v. fig. 11a; fixed on legs of *Melia tessellata*, Philippines.

Parthenopea, g. n. (? = *Lernæodiscus*, F. Müll.). Body compressed in a dorso-ventral direction, perfectly symmetrical; opening of the mantle small, very near the peduncle. Nidamental gland simple; eggs agglutinated in branched strings. *Nauplius*-stage with the terminal processes directed upwards. Parasitic on *Thalassinide*. *P. subterranea*, sp. n., Naples, on *Callianassa subterranea*. *Id. op. cit.* iii. pp. 203-206, pl. x. figs. 1-4, 10 & 11.

ARANEIFORMIA.

Rhopalorhynchus, g. n.; Pycnogonid; body linear, smooth, 1st pair of cephalic appendages (mandibles) wanting; 2nd pair (1st pair of maxillæ) very thin, 9-jointed, 2nd & 3rd joints lengthened; 3rd pair (2nd pair of maxillæ) present in both sexes, somewhat longer, 10-jointed; 4th & 5th joints very long, the last four prehensile and serrated on the inner edge; feet without auxiliary claws. *R. kræyeri*, sp. n., Port Blair, Andamans. J. Wood-Mason, *J. A. S. B.* (n. s.) xlii. pt. 2, pp. 172-175, pl. xiii. figs. 1-5; *Ann. N. H.* (4) xii. pp. 342-345.

ARACHNIDA.

BY

THE REV. O. P. CAMBRIDGE, M.A., C.M.Z.S.

THE GENERAL SUBJECT.

ABENDROTH, E. R. Ueber morphologie und Verwandtschaftsverhältnisse der Arachniden. Leipzig: 1868, pp. 1-64.

EISEN, G., & STUXBERG, A. Bidrag teli Kamdomen om Gotska Sandön. Öfv. Ak. Förh. 1868, pp. 353-379, pl. v.

Records (p. 379) 17 species of 12 well-known and widely-distributed genera of *Araneidea*, and a *Thrombidium*.

Chapter vi. of M. Girard's 'Études sur la chaleur libre,' &c. [Zool. Rec. vi. pp. 174 & 175] refers to the *Arachnida*. Among the general results is the conclusion that *sex* presents a marked influence in the disengagement of superficial heat, the highest temperature being found in males.

ARANEIDEA.

CAMBRIDGE, O. P. On the Spiders of St. Helena. P. Z. S. 1873, pp. 210-227, pl. xxiv.

Records 23 species (11 new), raising the number now known to inhabit St. Helena to 40, comprised in 27 genera, and of which a list is given (cf. Zool. Rec. vi. p. 141).

——. On some new species of *Araneidea*, chiefly from Oriental Siberia. *Tom. cit.* pp. 435-452, pls. xl. & xli.

Describes and figures portions of 14 new species (*Lethia*, *Linyphia*, *Erigone*).

——. On some new genera and species of *Araneidea*. *Tom. cit.* pp. 112-129, pls. xii.-xiv.

Characterizes 5 new genera of different families, and 12 species (11 new).

(CAMBRIDGE, O. P.) On some new species of European Spiders. J. L. S. xi. pp. 530-547, pls. xiv. & xv.

Describes and figures 12 new species of known genera.

——. An Introduction to the Study and Collection of the Araneidea of New Zealand. Tr. N. Z. Inst. vi. pp. 187-207, pl. vi.

Discusses: i. The systematic position and general structure of the Araneidea; ii. their distribution and habits; iii. mode of search and capture; iv. mode of preservation as cabinet objects. Among other special points, the present state of the question as to the use of the male palpal organs in the impregnation of the female Spider is discussed, and it is suggested that the seminal fluid may possibly be conveyed to the cesophagus from the spermatic vessels by minute ducts, through the alimentary canal.

——. On New and Rare British Spiders (being a second supplement to "British Spiders New to Science," Linn. Trans. xxvii. p. 393). Tr. L. S. xxviii. pp. 523-555, pl. xlvi.

Records 72 species (one not British), of which 18 are new, and 10 others noted for the first time as British. Various synonymical corrections are also made.

HASSELT, A. W. M. VAN. Araneæ exoticæ, quas collegit pro museo Lugdunensi D. A. van Kaathoven, S. T., Novâ Hollandiâ (Melbourne). Tijdschr. Ent. (2) viii. pp. 236-243, pl. xii. figs. A, B, C.

Records 19 species (one new) belonging to 5 families.

KOCH, L. Die Arachniden Australiens, nach der Natur beschrieben und abgebildet. Nürnberg: 1873, pts. 8, 9, & 10, pp. 369-528, pls. xxix.-xl.

In further continuation of the work (see Zool. Rec. ix. p. 207). 88 species (70 new) and 13 new genera (*Drassides*, *Theraphosides*, *Thomisides*) are characterized.

MENGE, A. Preussische Spinnen. vi. Abtheilung. Schr. Ges. Danz. iii. pp. 327-374, pls. lviii.-lxiii.

This part includes 9 genera (one new), comprising 22 known and 5 new species.

PAVESI, PIETRO. Enumerazione dei Ragni dei dintorni de Pavia. Atti Soc. Ital. xvi. pp. (separate copy) 1-11.

Records 147 known species of 12 families, distributed among 70 genera

——. Catalogo sistematico dei Ragni del Cantone Ticino, con la loro distribuzione orizzontale e verticale, e Cenni sull' araneologia Elvetica. Ann. Mus. Genov. iv. pp. 5-215, woodcuts.

After discussing the classification and geographical distribution of the *Araneæ*, with historical and critical notes on Swiss Araneology, 206 species (6 new) are described, with a list of synonyms and notes on geographical distribution. The author also gives a summary of the Araneological fauna of the Canton Ticino, comparing it with that of forty-seven other countries, and noting the absence of various families and genera.

POWELL, LLEWELLYN. On the Spiders of New Zealand. Part I. Genus *Salticus*. Tr. N. Z. Inst. v. pp. 280-286, pl. xix.

In the present part of this work (intended to embrace all families and genera of *Araneidea*) 7 new species of *Salticus* (Latr.) are described.

SIMON, EUGÈNE. Études Arachnologiques (2^e Mémoire). Ann. Soc. Ent. France (5) iii. pp. 109-116, 327-374, pls. iv. & x.

Notes on *Atypus*, *Cercidia*, *Xysticus*, *Eresus* and an allied new genus (which two, according to the author, should form a separate family, *Eresida*, in his sub-order "*Araneæ veræ*," near the *Epeiridæ*, *Dyctynidæ*, and *Thomisidæ*, but remote from the *Attidæ*), *Theridium*, and *Neotitiura*, especially with reference to the French fauna. 16 new species are described.

— — — Aranéides nouveaux ou peu connus du midi de l'Europe. Mém. Liége (2) iii. [1873] pp. 271-358.

The new species, &c., contained in this paper are mentioned in Zool. Rec. vii. from a separate copy, with no pagination. In a 2nd memoir, with the same title, *op. cit.* v. ['Novembre, 1873,' on title; received January, 1875] pp. 1-174, pls. i.-iii. including species discussed in both memoirs, the author abandons the suborders of *Araneidea* established by Latreille, Thorell, and others, and proposes the following classification of Spiders:—Suborder i. *Theraphosæ*; ii. *Gnaphosæ*; iii. *Araneæ*; iv. *Oculata*. These are subdivided into families, subfamilies, and genera, those of Europe and the "Mediterranean basin" being distributed as follows:—Suborder i. fam. 1, *Aviculariæ*; 2, *Filistatidæ*: Suborder ii. fam. 3, *Dysderidæ*; 4, *Scytodidæ*: Suborder iii. fam. 5, *Drassidæ*; 6, *Dictynidæ*; 7, *Agelenidæ*; 8, *Enyoidæ*; 9, *Urocteoideæ*; 10, *Hersiliidæ*; 11, *Pholcidæ*; 12, *Theridiidæ*; 13, *Uloboridæ*; 14, *Epeiridæ*; 15, *Eresidæ*; 16, *Palpimanidæ*; 17, *Thomisidæ*: Sub-order iv. fam. 18, *Lycosidæ*; 19, *Oxyopidæ*; 20, *Attidæ*. Five new genera (in families 11, 8, 12, 15, & 16) are characterized, and 89 species recorded, of which 59 are described as new.

TACZANOWSKI, LADISLAS. Les Aranéides de la Guyane française. Hor. Ent. Ross. ix. pp. 111-150, 261-286, pls. v. & vi. (Suite).

In continuation of former papers (see Zool. Rec. ix. p. 207) 59 species (including 40 new) of various genera (one new), chiefly *Epeirides*, are characterized.

Thorell's "Remarks on Synonyms of European Spiders" (Zool. Rec. ix. p. 207) are reviewed by the Recorder: Nature viii. pp. 378-380.

The Recorder, Gard. Chron. Oct. 4, 1873, details one of the usual ways in which Spiders'-threads are fixed across any considerable intervening space.

THERAPHOSIDES.

Mygale mexicana, sp. n., Bellevoye, Bull. Soc. Moselle, 1870, Mexico [Rec. Am. Ent. 1871, p. 144].

Avicularia andalusiaca, ♂ & ♀, Andalusia [probably = *Ischnocolus triangulifer* (Auss.)]; *A. maroccana*, ♂, Morocco, *A. tetramera*, ♀, and *A. striaticauda*, ♂ & ♀, Lebanon, spp. nn., E. Simon, Mém. Liège (2) v. pp. 13-21.

Idiops compactus, sp. n., Gerstäcker, in v. d. Decken's Reisen in Ost-Africa, iii. pt. 2, p. 484, Dafeta.

Idiommata lepida, sp. n., *id. l. c.* p. 485, Moschi.

Harpactira constricta, p. 486, *chordata*, p. 487, spp. nn., *id. l. c.*, Dafeta.

Macrothele huttoni, sp. n., ♂, Wellington, New Zealand, O. P. Cambridge, Tr. N. Z. Inst. vi. p. 200, pl. vi. figs. 14-19.

J. T. MOGGRIDGE, "Harvesting Ants and Trap-door Spiders" (London: 1873, pt. ii. pp. 73-151, pls. vii.-xii) describes the habits of certain spiders found near Mentone. These are described and identified by the Recorder (*op. cit.*) as *Nemesia cæmentaria* (Latr.), *N. meridionalis* (Costa), *N. eleanora*, sp. n., p. 108, and *Cteniza fodiens* (Walck.). According to E. Simon, Bull. Soc. Ent. Fr. (5) iii. p. c., *N. cæmentaria* (Cambr. nec Latr.) = *badia* (Auss.) = *meridionalis* (E. Sim., ? Costa); *N. meridionalis* (Cambr. nec Sim.) ? = *manderstjerne* (Auss.) ♀, and *E. eleanora* is a good species, common from the Alps to Briançon.

Nemesia alpigrada, ♂, Avignon, *N. angustata*, ♂, Malaga, *N. crassimana* [-us], ♂, Granja, Spain, *N. concolor*, ♂ & ♀, Syria, spp. nn., E. Simon, Mém. Liège (2) v. pp. 27-32.

Cyrtachenius elongatus, ♀, sp. n., Morocco, *id. l. c.* p. 32.

Atypus sulzeri, Blackw., nec Latr., re-characterized and named *blackwalli*, p. 110, pl. iv. figs. 1-5; *A. piceus*, Sulz., ♀, re-described, pp. 112-114, *ibid.* figs. 6-9; *A. bleodonticus*, sp. n., ♀, p. 115, *ibid.* figs. 10 & 11, Digne; *id.* Ann. Soc. Ent. Fr. (5) iii.

L. KOCH, Arachn. Austral., describes and figures the following new genera and species:—

Phrictus [Spinola, *Hemiptera*, 1839], p. 488: near *Harpacibius* (Auss.). *P. crassipes*, ♀, p. 489, pl. xxxvii. fig. 5, Bowen, Port Denison.

Ischnocolus lucubrans, ♀, Port Mackay, p. 487, pl. xxxvii. fig. 4.

Idioctis, p. 484, allied to *Nemesia*. *I. helva*, ♂, Ovalau, pp. 484-486, pl. xxxvii. fig. 3.

Trittame, p. 482, allied to *Idiops*. *T. gracilis*, ♂, Bowen, *ibid.* pl. xxxviii. fig. 2.

Idiommata fusca, ♀, Rockhampton, p. 478, pl. xxxvii. fig. 1, *aussereri*, ♀, Pelew Islands, p. 477, pl. xxxvi. fig. 6, *reticulata*, ♂ & ♀, Port Mackay, p. 474, pl. xxxvi. fig. 4.

Pholeuon [Hampe, *Coleoptera*, 1856], very near *Nemesia*, differing in the denticulation of the tarsal claws, p. 471, pl. xxxvi. figs. 3a & 3b

(name *Pholeuon* changed to *Arbanitis*; p. 491). *P. longipes*. ♂, Bowen, p. 472, pl. xxxvi. fig. 3.

Ixalus [Ogilby, *Mammalia*, 1836; Duméril & Bibron, *Reptilia*, 1840], p. 469. *I. varius*, ♂, Bowen, Port Denison, *ibid.* pl. xxxvi. fig. 2.

Migas, p. 467. *M. paradoxus*, ♀, Auckland, N. Z., *ibid.* pl. xxxvi. fig. 1. *Aname*, p. 465. *A. pallida*, ♀, Bowen; *ibid.* pl. xxxv. fig. 8.

Hadronyche, p. 463; closely allied to *Closterochilus* (Auss.). *H. cerebera*, ♀, Sydney, N. S. W.; *ibid.* pl. xxxv. fig. 6.

Masteria, allied to *Pelecodon* (Dol.) "Oculi 6." *M. hirsuta*, ♀, Ovalau, pp. 457-459, pl. xxxv. fig. 5.

FILISTATIDES.

Filistata australiensis, ♀, Rockhampton, L. Koch, *l. c.* p. 451, pl. xxxv. fig. 4; *F. vestita*, ♂, Corsica, E. Simon, Mém. Liége (2) v. p. 56; *F. condita*, ♀, St. Helena, O. P. Cambridge, P. Z. S. 1873, pp. 210-227, pl. xxiv. fig. 1: spp. nn.

ECOBIIDES.

Ecobius ionicus, sp. n., ♂, Corfu, O. P. Cambridge, J. L. S. xi. p. 531, pl. xiv. fig. 1.

TETRABLEMMIDES.

Tetrablemma, g. n., with 4 eyes and 4 spinners; abdomen covered with a corneous shield above, and similar plates underneath. *T. medi-oculata*, sp. n., ♂, Ceylon, *id.* P. Z. S. 1873, p. 114, pl. xii. fig. 1.

DYSDERIDES.

Dysdera rubicunda (Bl. nec Koch) = *crocota* (Koch); O. P. Cambridge, *l. c.* p. 212.

Ariadne ionica, ♂, Corfu, *id.* J. L. S. xi. p. 532, pl. xiv. fig. 2; *A. dysderina*, ♀, Bowen, Port Denison, L. Koch, *l. c.* p. 447, pl. xxxv. fig. 2: spp. nn.

Oonops [*Oops*] *loricatus*, ♀, Upolu, L. Koch, *l. c.* p. 449, pl. xxxv. fig. 3; *O. loricatus*, ♀, Vacluse, E. Simon, Mém. Liége (2) v. p. 44: spp. nn. [Koch has priority].

Schænobates pavesii, sp. n., ♂ & ♀, Corsica; E. Simon, *l. c.* p. 43.

DRASSIDES.

Lampona macilenta, ♀, *L. pusilla*, ♀, *L. sordida*, ♀, *L. cylindrata*, ♂ & ♀, *L. ruida*, ♀, and *L. obscana*, ♀, New Holland; *L. murina*, ♀, Port Mackay, spp. nn. L. Koch, *l. c.* pp. 369-379, pls. xxviii. fig. 7, xxix. fig. 7.

Micaria crosia, ♀, Sydney, *M. inornata*, ♂, New Holland, *id.* *l. c.* pp. 383-382, pl. xxix. figs. 8 & 9: spp. nn.

Drassus invenustus, ♀, and *D. silaceus*, ♀, Sydney, *D. pretiosus*, ♂, N. Zealand, (Waikato), *D. erebus*, ♂, Canterbury, N. Z., *D. dilutus*, ♀, Rockhampton, *D. ochropus*, ♀, N. Zealand, *D. griseus*, ♀, New

Holland, *id. l. c.* pp. 382-392, pl. xxx. figs. 1-8; *D. isabellinus*, ♂, Corte, p. 164, and *D. femineus*, ♂, Corsica, p. 165, E. Simon, *Mém. Liége* (2) v. ; *D. ravidus*, ♂, Airolo, Pavesi, *Ann. Mus. Genov.* iv. p. 119, *D. razoumowskii*, ♂, Lugano, *id. l. c.* p. 123, and *D. heeri*, ♂ & ♀, Val di Sella, St. Gothard, *id. l. c.* p. 126: spp. nn.

Gnaphosa lugubris, sp. n., ♂, St. Helena, O. P. Cambridge, *P. Z. S.* 1873, p. 212, pl. xxiv. fig. 2.

Prothesima flavens, sp. n., ♂, Swan River, L. Koch, *l. c.* p. 393, pl. xxx. fig. 9.

Uliodon, g. n., *id. l. c.* p. 431, pl. xxxiv. figs. 2a, 2b, 2c. *U. albipunctatum*, ♀, *U. cervinum*, ♀, New Holland, spp. nn., *id. l. c.* pp. 432-433, pl. xxxiv. figs. 2 & 3.

Rhomalea [Burmeister, *Orthoptera*, 1839], g. n., closely allied to *Lio-cranum*, L. Koch; *R. vasta*, sp. n., ♀, Viti Levu. *Id. l. c.* p. 435, pl. xxxiv. fig. 4.

Centrothele, g. n., allied to *Hypsinotus* (L. Koch); *C. lorata*, ? sp. n., ♀, Port Mackay, L. Koch, *l. c.* p. 414, pl. xxxii. fig. 7.

Clubiona modesta, ♀, Port Mackay, p. 416, fig. 1, *C. robusta*, ♂ & ♀, Swan River, p. 417, fig. 2, *C. cambridgii*, ♂ & ♀, Canterbury, N. Z., p. 419, fig. 4, *C. alveolata*, ♂ & ♀, Upolu, p. 421, fig. 6, *C. maculosa*, ♀, p. 423, fig. 8, *C. notabilis*, ♀, p. 424, fig. 9, and *C. vacuna*, ♀, p. 426, fig. 10, Port Mackay, *C. peculiaris*, ♂ & ♀, Auckland, p. 427, fig. 11, Koch, *l. c.* pl. xxxii.; *C. tridens*, ♂ & ♀, p. 361, pl. lxii. fig. 205, *C. bifurca*, ♂ & ♀, p. 365, pl. lxiii. fig. 208, Prussia, Menge, *Schr. Ges. Danz.* iii.; *C. voluta*, ♀, Scotland, O. P. Cambridge, *J. L. S.* xi. p. 533, pl. xiv. fig. 3: spp. nn.

Clubiona pallens, L. Koch (*nec* Hahn), = *trivialis* (Koch); *C. diversa* (Cambr.) = *pallens* (Hahn); O. P. Cambridge, *Tr. L. S.* xxviii. p. 530.

Chiracanthium diversum, ♂ & ♀, Upolu, *C. longimanum*, ♂ & ♀, Samoa and Tonga Islands, *C. furax*, ♂, Ovalu and Upolau, *C. gracile*, ♀, Brisbane, *C. mordax*, ♂, Ovalau, *C. brevicaratum*, ♂ & ♀, Swan River, *C. tenue*, ♂, Port Mackay, *C. stratioticum*, ♂ & ♀, Waikato, N. Z., *C. gilvum*, ♂ & ♀, Rockhampton, Bowen and Port Mackay, Koch, *l. c.* pp. 396-410, pls. xxxi. figs. 1-6, xxxii. figs. 1-6; *C. erroneum*, ♂, Europe, and *C. pennii*, ♂ & ♀, England, O. P. Cambridge, *Tr. L. S.* xxviii. pp. 532 & 533, pl. xlvi. figs. 5 & 6; *C. mellissi*, ♂, and *C. planum*, ♂, St. Helena, *id. P. Z. S.* 1873, pp. 214 & 215, pl. xxiv. figs. 4 & 5: spp. nn.

Chiracanthium nutrix (Westr.), ♀, and *C. carnifex* (Fabr. & Koch), ♂ & ♀, new to Britain, *id. Tr. L. S.* xxviii. pp. 530 & 531, pl. xlv. figs. 3 & 4.

Agroeca cuprea, ♂ & ♀, Prussia, Menge, *l. c.* p. 339, pl. lix. fig. 193; *A. picta*, ♀, Brisbane, L. Koch, *l. c.* p. 438, pl. xxxiv. fig. 5: spp. nn.

Liocranum pallipes, ♀, Australia, Koch, *l. c.* p. 430, pl. xxxiv. fig. 1; *L. fasciatum*, ♀, Palermo, Simon, *Mém. Liége* (2) v. p. 161: spp. nn.

Scotina [-nus, Kby., Coleopt.], g. n., [= *Liocranum*, L. Koch]: *S. (Agelena) gracilipes* (Bl.), Menge, *l. c.* p. 337, pl. lix. fig. 192.

Hecaerge (Zora) frenata, ♀, Canterbury, N. Z., *H. australiensis*, ♀, Wologong, *H. ferruginea*, ♂, Australia, *H. torva*, ♂, New Holland, *H. tarantulina*, ♂, Port Mackay, Koch, *l. c.* pp. 440-445, pls. xxxiv. figs. 6-9, xxxv. fig. 1: spp. nn.

PALPIMANIDES.

Chedima, g. n., closely allied to *Palpimanus* (Duf.), differing chiefly in the number (?) and position of the eyes. *C. purpurea*, ♂ & ♀, sp. n., Morocco, E. Simon, *l. c.* pp. 151-154.

Pachypus [Dej., *Col.* 1821: D'Alton, *Mamm.* 1839], g. n., allied to both *Palpimanus* (Duf.) and *Otiotrops* (Macleay). *P. macleayi*, sp. n. ♂ & ♀, Ceylon, O. P. Cambridge, *P. Z. S.* 1873, pp. 115-118, pl. xii. fig. 2.

DICTYNIDES.

Stegodyphus, g. n. (= *Eresus*, Walck., fam. 2, "subtiles"), for *E. acanthophilus* (Duf.), *E. adpersus* and *molitor* (C. Koch); E. Simon, *Ann. Soc. Ent. Fr.* (v.) iii. pp. 336-339.

Eresus annulatus (Hahn) = *purpuratus* (Panz.), = *cinnaberinus* (Ol.). var.; Thorell, *Syn. Eur. Spid.* iv. p. 420. E. Simon, *l. c.* p. 341, considers it specifically distinct, and also that Panzer's description is irrecognizable.

Eresus rotundiceps, ♂, Ukraine, p. 344, *E. tricolor*, ♀, Basse- & Haute-Alps and Corsica, p. 348, figs. 10 & 11, *E. albipictus*, ♀, Palermo, p. 352, fig. 12, *E. lucasi*, ♂ & ♀, Oran, pp. 353-355, figs. 8 & 9, Simon, *l. c.* pl. x.; *E. solitarius*, ♂, Ronda, p. 154, and *E. lautus*, ♂, Syria, p. 156, *id.* *Mém. Liège* (2) v.: spp. nn.

Adonea, g. n., closely allied to *Eresus*. *A. fimbriata*, sp. n., ♂, Algeria, *id. l. c.* p. 158, pl. iii. figs. 24 & 25.

Dorceus latifrons, sp. n., ♀, South Algeria, *id. l. c.* p. 160, pl. iii. figs. 26 & 27.

Dictyna koziorowiczi, ♂ & ♀, Corsica, *D. vicina*, ♂ & ♀, South of France and Corsica, *id. l. c.* pp. 146-148; *D. lugubris*, ♂ & ♀, Corfu, O. P. Cambridge, *J. L. S.* xi. p. 535, pl. xiv. fig. 4; *D. ignea*, ♂, Prussia, Menge, *l. c.* p. 329, pl. lviii. fig. 188: spp. nn.

Dictyna pusilla (Westr.), new to Britain; O. P. Cambridge, *Tr. L. S.* xxviii. p. 534.

AGELENIDES.

Cambridgia fasciata (L. Koch), ♂, described and figured for the first time, from Chatham Island, N. Z. O. P. Cambridge, *Tr. N. Z. Inst.* vi. p. 14, pl. vi. figs. 1-13.

Amaurobius crucifer, sp. n., ♀, St. Helena, *id. P. Z. S.* 1873, p. 216, pl. xxiv. fig. 6.

Lathia taczanowskii, sp. n., ♂, Siberia, *id. l. c.* p. 435, pl. xl. fig. 1.

Celotes pickardi, sp. n., ♂, Switzerland, *id. J. L. S.* xi. p. 537, pl. xiv. figs. 5a-d.

Lachesis rufiventris, sp. n., ♂, Jordan Valley, E. Simon, *Mém. Liège* (2) v. p. 48.

Selamia, g. n., p. 69, founded upon *Lachesis reticulata* (Sim.), and *S. unicolor*, sp. n., Corsica, p. 79, ♀, E. Simon, *l. c.* pl. ii. figs. 4 & 5.

Habronestes (Zool. Rec. ix. p. 211) *libani*, ♂ & ♀, Lebanon, p. 73, and *H. islamita*, ♀, Syria, p. 76, spp. nn., *id. l. c.*

Enyo (mode of life detailed, p. 55) *elegans*. ♂ & ♀, Sicily, *E. nigriceps*.

♂ & ♀, and *E. soror*, ♂ & ♀, Corsica, *E. emarginata*, ♂ & ♀, Porto Vecchio, *E. gallica*, ♂ & ♀, Paris and Brittany, spp. nn., *id. l. c.* pp. 56-65, pl. ii. figs. 6, 7, 13, 14.

Tegenaria proxima, ♂, St. Helena, O. P. Cambridge, P. Z. S. 1873, p. 217; *T. femoralis*, ♂, *armigera*, ♂, Corsica, *maronita*, ♂ & ♀, Lebanon, and *sororiculata*, ♂, Corsica, *T. concolor*, ♂, Damascus, E. Simon, *l. c.* pp. 137-146, pl. i. figs. 17, 19, 20: *T. fuersilinii*, ♀, Lugano, P. Pavesi, Ann. Mus. Genov. iv. p. 105, woodcut: spp. nn.

Tegenaria cicurea (Koch), ♂, new to Britain. O. P. Cambridge, Tr. L. S. xxviii. p. 534.

Textrix moggridgii, sp. n., ♀, Mentone, *id. J. L. S.* xi. p. 537, pl. xiv. fig. 6.

HERSILIDIDES.

The genus *Hersilidia* (Simon, Mém. Liège, 2, iii. p. 347) is erroneously written *Hersiliada* in Zool. Rec. vii. p. 215, & ix. p. 212.

SCYTODIDES.

Scytodes delicatula, sp. n., ♂ & ♀, Spain, Barbary, Sicily, and Corsica, E. Simon, *l. c.* p. 379.

Loxoscelis erythrocephala (C. Koch), ♂, Mediterranean regions, and *L. rufescens* (L. Dufour), ♂, Spain, Sicily, and Corsica, described; *id. l. c.* p. 38.

PHOLCIDES.

Holocnemus, g. n., founded upon *Pholcus rivulatus* (Sav.), and *P. caudatus* (Duf.), *id. l. c.* p. 48.

Spermophila elevata, sp. n., ♂ & ♀, Corsica, *id. l. c.* p. 50, pl. iii. figs. 9 & 10.

THERIDIIDES.

Ariamnes nasica, ♂ & ♀, Ajaccio, *A. argenteolus*, ♀, Bonifacio, and *A. rostrata*, Porto Vecchio, spp. nn., *id. l. c.* pp. 132-137, pl. ii. figs. 17-21.

Argyroides nephila, ♂ & ♀, Cayenne, *A. trapezoidalis*, ♂ & ♀, Cayenne and Uassa, *A. elegans*, ♂ & ♀, Uassa, *A. hirtus*, ♀, Cayenne, *A. elevatus*, ♀, Uassa, *A. paradoxus*, ♀, and *A. triangularis*, ♂, Cayenne, spp. nn., L. Taczanowski, Hor. Ent. Ross. ix. pp. 114-123, pl. v. figs. 10-14.

Argyroides epëire (Sim.), = *gibbosus* (Luc.); E. Simon, *l. c.* p. 129.

Episinus lugubris, ♂, near Paris, Spain, and Corsica, *E. theridioides*, ♀, Corsica, spp. nn., E. Simon, *l. c.* pp. 123-126, pl. ii. figs. 32 & 33.

Pholcomma thorelli, sp. n., ♀, Porto Vecchio, *id. l. c.* p. 121, pl. ii. fig. 15.

Theridium (Walck.) and *Neottiura* (Menge). E. Simon, Ann. Soc. Ent. Fr. (5) iii. pp. 359-374, gives a sexually analytical list of the French species of these genera.

Theridium musivum, ♂, *T. genistæ*, ♂, Corsica, *T. rusticum*, ♂ & ♀, Sicily and Corsica, *T. nigrivariegatum*, ♂ & ♀, Corsica and Eastern Pyrenees, *T. bellicosum*, ♂, Zermatt, *T. (Neottiura) gonygaster*, ♂ & ♀,

Corsica and Naples, *T. (Neottiura) pellucidum*, ♂ & ♀, and *T. herbigrada*, ♂ & ♀, Corsica, spp. nn., *id.* Mém. Liége (2) v. pp. 94–115, pl. ii. figs. 26–29.

Theridium tepidariorum (Koch): H. Lucas, R. Z. 1872 (in continuation of a paper on this species, noted in Zool. Rec. viii. p. 202), describes at length its ♂ & ♀; and, among other interesting remarks, states as his opinion that the colour of the eyes of Spiders is due to colour in the cornea, just as that of the falces (in *Segestia florentina*) is owing to colour in the corneous epidermis.

Theridium (Pachydactylus) pronum (Menge), ♂, new to Britain; O. P. Cambridge, Tr. L. S. xxviii. p. 535.

Nesticus speluncarum, ♀, sp. n. (with four eyes only), in a cave near Spezzia; P. Pavesi, Ann. Mus. Genov. iv. pp. 344–352.

Lathrodictus oculatus (Walck.) and *L. argus* (Sav.) = *13-guttatus* (Rossi); E. Simon, *l. c.* p. 86.

Steatoda triangulifera (Walck.). On its synonymy; *id. l. c.* p. 116.

Lithyphantes dispar (L. Duf.). On its synonymy; *id. l. c.* p. 82.

Lithyphantes latifasciatus, ♀, p. 83, pl. ii. fig. 31, *L. septem-guttatus*, ♀, p. 84, Morocco, spp. nn., *id. l. c.*

Euryopsis umbratilis, ♀, p. 117, pl. ii. fig. 25, *E. pilula*, ♂, p. 119, Corsica, spp. nn. *id. l. c.*

Asagena corsica, sp. n., ♂ & ♀, Corsica, *id. l. c.* p. 78.

Formicina mutinensis (Canestrini), = *F. pallida* (Can.), *id. l. c.* p. 129.

Erigone psychrophila, sp. n., Spitzbergen, T. Thorell, Öfv. Ak. Förh. xxviii. (1871), pp. 689 & 690; *E. (Neriene, Bl.) pascalis*, ♂, *E. pavitans*, ♀, *E. clara*, ♀, *E. pudens*, ♀, and *E. morula*, ♂, Scotland, *E. uncata*, ♂ & ♀, North of England, spp. nn., O. P. Cambridge, Tr. L. S. xxviii. pp. 542–546, pl. xlvi. figs. 12–17; *E. (Walckenaera, Bl.) præcox*, sp. n., ♂, South of England, *id. l. c.* p. 549, pl. xlvi. fig. 19; *E. similis* (Camb.), ♂, and *E. furcillata* (Menge), ♂, recorded as British, *id. l. c.* p. 548, pl. xlvi. fig. 18; *E. nodosa*, ♂, North of England, *E. incurvata*, ♂, Scotland, spp. nn., *id. l. c.* pp. 550 & 551, pl. xlvi. figs. 20 & 21; *E. (Neriene, Bl.) flavescens*, ♀, *E. prolata*, ♂, *E. intercepta*, ♂, *E. taczanowskii*, ♂ & ♀, *E. wagæ*, ♂, *E. (Walckenaera) karpinskii*, ♂ & ♀, *E. dybowski*, ♂, and *E. subrostrata*, ♂, Siberia, *E. (Neriene) sollers*, ♂, Kiew, Poland, *id. P. Z. S.* 1873, pp. 440–450, pls. xl. figs. 6 & 7, & xli.

Erigone rurestris, C. Koch. Observations on the act of copulation in this species, by A. W. M. van Hasselt: Tijdschr. Ent. (2) viii. pp. 61–66.

Linyphia lepida, sp. n., ♀, Scotland, O. P. Cambridge, J. L. S. xi. p. 539, pl. xv. fig. 7; *L. albimaculata*, ♀, p. 219, *L. (?) trifididens*, ♂ & ♀, p. 220, St. Helena, *id. P. Z. S.* 1873, *L. karpinskii*, ♂ & ♀, *L. dybowski*, ♂ & ♀, *L. unicornis*, ♂ & ♀, and *L. taczanowskii*, ♂ & ♀, Siberia, spp. nn. *id. l. c.* pp. 437–439, pl. xl. figs. 2–5; *L. alticeps* (Sund.), ♂ & ♀, *L. angulipalpis* (Westr.), ♂, and *L. rufa* (Westr.), ♂ & ♀, recorded as new to Britain, *L. contrita*, ♂, Cheviot Hills, *L. linguata*, ♀, Berwick-upon-Tweed, *L. prudens*, ♂, *L. arcana*, ♂, and *L. reticulata*, ♂ & ♀, Cheviot, spp. nn., *id. Tr. L. S.* xxxviii. pp. 535–549, pl. xlvi. figs. 7–11 (*cf.* also note to p. 553, *l. c.*).

Ctenophora (Blackw., 1870 [Meigen, *Diptera*, 1803]), = *Mimetus* (Hentz, 1851); Simon, Mém. Liége (2) v. p. 76.

PHORONCIDIIDES.

Phoroncidia thratesi (Camb.), ♂, described; *P. septemaculeata*, ♂ & ♀, and *T. trispinosa*, ♀, Ceylon, spp. nn.; O. P. Cambridge, P. Z. S. 1873, pp. 123-125, pl. xiv. figs. 7-9.

Stegosoma, g. n.; allied to *Phoroncidia*, but the abdomen is without spines. *S. testudo*, ♀, p. 126, pl. xiv. fig. 10, *S. nasutum*, ♂ & ♀, p. 127, fig. 11, Ceylon, spp. nn., *id. l. c.*

Oroodes, g. n., founded upon *Epeira paradoxa* (Luc.); E. Simon, Mém. Liège (2) v. p. 127. [Evidently = the preceding genus, which has priority.*]

EPEIRIDES.

Meta digna (Camb.), = *Tetragnatha digna* and *T. indigna* (Camb.), O. P. Cambridge, P. Z. S. 1873, p. 222.

Tetragnatha filiformis, ♂ & ♀, Cayenne and Uassa, p. 111, *T. gibba*, ♀, Cayenne, p. 113, spp. nn., L. Taczanowski, Hor. Ent. Ross. ix.

Nephila sulphurea, ♀, Cayenne, p. 148, and *N. hirta*, ♂ & ♀, Cayenne and St. Laurent, p. 149, *id. l. c.*; *N. hymenæa*, p. 497, pl. xviii. fig. 11, *obsoleta*, p. 498, Dafeta, *dasyncnemis*, p. 498, *cothurnata*, p. 499, *sumptuosa*, p. 501, pl. xviii. fig. 12, *argyrotoxa*, p. 502, Zanzibar, *amænula*, p. 500, Bura Mts., Gerstäcker, in V. d. Decken's Reisen in Ost-Africa. iii. pt. 2; spp. nn.

Nephila. A. W. M. Van Hasselt (Arch. Neerl. viii.; separate copy, pp. 1-10; also published in Dutch, Tijdschr. Ent. 2nd ser. viii. pp. 136-145) gives a general review of the observations of some other authors, with a comparison in figures of the respective dimensions and weights of the male and female spider. Similar proportional dimensions and weights applied to the human race, would result in a man, 6 feet in height, and weighing 150 lbs. being consorted with a woman from 75 to 90 feet in height, and weighing 200,000 lbs. [The author does not appear to have been acquainted with the Recorder's observations and figures on this subject; Zool. s.s. 1868, p. 1241, and P. Z. S. 1871, p. 621, pl. xlix. figs. 1-4.]

Nephilengys genualis, sp. n., Gerstäcker, *l. c.* p. 502, Mombas.

Argiope [*Argyopes*] *maronicus*, ♀, St. Laurent de Maroni, p. 261, *A. subtilis*, ♀, Cayenne, p. 262, L. Taczanowski, *l. c.*; *A. suavissima*, Gerstäcker, *l. c.* p. 495, pl. xviii. fig. 10, Mombas, Zanzibar (? = *Epeira coquereli*, Vins.): spp. nn.

Singa lauræ, sp. n., ♀, France (not described but well figured), E. Simon, Mém. Liège (2) v. pl. iii. fig. 4; *S. guianensis*, ♀, Cayenne and St. Laurent, *S. marmorata*, ♀, Uassa, *S. erythrothorax*, ♂ & ♀, and *S. vittata*, ♀, Cayenne, spp. nn., L. Taczanowski, *l. c.* pp. 124-128. *S. pygmæa* (Sund.), = *S. trifasciata* (Koch), + *S. herii* (Westr.) + *E. anthracina* (Bl.), *S. sanguinea*, Koch, = *E. herii*, Bl.; O. P. Cambridge, Tr. L. S. xxviii. p. 552.

Cercidia pachyderma, sp. n., ♀, Ukraine, E. Simon, Ann. Soc. Ent. Fr. (5) iii. p. 327, pl. x. fig. 1.

* [*Stegosoma*, Loew, *Diptera*, 1863.—Ed.]

Epeira fuliginea (Koch), ♀, and *E. similis*, ♀, Cayenne and St. Laurent, *E. tristis*, ♀, Isles de Salut, *E. pantherina*, ♂ & ♀, Uassa, *E. kochi* (= *E. opuntia*, Koch) ♀, Cayenne and Uassa, *E. cayana* [*cayennensis*], ♀, *E. caudacuta*, ♀, Cayenne, *E. appendiculata*, ♂ & ♀, Uassa, *E. jelskii*, ♂ & ♀, Cayenne, *E. spinosa*, ♂ & ♀, St. Laurent and Isles de Salut, *E. decaspina*, ♀, and *E. anomala*, ♂ & ♀, Cayenne, L. Taczanowski, Hor. Ent. Ross. ix. pp. 129–144, pl. v. figs. 15–19; *E. beelzebub*, ♀, New Holland (Melbourne), A. W. M. van Hasselt, Tijds. Ent. (2) viii. p. 240, pl. xii. figs. A, B, C; *E. hæmatomera*, p. 491, pl. xviii. figs. 9, See Jipe, *kersteni*, p. 492, Moschi, *melanopa*, p. 493, Wanga, Gerstäcker, l. c. : spp. nn.

GASTRACANTHIDES.

A. G. Butler, P. Z. S. 1873, pp. 420–429, gives a synonymic list of 61 species of *Acrosoma*, and 6 of *Micrathena* [*M. (Plectane) argoides*, Dd., quoted doubtfully, p. 429, as of this genus, is undoubtedly a *Phoronidea*].

Acrosoma defensum, Para, *A. rubricinctum*, Brazil, and *A. rufipunctatum*, Jamaica, *A. raceminum*, Orinoco, *A. mamillatum*, Santarem, *id. l. c.* pp. 420–427; *A. rufum*, ♀, Cayenne, *A. luctuosum*, ♀, Cayenne and St. Laurent, *A. cornutum*, ♀, *A. pilosum*, ♀, Uassa, *A. maronicum*, St. Laurent, *A. sordidum*, ♀, *A. oblongum*, ♀, and *A. tenue*, ♀, Cayenne, *A. petersi*, ♂ & ♀, St. Laurent & Uassa, *A. subtile*, ♀, St. Laurent, *A. myrmeciiforme*, ♀, and *A. horridum*, ♀, Cayenne, L. Taczanowski, l. c. pp. 265–281, pls. v. figs. 20–24, vi. figs. 25–31 : spp. nn.

Gastracantha. A. G. Butler, Tr. E. Soc. 1873, pp. 153–180, pl. iv. in a monographic list, adopts various sub-genera proposed by Eugène Simon (Nat. Hist. des Araignées), and adds others; recording 115 species, of which 19 are described as new. The genus *Cyrtarachne* (Thor.) is also included, 19 known species of it being recorded.

Gastracantha remifera, Ceylon, *G. nigrisparsa*, Philippines, *G. sororna*, Madras, *G. scintillans* (locality unknown), *G. regalis*, New Hebrides, *G. retracta*, Old Calabar, *G. falcicornis*, S. Africa, *G. unguicornis*, India or China, *G. consanguinea*, China, *G. milvodes*, S. Africa, *G. dicallina*, Pachebon, Siam, *G. nana*, Congo, *G. panisicea*, Philippines, *G. nebulosa*, Java, *G. sumatrana*, Sumatra, *G. hebridisia*, New Hebrides, *G. albiventer*, Dorey, N. Guinea, *G. connata*, Old Calabar, *G. cambridgii*, West Coast of Africa, *id. l. c.* pp. 154–176, pl. iv.; *G. scapha*, p. 487, *toxotes*, p. 489, Dafeta, *radiata*, p. 488, Endara, *resupinata*, p. 490, pl. xviii. fig. 8, Endara, Mbaramu, Bura Mts., *impotens*, p. 491, Mombas, Gerstäcker, l. c. : spp. nn.

Hypophthalma [Latreille, *Crustacea*, 1831; -*mus*, Spix, *Pisces*, 1829], g. n. (allied to *Gastracantha*, but without spines on the abdomen); *H. deplanata*, sp. n., ♀, Cayenne : Taczanowski, l. c. p. 284, pl. vi. fig. 32.

ULOBORIDES.

Uloborus productus, sp. n., ♀, Corsica and Syria, E. Simon, Mém. Liège (2) v. p. 149.

STEPHANOPIDES.

Stephanopis (Camb.). L. Koch, Arachn. Aus. p. 492, includes this genus in his family 'Thomisiden,' dividing the species into two groups, in which the head is respectively higher or not higher than the thorax, and describing as new (Group I.) *S. bicornis*, ♀, Sydney, *S. armata*, ♂ & ♀, Bowen, and *S. scabra*, ♀, Port Mackay, Bowen, and Sydney, ♂, Wologong; (Group II.) *S. trapezia*, and *S. bicuspidata*, ♀, Port Mackay and Sydney, *S. lobata*, ♀, Rockhampton and near Sydney, *S. longipes*, ♀, and *S. hirsuta*, ♀, Rockhampton, *S. rubrisignata*, ♀, near Sydney: pp. 501-521, pls. xxxviii. & xxxix.

THOMISIDES.

Stiphropus, g. n., Gerstäcker, l. c. p. 478. Allied to *Xysticus*, but with a regularly quadrate and depressed cephalothorax, the outer anterior ocelli much larger than the rest, flattened and bluntly trigonal falces, short, robust, unarmed legs, of which the 2 anterior are longest and stoutest, and very rudimentary tarsal claws. *S. lugubris*, sp. n., *id. l. c.* p. 479, pl. xviii. fig. 6, See Jipe.

Selenops sansibaricus, sp. n., *id. l. c.* p. 479, Zanzibar.

Ocypte ferruginea, Koch, = *Olius regius*, F., *juv.*: *id. l. c.* p. 482.

Bomis, g. n. [allied to *Thomisus* and *Xysticus*]: *B. larvata*, sp. n., ♀, Australia, Koch, l. c. pp. 527 & 528, pl. xl. fig. 4.

Thomisus prosper, ♀ (locality unknown), and *T. opportunus*, ♂ & ♀, Ceylon, spp. nn., O. P. Cambridge, P. Z. S. 1873, pp. 119 & 120, pl. xiii. figs. 4 & 5.

C. W. Penny, in 3rd Rep. Wellington College Nat. Hist. Soc. p. 27, remarks on the adaptation in colour of the different varieties of *Thomisus citreus* (Walck.), ♀, and *T. abbreviatus* (*id.*), ♀, to the particular flowers inhabited by the individuals.

Xysticus pavesii, ♂, Naples, and *X. defectus*, ♂, Austria, spp. nn., O. P. Cambridge, J. L. S. xi. pp. 540 & 541, pl. xv. figs. 8 & 9. *X. jucundus*, ♂ & ♀, Digne & Briançon [= *X. defectus* (Camb.), which has priority]. *X. parallelus*, ♂ & ♀, and *X. comptulus*, ♂ & ♀, Corsica, spp. nn., E. Simon, Ann. Soc. Ent. Fr. (5) iii. pp. 328-333, pl. x. figs. 2-7. *X. rufipictus* (Camb.) = *X. sabulosus* (Hahn), var.; *X. westwoodi* (Camb.), = *X. bivittatus* (Westr.), ♂, = *X. ulmi* (Hahn); *X. viaticus* (Koch), ♂ & ♀, recorded as British; O. P. Cambridge, Tr. L. Soc. xxviii. pp. 528 & 529.

Moneses (*Monastes*, Luc.) *angulatus*, ♀, and *M. brevicaudatus*, ♀, Rockhampton, *M. xyphioides*, ♂, Port Mackay, spp. nn., L. Koch, Arachn. Austr. pp. 523-526, pl. xl. figs. 1-3. *M. staintoni*, sp. n., ♀, sp. n., Cannes, O. P. Cambridge, J. L. S. xi. p. 542, pl. xv. fig. 10.

Thanatus mundus, sp. n., ♀, Mentone, *id. l. c.* p. 543, pl. xv. fig. 11.

Philodromus torquatus, sp. n., ♂, Corfu, *id. l. c.* p. 545, pl. xv. fig. 12.

Amycle [Stål, *Hemiptera*, 1861; -*cla*, Koch, *Hemip.* 1857, Adams, *Moll.*, 1858; -*clæa*, Rondani, *Dipt.* 1863; -*cles*, H. Schäffer, *Lep.* 1855], g. n., remarkable for its general resemblance to *Salticus* in the cephalothorax and abdomen, but dissimilarity in the slenderness of its legs; *A. forticeps*, sp. n., ♂ & ♀, Ceylon, *id. P. Z. S.* 1873, p. 122, pl. xiii. fig. 6.

PODOPHTHALMIDES.

Labdacus, g. n., allied to *Podophthalma* (Capello) and *Triclaria* (Koch); *L. monastoides*, sp. n., ♀, Rio Grande, Brazil, O. P. Cambridge, P. Z. S. 1873, p. 118, pl. xii. fig. 3.

LYCOSIDES.

Phoneutria decora, sp. n., Gerstäcker, *l. c.* p. 483, pl. xviii. fig. 7, Mbaramu.

Lycosa astuta, sp. n., *id. ibid.* Mbaramu. *L. (Trochosa) dolosa*, ♀, St. Helena, sp. n., O. P. Cambridge, P. Z. S. 1873, p. 223. *L. trailli*, ♂ & ♀, and *L. biunguiculata*, ♂, Scotland, spp. nn. *id. Tr. L. S.* xxviii. pp. 524-526, pl. xlvi. figs. 1 & 2. *L. congener* (Camb.) = *L. nigriceps* (Westr.) and *L. saccigera* (Westr.); *L. degreyi* (Camb.) = *Araneus piscatorius* (Clerck); *L. umbraticola* (Koch), *L. piscatoria* (Bl.) γ = *Pirata hygrophilus* (Thor.); *L. barbipes* (Camb.) = *A. cuneatus* (Sund.); *L. cambrica* (Bl.) = *Pirata leopardus* (Sund.): *id. l. c.* pp. 523 & 524. *L. giebeli*, ♂ & ♀, St. Gothard, and *L. (Tarantula) sulzeri*, ♀, Lugano, spp. nn., P. Pavesi, Ann. Mus. Genov. iv. pp. 164-169, woodcuts.

SALTICIDES.

Salticus (Marpissus) nigrilimbatus (Camb.), ♂, described, and both sexes recorded as British; *S. (Attus) floricola* (Koch), ♂ & ♀, recorded as British; O. P. Cambridge, *l. c.* pp. 527 & 528. *S. (Attus) inexcultus*, ♂ & ♀, and *S. subinstructus*, ♂ & ♀, [= *S. illigeri* (Camb.)], St. Helena, spp. nn., *id. P. Z. S.* 1873, pp. 225-227. *S. (Attus) gemellus*, sp. n., ♀, North Italy, E. Simon, Mém. Liége (2) v. p. 166. *S. appressus*, ♂, *S. minax*, ♂ & ♀, *S. atratus*, ♂ & ♀, *S. v-notatus*, ♂, *S. fumosus*, ♂ & ♀, *S. mustelinus*, ♂, *S. albibarbatus*, ♂, spp. nn., Christchurch, Canterbury, New Zealand, L. Powell, Tr. N. Z. Inst. v. pp. 280-286, pl. xix.

Plexippus cothurnatus, p. 473, Mbaramu. *nummularis*, p. 474, pl. xviii. fig. 3, Zanzibar, spp. nn., Gerstäcker, in V. d. Decken's Reisen, iii. pt. 2.

Phidippus bucculentus, p. 475, pl. xviii. fig. 4, Mombas, *inflatus* and *orbicularis*, p. 476, Wanga, spp. nn., *id. l. c.*

Eris niveipalpis, sp. n., *id. l. c.* p. 477, Zanzibar, Egypt, Ceylon.

DINOPIDES.

Dinopis cornigera, sp. n., Gerstäcker, *l. c.* p. 478, pl. xviii. fig. 5, Aruscha.

THELYPHONIDEA.

PHRYNIDES.

A. G. BUTLER, Ann. N. H. (4) xii. pp. 117-125, pls. vi. & vii., in a monographic revision of the genus *Phrynus*, calls attention to the arrangement of the teeth in the falces as an important, but hitherto overlooked, specific character. He gives a synonymic list of 24 species

the four following being described and figured as new to science. *Phrynus batesi*, Upper Amazons, p. 120, pl. vi. figs. 8 & 9; *P. granulatus*, S. America, p. 122, pl. vii. figs. 10-12; *P. longicornis*, Para., p. 123, pl. vii. figs. 6 & 7, and *P. coronatus*, California, p. 124, pl. vii. figs. 8 & 9. *P. medius* (Koch, *nec* Herbst) is re-named *kochi*, p. 118, and figured, pl. vi. fig. 2.

Phrynus bacillifer, sp. n., Gerstäcker, in V. d. Decken's Reisen, iii. pt. 2, p. 472, Zanzibar.

Architarbus subovalis, sp. n. (foss.), H. Woodward, Geol. Mag. Sept. 1872, ironstone and coal measures, Lancashire.

THELYPHONIDES.

F. STOLICZKA, J. A. S. B. (n. s.) xlii. pt. 2, pp. 26-143, pl. xii. criticizes Butler's monograph of *Thelyphonus* [Zool. Rec. ix. p. 217], doubting the invariability of the number of teeth on the 2nd palpal joint, and laying more stress on the relative proportions of the joints themselves (especially of the 2nd, 3rd, and 4th), as well as on the proportions of the feet: stress is also laid on the form of the anterior part of the cephalothorax. Remarks are added on the geographical distribution of the genus (in many respects following Kaup's theory): no species has hitherto been recorded west of India and Ceylon, not even in Eastern Africa. Six species are described and figured, of which the following are new to science:—*Thelyphonus scabrinus*, p. 130, fig. 1, *T. indicus*, p. 138, fig. 5, *T. beddomii*, p. 142, fig. 6.

A. G. BUTLER, Ann. N. H. (4) xii. pp. 114-116, maintains his former views, in answer to the above recorded criticism. In Cist. Ent. pt. vi. (May, 1873), pl. v. he describes as new (and figures portions of) *Thelyphonus psittacinus*, p. 129, fig. 2, Silhet, *T. parvimanus*, p. 130, fig. 3, Ceylon, *T. philippensis*, *ibid.*, fig. 5, Philippines, *T. sepiaris*, p. 131, fig. 6, Burmah, Ceylon, and *T. nigrescens*, *ibid.* fig. 4, Tenasserim (= *sepiaris*, local form, *teste* Butler).

SCORPIONIDEA.

Lychas paraensis, Koch, = *Scorpio (Isometrus) americanus*, L., ♂, *ex. typ.*: Gerstäcker, in V. d. Decken's Reisen, iii. pt. 2, p. 471.

Chelifer minax, sp. n., Gerstäcker, *l. c.* p. 470, Endara.

SOLPUGIDEA.

A. G. BUTLER, Tr. E. Soc. 1873, pp. 415-425 (woodcut), adopts provisionally all Koch's genera of this group, founded on the number of tarsal joints, and gives a synonymic list of 52 species, distributed as follows:—*Rhax* (Hermann) 5, *Aellopus* (Koch) 1, *Galeodes* (Oliv.) 16, *Solpuga* (Leicht.) 18, *Gluvia* (Koch) 12.

Galeodes bengalensis, Bengal, Butler, *l. c.* p. 419, and p. 415, figs. 3, 3a, 3b.

PHALANGIDEA.

A. G. BUTLER, in a monographic list of the species of *Gonyleptes*, Ann.

N. H. (4) xi. pp. 112–117, pl. iii., records 19 species, of which the following are new:—*Gonyleptes armillatus*, Ecuador, p. 115, figs. 1 & 2; *G. ancyrophorus*, Quito, p. 116, figs. 5 & 6; *G. telifer*, Ega, p. 116, figs. 3 & 4.

ACARIDEA.

Acarus (Acaridina) balanarum, sp. n., C. J. van Beneden, Bull. Ac. Belg. (2) xxix. (1870), p. 353, on *Balena australis*.

Cnemidocoptes (g. n.) viviparus, sp. n., Fürstenberg, ("Die Kratzmilben der Hühner"), M. T. Vorpomm. ii. pp. 56–73, pl. i.

Pennetier's "Note sur la Demodex caninus et la Gale folliculaire," Bull. Soc. Rouen, 1872 (2^{me} trimestre), has not been seen by the Recorder.

Thrombidium (?) bulbipes, sp. n., A. S. Packard, Jr., Rep. Ins. Mass. iii. p. 26, Am. Nat. vii. p. 547, fig. 152, Massachusetts, U. S. A.; devours the *Aphis* of the rose.

Thrombidium tinctorium, L., occurs in Guinea, Zanzibar, Nubia, Egypt, and Bengal (p. 463); *Amblyomma venustum*, Koch, = *variegatum*, F., certe (p. 465); the ♀ of *Dermacentor rhinocerotis*, Deg., is described (p. 467): A. Gerstäcker, in V. d. Decken's Reisen, iii. pt. 2, who describes the following new species:—

Ornithodoros morbillosus, p. 464, See Jipe.

Amblyomma eburneum, p. 465, pl. xviii. fig. 1, Aruscha, Bura Mts., on *Varanus saurus*.

Dermacentor pulchellus, p. 467, pl. xviii. fig. 2, Aruscha, Uru, See Jipe.

Rhipi[do]cephalus pratextatus, p. 468, *perpulcher*, p. 469 (? = *pratextatus*, ♀), *stigmaticus*, *ibid.*, *punctatissimus*, p. 470, Mombas.

MÉGNIN, C. R. lxxvii. pp. 129–132, 492 & 493, gives lengthened observations on the zoological position and economy of the parasitic *Acari* known by the various names of *Hypopus*, *Homopus*, and *Trichodactylus*. The first of these is not a fully developed form but a "nymphé cuirassée, adventive, hétéromorphe": it is not the larva of a *Gamasus*, as Dujardin thought, but, in the case at least of *Tyroglyphus rostroerratus* (sp. n., Mégnin, J. de l'Anat. July, 1873), is an earlier stage of that species.

Hypopus spinitarsus, Herm., is also proved to be an early stage of *Tyroglyphus*, sp. n. *Homopus* and *Trichodactylus* must be dropped, but *Hypopus* may be retained as the name of this particular stage of development.

[O. Grimm's notice of *Tyroglyphus siro*, Zool. Rec. viii. p. 210, is accidentally included in the *Myriopoda*, and should of course be transferred to *Acaridea* in the preceding page.]

Macrobiotus americanus, sp. n., A. S. Packard, Jr., Am. Nat. vii. p. 741, fig. 181, New Gloucester, Maine, U. S. A. (another undescribed species occurs in Iowa).

Dermalichus ? sp. (? = a form of *Acarus malus*), is described and figured by C. V. Riley, Rep. Ins. Miss. v. 87, note, fig. 33. It destroys *Mytilaspis pomicorticis*, Riley, in Georgia.

C. V. RILEY, Am. Nat. vii. pp. 16–19, in an article on "Harvest Mites," describes as new *Leptus americanus* ? (probably the young of a *Throm-*

bidium), p. 17, fig. 5a, and *L. irritans*, p. 18, note, fig. 5b, S. W. States of North America.

A. FITCH, Rep. Ins. N. York, xii. (in Tr. N. Y. Agric. Soc. 1871, pp. 355-381) " regards the original habitat of *Ixodes americanus* as New York ; and describes as new *Ixodes 5-striatus*, Virginia and Indian Territory ; *I. robertsoni*, Indian Territory ; *I. cruciarius*, N. Y. ; *I. ? odontalgia*, N. Y." [Rec. Am. Ent. 1873, p. 114].

Ixodes ægyptius, L., from *Testudo mauritanica*, Algeria ; H. Lucas, Bull. Soc. Ent. Fr. (5) iii. p. xxxii.

Ixodes fuscimaculatus, sp. n., *id. l. c.* p. xxxi. from *Boa constrictor*, S. America.

Argas persicus, from Taurio, briefly described, and its venomous attributes denied ; Fumouze, *op. cit.* p. xxv.

Atoma gryllaria, sp. n., W. Le Baron, Rep. Ins. Illin. ii. fig. 1, Illinois, parasitic on *Caloptenus femur-rubrum* (*Orthopt.*) [Rec. Am. Ent. 1872, p. 35].

Thalassarachna, g. n., A. S. Packard, Jr., Am. J. Sci. (3) i. (1871), p. 108. Allied to *Hydrachna* ; head distinct, conical, max. palpi 5-jointed, ending in an incurved spine ; mandibles large ; claws long ; upper hook minute, lower hook with brush of hairs beneath. *T. verrilli*, sp. n., *id. l. c.* p. 107, fig. 5, a-d, in 20 fathoms salt-water, Eastport Harbour, U. S. A.

Hydrachna tricolor, sp. n., *id. l. c.* p. 108, note, New Haven, U. S. A.

MYRIOPODA.

BY

THE REV. O. P. CAMBRIDGE, M.A., C.M.Z.S.

THE GENERAL SUBJECT.

WOOD, H. C., Jr. The Myriopoda of North America. Tr. Am. Phil. Soc. (n. s.) xiii. pp. 137-248, pls. i.-iii. [and numerous woodcuts, to illustrate structural features].

The general structure of Myriopods is discussed at pp. 137-144. The Orders, Sub-orders, Families, and Genera are concisely characterized, and 87 species recorded, 2 being described as new. A synopsis of North American Myriopods is given, pp. 232-239, followed by "Remarks on the Natural Arrangement of the Myriopoda" (pp. 239-244), written after the paper itself had gone to press, and somewhat modify-

ing the classification originally adopted. The systematic arrangement finally adopted (pp. 244-248) discards the name *Chilopoda* (Latr.) in favour of *Syngnatha* (Leach), which is prior in date. The term *Diplopoda* (Blainville) also gives place to the older and more generally used name, *Chilognatha* (Latr.). The following is an analysis of the two arrangements of the *Myriopoda* as a class (as applied to N. American species):—

Order CHILOPODA. Sub-Order SCHIZOTARSIA. Fam. Cermatiidæ, gen. *Cermatia* (1 sp.). Sub-Order HOLOTARSIA. Fam. Lithobiidæ, gg. *Lithobius* (3 spp.), *Bothropolys* (3 spp.); fam. Scolopendridæ, gg. *Scolopendra* (9 spp.), *Cryptops* (2 spp.), *Opisthomega* (2 spp.), *Theatops* (1 sp.), *Scolopocryptops* (4 spp.); fam. Geophilidæ, gg. *Mecistocephalus* (3 spp.), *Geophilus* (4 spp.), *Strigamia* (14 spp.).

Order DIPLOPODA. Sub-Order STRONGYLLA. Fam. Polydesmidæ, gen. *Polydesmus*, sub-gg. *Polydesmus* (6 spp.), *Paradesmus* (2 spp.), *Fontaria* (3 spp.), *Leptodesmus* (3 spp.), *Strongylosoma* (1 sp.); fam. Iulidæ, gg. *Iulus* (16 spp.), *Spirobolus* (4 spp.); fam. Lysiopetalidæ, gen. *Spirostrephon* (2 spp.). Sub-Order SUGENTIA. Fam. Polyzonidæ, gen. *Octoglena* (1 sp.); fam. Siphonophoridæ, gen. *Brachycybe* (1 sp.).

The revised arrangement appears chiefly to affect the larger groups, and is as follows:—

Order SYNGNATHA. Sub-Order SCHIZOTARSIA. Fam. Cermatiidæ. Sub-Order HOLOTARSIA. Fam. Lithobiidæ, Scolopendridæ, Scolopendrellidæ, Geophilidæ.

Order CHILOGNATHA. Sub-Order PENTAZONIA. Fam. Glomeridæ, Sphærotheridæ. Sub-Order STRONGYLLA. Fam. Polyxenidæ, Polydesmidæ, Iulidæ, Lysiopetalidæ. Sub-Order SUGENTIA. Fam. Polyzoniidæ, Siphonophoridæ.

Eurypterus? (*Arthropleura*) *ferox*, Salter, is probably a *Euphoberia*: H. Woodward, Mon. Brit. foss. Crust. Merostomata, pt. iv.: cf. Am. J. Sci. (3) v. p. 312.

CHILOPODA.

Lithobius curtirostris, Gotska Sandön, Eisen & Stuxberg, Öfv. Ak. Förh. 1868, p. 376: *L. pinetorum*, O. Harger, Am. J. Sci. (3) iv. [1872], p. 118, Oregon: spp. nn.

Scolopendrella americana, sp. n., A. S. Packard, Jr., P. Bost Soc. xvi. p. 111, Massachusetts (connects *Thysanura* and *Myriopoda*).

F. Meinert's paper, "Myriopoda Musæi Havniensis. Bidrag til Myriopodernes morphologie og Systematik. I. Geophile," Nat. Tids. (3) vii. (1870), pp. 1-128, pl. i.-iv., has not been seen by the Recorder.

Geophilus pachymeropus, Gotska Sandön, Eisen & Stuxberg, l. c. p. 377; *G. gracilis*. Harger, l. c. New Haven, U. S. A.: spp. nn.

For synonymy of *Heterostoma trigonopoda*, Leach, *Scolopendra subspiniipes*, Leach, and *S. platypus*, Brdt., cf. Gerstäcker, in V. d. Decken's Reisen, iii. pt. 2, pp. 520-523.

Eucorybas grandidieri, Luc., = *multicostis*. Smh.; id. l. c. p. 524.

CHILOGNATHA.

Sphærotherium glabrum, Madagascar, p. 173, pl. xix. figs. 1 & 1a, *S. kochi* (= *S. punctatum*, Koch, nec Brandt), Java, p. 177, *S. stigmaticum*, Madagascar, p. 178, pl. xix. fig. 3, spp. nn., A. G. Butler, P. Z. S. 1873; *S. fraternum*, Butler, figured, *ibid.* pl. xix. fig. 2.

Zephronia banksiana, sp. n., locality unknown, *id. l. c.* p. 181, pl. xix. fig. 9. *Z. noticeps*, *artescens*, *ignobilis*, *pilifera*, *corrugata*, and *leopardina*, Butler, figured, *l. c.* pl. xix. figs. 3, 4, 5, 6, 7, 8, 10.

Polyxenus fasciculatus, Say, not uncommon in Massachusetts: A. S. Packard, Jr., P. Bost. Soc. xvi. p. 111.

Polydesmus armatus, Harger, Am. J. Sc. (3) iv. [1872], p. 121, pl. ii. fig. 8, Oregon; *P. mastophorus*, Gerstäcker, in V. d. Deeken's Reisen, iii. pt. 2, p. 517, pl. xviii. fig. 14, Mombas: spp. nn.

Eurydesmus laxus, p. 518, *compactilis*, p. 519, spp. nn., Gerstäcker, *l. c.* Mombas.

Iulus furcifer, Harger, *l. c.* p. 120, pl. ii. fig. 7, Oregon; *I. anceps*, Gotska Sandön, Eisen & Stuxberg, *l. c.* p. 378: spp. nn.

Spirostreptus xanthodactylus, p. 507, *procerus*, p. 508, *pyrrhozonus*, and *macrotis* (pl. xviii. fig. 13), p. 509, *civilis*, p. 510, *brachyterus*, p. 511, *pardalis*, p. 513, *suavis*, p. 514, Zanzibar, *sugillatus*, p. 512, Mombas, *scaliger*, p. 513, See Jipe, Gerstäcker, *l. c.*

Spirobolus pulchripes, p. 515, Mombas, *lumbricinus*, p. 516, Zanzibar, *id. l. c.* spp. nn.

S. H. SCUDDER, Mem. Bost. Soc. ii. pp. 231-239, "On the Carboniferous Myriopods preserved in the Sigillarian Stumps of Nova Scotia," characterizes a new family, *Archiulide* (p. 239), distinguished from the *Iulide* by having a cylindrical (or sub-cylindrical) body of uniform size throughout the principal portion, but tapering at each end to half the central width; many segments, with large lateral pores from 7th segment posteriorly; legs attached in double pairs to anterior half of each segment posterior to 4th; with no eyes, or few ocellar tubercles; and antennæ 4-jointed (?), very simple. This family contains *Archiulus*, g. n., p. 236 (closely resembling *Xylobius*, but with segments not broken into frustra. prominently ridged on anterior borders; and antennæ divided into 2 nearly equal halves between joints 2 & 3; *A. xylobioides*, sp. n. (*id. ibid.*), and *Xylobius*, Dawson, including *X. similis*, p. 233, *fractus*, p. 234, *dawsoni*, p. 235, *Acadia woodwardi*, p. 238, Gt. Britain, *id. l. c.* spp. nn.

Trichopetalum, g. n., Harger, *l. c.* p. 118.

Lysiopetalide: differs from *Pseudotremia*, Cope, in having no pores: eyed; sterna not closely united with scuta. *T. lunatum*, p. 119, pl. ii. figs. 1-4, New Haven, U. S. A., *glomeratum*, fig. 5, Oregon, *iuloides*, fig. 6, Lake Superior, p. 120, *id. l. c.* spp. nn.

Scoterpes, g. n., eyeless; with no lateral pores. E. D. Cope, Am. Nat. vi. [1872], p. 414; type, *Spirostrephon copii*, Packard.

Spirostrephon (*Pseudotremia*) *cavernarum*, Cope, occurs in Wyandotte Cave, Indiana. E. D. Cope, *l. c.*

INSECTA.

THE GENERAL SUBJECT

BY E. C. RYE, F.Z.S.

APPUN, K. F. Beiträge zur Insecten-Fauna von Venezuela und British Guyana. Das Ausland, xlv. (1872) pp. 41-47, 67-70.

An account of the habits, &c., of the most conspicuous species of all Orders, from personal observation.

BAR, CONSTANT. Note controversive sur le sens de l'ouïe et sur l'organe de la voix chez les insectes. CR. Ent. Belg. xvi. pp. lxxxix.-cxii.

General observations, with (as the author admits) no definite conclusions, and only intended to keep the subject in view. Experiments on *Hymenoptera* are recorded, proving that humming can be produced artificially, after complete abstraction of the wings.

BAUDELLOT, E. Contributions à la physiologie du système nerveux des insectes. Rev. Montp. i. (1872).

Not seen by the Recorder.

BETHUNE, C. J. S., SAUNDERS, W., & REED, E. B. Report of the Entomological Society of Ontario, 1872, including a Report on some of the noxious, beneficial, and common insects of the province of Ontario, prepared for the Honourable the Commissioner of Agriculture on behalf of the Society. Printed by Order of the Legislative Assembly. Toronto: 1873, 4to, pp. 75, woodcuts.

Insects injurious to the grape, hop, maple, peach, and potato, and common and beneficial species, are discussed and illustrated by the usual (borrowed) cuts. Bethune gives introductory remarks on the *Insecta* generally, and briefly characterizes the chief groups of *Coleoptera*. Nothing novel is recorded.

DUNCAN, P. M. Insect Metamorphosis. Nature, vii. (1872) pp. 30-34, 50-53, figs. 1-8.

A lecture delivered at the meeting of the British Association, 1872

(not reported in Rep. Br. Ass.). The author enters at some length upon the structure of the stomach, œsophageal epithelium, &c. of insects in various stages.

EBELL, A. J. About Insects, and how to observe them. Salem, Mass.: 1873, 12mo, pp. 75, 36 woodcuts.

An elementary Treatise on structure and classification.

FITCH, ASA. Twelfth Report on the noxious, beneficial, and other insects of the State of New York; in Transactions of the New York States Agricultural Society, xxvii. (for 1867; 1868 on title), pp. 889-932.

Contains observations on the economy of *Ceresa bubalus*, F., *Gypona flavilineata*, Fitch, *G. octolineata*, Say (*Homoptera*); *Alaria florida*, Guen., *A. volupia*, sp. n., pp. 907 & 908, Indian Territory west of Arkansas (*Noctuidæ*; Lep.); *Pristophora rufipes* (?), St. F., and *Nematus 3-maculatus*, St. F. (*Tenthredinidæ*; Hym.), — on the last, at great length.

This and other reports by the same author have hitherto escaped record both in Zool. Rec. and in Rec. Am. Ent. The 13th Report, however, was published in 1869, *op. cit.* p. 494, and the 14th in 1870, *op. cit.* p. 355 [from notice in Bull. Soc. Ent. Fr. (5) iii. p. civ. There is no Report in the vol. of Trans. N. Y. Agric. Soc. for 1871].

GERSTAECKER, A. In 'Baron Carl Claus von der Decken's Reisen in Ost-Africa in den Jahren 1859-1865.' Dritter Band: Wissenschaftliche Ergebnisse. Zweite Abtheilung: Gliederthiere (Insekten, Arachniden, Myriopoden, und Isopoden). Leipzig & Heidelberg: 1873. 4to, pp. 542, pls. 18.

The *Insecta* occupy 460 pages, and 17 pls., discussing the *Orthoptera*, *Coleoptera*, *Hymenoptera*, *Lepidoptera*, *Diptera*, and *Hemiptera*, met with during the above-mentioned travels. Many species, and a few genera, are most improperly declared to be new, although they were characterized by the author in Arch. f. Nat. xxxvii. (1871). General observations are made (pp. 438-455) on the Insect-fauna of the Zanzibar district, and on the distribution of the *Insecta* in Africa, and (pp. 456-460) on the character of the Insect-fauna of Madagascar.

GIRARD, MAURICE. Les Insectes; Traité élémentaire d'entomologie, comprenant l'histoire des espèces utiles et de leurs produits, des espèces nuisibles et des moyens de les détruire, l'étude des métamorphoses et des mœurs, les procédés de chasse et de conservation. I. Introduction (pp. 1-240). Coléoptères (pp. 241-840). Paris: 1873, large 8vo, with atlas of 60 pls.

In addition to the points specified in the title, the first part contains accounts of the anatomy and physiology, nervous system, instinct and intelligence, geographical distribution, and classification of insects, and a chapter on insects considered palæontologically. There is also a supple-

mentary index of general citations referring to entomology. The *Coleoptera* are discussed in a general way, both European and Exotic genera and species being briefly described, especially if of noxious or useful habits. The plates, of which some are coloured, are chiefly from Guérin's edition of Cuvier's 'Iconographie.' Exhaustive summaries of the work are given in R. Z. (3) i. pp. xxv.—xxx. and (by F. Plateau) in CR. Ent. Belg. xvi. pp. xxxiii.—xxxvi. ; it is also well reviewed in Bull. Soc. Ent. Fr. (5) iii. p. cxcii., (by Kraatz) in B. E. Z. xvii. pp. 218 & 219, (by De Marseul) Nouv. et faits (2), p. 2, and (by Deyrolle) Pet. Nouv. pp. 288–290.

GLOVER, TOWNEND. Entomological Record, in Monthly Reports of the Department of Agriculture for the year 1873. Washington, 1873, 8vo, pp. 29–31, 164–166, 237–239, 345–351, 426–431, 496–499, 571–579 (*cf.* also p. 285), six woodcuts.

Practical observations on the spread of noxious species in N. America, and the means of destroying them.

GRABER, V. Ueber die Blutkörperchen der Insekten. SB. Ak. Wien, lxiv. (1871), pt. 1, pp. 9–44, pl.

The above is the reference to the paper on the subject mentioned in Zool. Rec. viii. p. 219.

——. Vorläufiger Bericht über den propulsatorischen apparatus der Insekten. SB. Ak. Wien, lxv. (1872) pt. 1, pp. 189–204, pl.

An anatomical and physiological outline of the circulatory system, with details of the structure of the cellular membrane and different component layers of the apparatus. Highly magnified figures of various parts of the blood-sinuses, &c., in *Apis mellifica*, *Anthophora*, *Locusta viridissima*, *Ædipoda cærulescens*, *Stetheophyma grossum*, and *Chironomus plumosus* are given.

KALTENBACH, J. H. Die Pflanzenfeinde aus der Klasse der Insekten. II. Stuttgart: 1873, 8vo, pp. 289–848, woodcuts.

Completes the work mentioned in Zool. Rec. ix. p. 223 (*Daucus* to end of arrangement botanically). Lists are given of the vernacular and botanical names of the plants attacked; and of the Insects attacking them, arranged by Orders.

KIESENWETTER, H. VON. Entomologische Beiträge zur Beurtheilung der Darwin'schen Lehre von der Entstehung der Arten. B. E. Z. xvii. pp. 217–235.

Chiefly discusses the dimorphism of *Dytiscus*.

LE BARON, W. First Annual Report on the Noxious Insects of the State of Illinois, 1871. Second Report, 1872. Third Report, 1873 (76 pp.).

Not seen by the Recorder. From a notice in Canad. Inst. v. p. 235,

the last Report is of the usual American practical nature, discussing insects injurious to apple and cotton-wood, and containing also general 'Outlines of Entomology.'

LECONTE, J. L. Hints for the promotion of Economic Entomology in the United States. *Am. Nat.* vii. pp. 710-722.

This paper, read before the Portland meeting of the American Association, contains a historical review of American Entomological works, and many valuable suggestions for the further improvement of the practical works now published.

LOWNE, B. T. On the Structure of the Mouths of Insects. *Sci. Goss.* 1873, pp. 229-232, figs. 142-146.

The commencement of an illustrated explanatory series of observations, apparently intended for microscopists. Fig. 145, "The mandible of a predatory beetle," is an amalgamation of mandible, maxilla, 5-jointed maxillary palpus, and 3-jointed labial palpus.

LUBBOCK, Sir J. On the Origin and Metamorphoses of Insects. *Nature*, vii. pp. 446-449, 486-489, viii. pp. 31-33, 70-73, 107-109, 143-146, 167-169, 207-209, pls. i.-vi. & 63 figs. [also published separately, in "Nature Series," sm. 8vo, 1874].

After a general outline of the *Insecta*, and a comparison of the larvæ of various orders, the author comes to the conclusion that the form of the larva, whenever it departs from the hexapod *Campodea* type, has been modified by the conditions of its life; and, accordingly, that metamorphoses are either developmental or adaptive. The embryonic stage is compared with that of other *Articulata*. The ultimate conclusion is that the *Insecta* generally are descended from ancestors resembling *Campodea*, and that these have themselves arisen from others belonging to a type represented more or less closely by *Lindia* (*cf.* also a review by this author of A. S. Packard's 'Ancestry of Insects' in *Nature*, viii. pp. 249 & 250).

LUNGERSHAUSEN, LOUIS. Die Vertheidigungsmittel der Insectenwelt. *Das Ausland*, xliii. (1870), pp. 984-992.

An interesting general account of the means of self-defence possessed by insects.

MELDOLA, RAPHAEL. On a certain Class of Cases of Variable Protective Colouring in Insects. *P. Z. S.* 1873, pp. 153-162.

The author urges the adoption of Wallace's distinction between the terms "mimicry" and "protective resemblance," the former of which (the result of a "psychical mimetic adaptation," and not a *voluntary* imitation) is to be applied only to cases in which the object simulated is animate.

Instances of protective resemblance are classified under heads: 1. con-

stancy of characters both in imitator and imitated during life; 2, variation within small limits; 3, variation *once* during life; and 4, *periodic* change. Cases of variable protective colouring are given, chiefly in *Lepidoptera*.

MELDOLA, RAPHAEL. On the Amount of Substance-waste undergone by Insects in the Pupal State; with Remarks on *Papilio Ajax*. Ann. N. H. (4) xii. pp. 301-307.

Refers simply to experiments on *Bombyx quercus* and *Liparis dispar* (*Lepidoptera*).

MÜLLER, ALBERT. Contributions to Entomological Bibliography up to 1862. No. 1. Tr. E. Soc. 1843, pp. 207-217. Nos. 2 (pp. 15) & 3 (pp. 16) published separately, 8vo, London: 1873.

Additions (mostly unimportant) to Hagen's well known work.

MÜLLER, HERMANN. On the Fertilization of Flowers by Insects, and on the reciprocal adaptations of both. Nature, viii. pp. 187-189, 205 & 206, 433-435, ix. pp. 44-46, figs. 1-22.

Chiefly in connection with *Hymenoptera*. Highly magnified figures of the mouth organs in *Apis* and *Bombus* are given.

PAASCH, A. Von den Sinnesorgan der Insekten im Allgemeinen, von Gehör- und Geruchsorganen im Besonderen. Arch. f. Nat. xxxix. 1, pp. 248-275.

Contains a review of former publications on the senses of insects. No fresh discoveries or experiments are recorded.

PACKARD, JUNR., ALPHEUS S. Our Common Insects. Salem, Mass.: 1873. 12mo, pp. 220, 268 woodcuts.

A popular account of the more common Insects of the United States, with a calendar containing an account of injurious and beneficial species, their times of appearance, habits, &c. Chapter xiii. of this work, "The Ancestry of Insects," was printed in advance [see LUBBOCK, *suprà*], pp. 148-186, figs. 177-214. In it, the affinities of the *Insecta* to other Invertebrates are traced through the earlier stages, and the idea that the evolution hypothesis is opposed to a plan of creation is repudiated. The type of the *Articulata* is founded from similar development and structure between *Annelida* and *Crustacea* on the one hand, and *Annelida* and *Insecta* on the other.

——. On the Cave Fauna of Indiana. Rep. Peab. Ac. v. p. 93.

Enumerates *Anthomyia* sp.?, *Anophthalmus tenuis*, Horn, *Platynus marginatus*, with normal eyes (pupa also eyed), and *Ceuthophilus* (*Orthopt.*), sp. n.

——. Record of American Entomology, for the year 1872. Salem, Mass.: 1873, 8vo, pp. 35.

(PACKARD, JUNR., ALPHEUS S.) Third Annual Report on the Injurious and Beneficial Insects of Massachusetts, made to the State Board of Agriculture. Salem, Mass.: 1873, 8vo, pp. 27, 15 woodcuts.

Reprinted, with corrections, under the title 'Injurious and Beneficial Insects'; Am. Nat. vii. pp. 524-548. Insects injurious to the strawberry and bean, fruit and forest trees, and a few beneficial species are discussed, chiefly as to the larval state.

— Directions for collecting and preserving Insects. Sm. Misc. Coll. No. 261 (Sept. 1873), pp. 60, 55 woodcuts.

Much of this is from the author's 'Guide to the Study of Insects.'

PERRIS, ÉDOUARD. Les Oiseaux et les Insectes. Mém. Liège (2) iii. [1873], pp. 673-730.

The above is the publication reference of this paper, noticed in Zool. Rec. ix. p. 227.

— Résultats de quelques promenades entomologiques. Ann. Soc. Ent. Fr. (5) iii. pp. 61-98, 249-252.

These observations are the result of a week's stay early in July, 1872, near the Adour, in the Landes, and comprise interesting details of the habits, structure, and economy of insects of all orders. As a rule, the author is of opinion that no larva, under normal conditions, lives as such for more than 2 years: eggs of a *Cetonia*, laid in the spring of 1872, had hatched, and many of the larvæ assumed the pupal state in the middle of September of the same year, some few having even assumed the perfect state at that time. In a discussion of the subject of correcting evident errors in the construction of names of insects, the author states that the specific name of *Apion tamaricis* should be incontestably written *tamariscis*.

REED, E. B. [See BETHUNE.]

RILEY, C. V. Fifth Annual Report on the noxious, beneficial, and other Insects of the State of Missouri, made to the State Board of Agriculture, pursuant to an appropriation for this purpose from the Legislature of the State. Jefferson City, Mo.: 1873, 8vo, pp. 160 & viii., 73 woodcuts.

Contains a general introduction to Entomology, and instructions for collecting and preserving insects. The author continues his notices of various noxious species, especially as to their earlier stages and parasites.

RITZTEMA, J. Bijdrage tot de Kennis van de Entomologische Fauna der Noordzee-Eilanden. Tijdschr. Ent. (2) viii. pp. 243-256.

Enumerates species of *Orthoptera*, *Neuroptera*, *Coleoptera*, *Hymenoptera*, *Lepidoptera*, *Diptera*, and *Hemiptera* found in the islands Tessel, Terschelling, Ameland, Schiermonnikoog, and Rottum.

RONDANI, CAMILLO. Degli Insetti nocivi e dei loro Parassiti.
Bull. Ent. Ital. v. pp. 3-30, 133-165, 206-232.

Completes the *Lepidoptera*, and in like manner discusses injurious *Coleoptera* and *Hymenoptera* and their various insect enemies.

SAUNDERS, H. [See BETHUNE.]

WEYENBERGH, H. Ueber ein zweiköpfiges monstrum (Larve von *Chironomus*) und über Insecten-monstra überhaupt.
S. E. Z. xxxiv. pp. 452-458, fig.

After describing and figuring the double-headed larva above-mentioned, the author discusses various works on Insect monstrosities, coming to the conclusion that only one, a larva of *Bombyx mori*, can be considered a genuine monster, the others being mere deformities.

General observations on Insect instinct. Das Ausland, xliii. (1870) pp. 217 & 219.

Insect-music. Landois' observations (Nat. Ver. preuss. Rheinl. & Westph.) reproduced with comments; *op. cit.* pp. 429 & 430.

On the position of the centre of gravity in insects: a short statement of his theory by F. PLATEAU, Nature, v. (1872), p. 297. An abstract of the same author's observations on submersion, &c., of aquatic *Articulata* (Zool. Rec. ix. p. 226) is given by him in Ann. N. H. (4) xi. pp. 70-73.

A general account of the mouth-organs of insects by B. T. LOWNE, J. Quek. Club, iii. pp. 207-209.

Observations by P. PANCERI on the luminosity of the eyes of insects are discussed in Bull. Ent. Ital. pp. 57 & 58.

Hypermetamorphosis: general observations by J. LICHTENSTEIN, Bull. Soc. Ent. Fr. (5) iii. p. xxi.

Mimicry: *Salticus* and *Sima* (p. ix.), *Pentatoma* (p. xiv.); P. E. Soc. 1873.

On Insects useful to man, *cf.* GOUREAU, Bull. Soc. Yonne, xxvi. p. 3.

M. GIRARD'S 'Études sur les insectes carnassiers utiles,' Paris: 1873, 8vo, cut (extr. from Bull. Soc. Acclim.), and the same author's 'Rapport sur l'Exposition des Insectes de 1872 à Paris' (extr. from publications of Soc. des Agriculteurs de France), have not been seen by the Recorder.

Noxious and useful Insects. A paper by LETHIERRY, DESPRETZ, & others, entitled "Réponses à un questionnaire de la Société des Agriculteurs de France, sur les Insectes nuisibles ou utiles," extr. from the Archives du Comice agricole de Lille, is referred to in Bull. Ent. Fr. (5) iii. p. x.

In S. B. z.-b. Wien. xxiii. p. 9, is an abstract of a 'Bericht' of the Krakauer Landwirthschafts-gesellschaft, containing short notices of insects of all orders injurious to plants. A similar list in Bull. Soc. L. N. Fr. 1873, p. 151.

On destruction of insects injurious to vegetation, *cf.* YOL, C. R. lxxvi.

Insects used as food: general remarks by J. DE GAULLE, *Feuill. Nat.* iii. p. 125.

In ASA GRAY'S "Botany for Young People," Part II. (Salem, Mass.: 12mo, pp. 46, 40 cuts), is an account of the way in which insects are employed for the good of plants.

Fertilization of plants by insect agency [see H. MÜLLER, *suprà*]: W. E. HART, *Nature*, viii. pp. 49 & 50, 121, 244, figs. 1 & 2, F. E. KITCHENER, *l. c.* p. 143, A. T. MYERS, *l. c.* p. 202, A. W. BENNETT, *l. c.* p. 403, all in connection with *Viola*; W. A. FORBES, *l. c.*, *Orchids*; H. MÜLLER, *l. c.* p. 161, W. E. HART, *l. c.* p. 162, F. E. KITCHENER, *l. c.* p. 143, and an anonymous note, *l. c.* p. 121, all on *Nepeta glechoma*; T. H. FARRER, *l. c.* p. 162, *Lotus*. F. B. WHITE, *J. of Botany*, Jan. 1873, on distribution by insects, chiefly *Lepidoptera* (also *Am. Nat.* vii. p. 268); on insect fertilization of *Ericæ* and other plants with pulverulent pollen, *Ann. N. H.* (4) xii. p. 436 (abstr. of Kerner's paper, *Arch. Sci. Nat.* xlvii. p. 302).

For plan of an exhibition of the useful and noxious insects of North France, *cf.* *Bull. Soc. L. N. Fr.* 1872, p. 144, 1873, p. 187.

Economic entomology: note, *Nature*, vi. (1872) p. 197.

Insect-galls produced in Scotland are briefly described by J. W. H. TRAILL, *Scot. Nat.* ii. pp. 30-32, 78-80, 126-128, 170-173.

Fungoid growth. J. PEYRITSCH, *SB. Ak. Wien*, lxviii. pt. i. pp. 227-254, pls. i.-iii., discusses the origin and growth of *Laboulbenia* in various insects, especially *Carabidæ*; in continuation of a former notice by him, *op. cit.* lxiv. (1871) pt. 1, pp. 441-458, pls. 2, in which the same fungus is described in connection with *Diptera*.

The sea from Tunis to Italy covered with dead butterflies, moths, and dead dragonflies during a period of 5 days. J. S. Walker: *Ent.* vi. p. 457.

Geographical distribution. DE SÉLYS LONGCHAMPS (*Lepidoptera*), *CR.* *Ent. Belg.* xvi. pp. xxii.-xxv., advocates the adoption of an exact statistical local fauna, refusing to accept Staudinger's 60 per cent. as a definition of limit. ROELOFS, *op. cit.* pp. xxv.-xxix. discusses the theories of Koch & Murray. DE BORRE, *op. cit.* pp. xliii.-liii., generalizes, and advocates the formation of groups of faunas. General observations also by V. KIESENWETTER, *SB. Ges. Isis*, 1871-2, p. 171.

Captures:—In the Glenelg Valley, Inverness; P. CAMERON, *Scot. Nat.* ii. p. 61. East Berwickshire (*Coleoptera*, *Hymenoptera*, *Hemiptera*): J. HARDY gives a list in continuation of former accounts, with notes of localities, &c.; P. Berw. Club, vii. pp. 138-142. Cheviot Hills: a similar list, *id. op. cit.* pp. 152-156. Upper Carinthia: *Coleoptera* and *Hemiptera* observed by GÉHIN, PUTON, & TSCHAPECK; *Pet. Nouv.* p. 360. In A. BECKER'S 'Reise nach Baku, Lenkoran, Derbent, Madschalis, Kasum Kent, Achty,' *Bull. Mosc.* xlvi. 1, pp. 255-258, are lists of *Lepidoptera* and *Coleoptera* observed. Caucasus and eastern coast of the Caspian: J. FAUST, *Bull. Ent. Ross.* ix. pp. x.-xii. Results of excursions to the wood of Ficuzza and other places in Sicily recorded by G. P. MAROTT, *Bull. Ent. Ital.* v. pp. 180-197. Italy and S. France: F. WALKER continues his notes; *Ent.* vi. pp. 278, 403. California: G. R. CROTCH, *Pet. Nouv.* p. 311.

New Zealand. In R. TAYLOR'S 'Te Ika a Maui,' 2nd edn., London : 1870, 8vo, pp. 641-646, are brief notices of the most conspicuous indigenous species, with the native names. A coloured figure of *Diadema arge* is given. A sand-frequenting beetle, '*Mumutawa*,' is often entirely occupied by a fungus; dragon-flies frequent the sea-shore in great numbers, and are found dead on the wet sand, indicating the method by which fossil species have been imbedded; *Cicadæ* are found affected by *Sphæria*; *Cynthia cardui* and *Sphinx convolvuli* occur; a striped Indian *Culex* has been imported, and no musquito is believed to be indigenous; the large blue flesh-fly has been introduced from England, *viâ* N. S. Wales; and it is noted that in a voyage from Sydney to London, 12 Australian species of insects arrived in sufficient numbers and good condition to propagate.

A list of 502 species of insects (of all orders except *Lepidoptera*) found previously to 1870, *viz.*:—*Coleoptera*, 265 species; *Hymenoptera*, 23; *Diptera*, 98; *Neuroptera*, 42; *Orthoptera*, 30; *Hemiptera-Heteroptera*, 22; *H.-Homoptera*, 22. F. W. Hutton, Tr. N. Z. Inst. vi. pp. 158-171.

Killing and Preserving. AUZOUX, Bull. Soc. Ent. Fr. (5) iii. p. clxxxii. recommends the use of a few drops of oil of bitter almonds in sawdust.

On collecting (chiefly as to the use of cyanide of potassium); T. L. MEAD, Canad. Ent. v. pp. 78-80.

To preserve insects in collections, P. STEFANELLI, Bull. Ent. Ital. v. pp. 53-56, woodcut, recommends the application of the essential oil of *Betula alba*, and mentions another mixture of essence of fennel, creosote, alcohol, camphor, and naphthaline as especially obnoxious to *Anthreni*. L. REYNAUD, Feuille. Nat. iii. pp. 107 & 121, advocates the use of patchouli. Carbolic acid in solution recommended, as a wash for boxes or card, to preserve specimens from attack: T. A. MARSHALL, Ent. M. M. x. p. 166.

On insect-mounting in hot climates: T. CURTIES & J. E. INGPEN, J. Quek. Club, iii., pp. 230-232 (immediate immersion in Canada balsam, without pressure, and exposure for a considerable time to rays of the sun, in the case of small species; slight pressure and drying in leaves of a book, immersion in spirits of turpentine, and mounting in balsam, for larger insects). *Cf.* R. C. R. Jordan, Ent. M. M. ix. p. 273.

Mounting insects on card advocated: T. J. BOLD, Ent. M. M. ix. p. 219.

On packing insects for transport: DOURS, Bull. Soc. L. N. Fr. 1872-73, p. 92.

On a cheap substitute for a cabinet: BELL, Canad. Ent. v. p. 136.

Stalks of *Typha latifolia* can be used instead of cork for insect boxes: H. B. MÖSCHLER, S. E. Z. xxxiv. p. 96.

Entomological desiderata: Bull. Soc. L. N. Fr. 1873, p. 183.

Nomenclature. D. SHARP, in a pamphlet on 'The Object and Method of Zoological Nomenclature,' London: 1873, 8vo, pp. 39, more particularly discusses the various opinions published on the subject of insect nomenclature. He considers that naturalists are at the present time justified in the attempt to establish a basis of permanent names; that genera are still so unsettled that their names cannot form a part of such permanent scheme; that the *first* generic and specific names together

form the (unalterable) specific name of any insect; and that such generic names as may be from time to time proposed should be used in addition to these two; thus reverting to a trinomial plan. H. VON KIESENWETTER, CR. Ent. Belg. xvi. pp. cxlvi.—cxlviii., denies that he invented or materially seconded the adoption of the principle of absolute priority. BREYER, *op. cit.* p. cxlviii., contradicts this denial. On the general question, *cf.* T. L. MEAD, Canad. Ent. v. pp. 18 & 108; W. H. EDWARDS, *op. cit.* pp. 21–36; H. K. MORRISON, *op. cit.* pp. 70 & 106; F. B. WHITE, Scot. Nat. ii. pp. 104–109; S. A. DE MARSEUL, Nouv. et faits. No. 40, and Bull. Soc. Ent. Fr. (5) iii. p. clix.

General observations on the definition of a species in entomology are given by C. P. DE LA BRÛLERIE (followed by A. FAUVEL & P. MABILLE) in Bull. Soc. Ent. Fr. (5) iii. pp. lviii.—lxii., lxxi.—lxxiv. No new opinion is advanced.

Hans Ström: Further account of his entomological works by HAGEN, S. E. Z. xxxiv. pp. 225–232, with list of species of all orders described by him.

COLEOPTERA.

BY

E. C. RYE, F.Z.S.

THE GENERAL SUBJECT.

BARGAGLI, P. Materiali per la Fauna Entomologica dell' Isola di Sardegna. Coleotteri. Bull. Ent. Ital. v. pp. 34–49, 88–97, 198–207, 244–256.

Cebrionidæ to end.

BATES, H. W. On the Geodephagous Coleoptera of Japan. Tr. E. Soc. 1873, pp. 219–322.

244 species of *Cicindelidæ*, and *Carabidæ* are now known from Japan, 120 of which are added in this paper, from the captures of Mr. G. Lewis. 9 genera out of the 84 in which these are contained are peculiar to the country, but no extensively endemic fauna is to be expected, as the islands are not geographically oceanic, the separation from Korea being narrow and shallow. In spite of the apparent similarity between Japanese species and those of Western Europe [see SHARP, *infra*], there is no identity between the two faunas; but there are distinct traces of affinity between the Eastern states of N. America and Japan.

——. Descriptions of new genera and species of Geodephagous Coleoptera, from China. *Tom. cit.* pp. 323–334.

BAUDI, FLAMINIO. Catalogo dei Dascillidi, Malacodermi e Teredili della Fauna europea e circummediterranea appartenenti alle collezioni del Museo Civico di Genova. Ann. Mus. Genov. iv. pp. 226-268.

Some new species are described, but many of them are not named. Varieties and localities are mentioned, with some synonymy.

——. Coleopterorum messis in insulâ Cypro et Asia Minore ab Eugenio Truqui congregatæ recensitio: de Europæis notis quibusdam additis (Pars quinta). B. E. Z. xvii. pp. 317-338.

The author continues his remarks upon Coleoptera from the above specified localities (*Dasytides*—*Cioidæ*). New species are described.

BERTOLINI, S. DE. Catalogo sinonimico e topografico dei Coleotteri d'Italia. Firenze: 1873, pp. 45-92.

Published with Bull. Ent. Ital. v. This part includes from the *Staphylinidæ* to the *Cucujidæ*.

CROTCH, G. R. Check List of the Coleoptera of America, North of Mexico. Salem, Mass.: 1873 [on title: 1874 on cover]. 8vo, pp. 136.

Enumerates 7450 species, with alterations and synonyms. The *Coccinellidæ*, *Erotylidæ*, and *Endomychidæ* are treated as *Clavicornes*, and the system ends with the *Brenthidæ*: the *Bruchidæ*, under the name *Spermo-phagidæ*, immediately preceding the *Chrysomelidæ*.

——. On the arrangement of the families of Coleoptera. P. Am. Phil. Soc. xiii. pp. 75-87.

Following Leconte in separating the *Rhynchophora* from the "*Coleoptera genuina*," on account of their anterior coxal cavities being closed by the junction of the epimera, and of their tarsal structure, the author divides the latter into *Heteromera* and *Isomera*, and the *Isomera* into *Tetramera* and *Pentamera*. The *Pentamera* are composed of *Lamellicornes*, *Clavicornes*, *Adephaga*, and *Serricornes*, thus respectively subdivided:—ADEPHAGA: *Cicindelidæ*, *Carabidæ*, *Pseudomorphidæ*, *Amphizoidæ*, *Haliplidæ*, and *Dytiscidæ* (all queried as sub-families of one group, chiefly on account of *Pelobius*, "a natatorial Amphizoid," which must either form a fresh family, or unite all the rest) *Rhysodidæ* and *Gyrinidæ*. CLAVICORNES; *Hydrophilidæ*, *Leptinidæ* (anterior angles of thorax projecting under the head), *Platypsyllidæ*, *Sphæriidæ*, *Trichopterygidæ*, *Staphylinidæ* (*Piestides* queried as approaching the *Cucujidæ*), *Pselaphidæ*, *Silphidæ* (" *Clambus* is probably a family, and also *Leptoderus*"), *Brathinidæ* ("Form of *Scydmanus*, but differing by the middle and posterior coxæ, and evidently forming a distinct family"), *Scydmanidæ*, *Corylophidæ*, *Scaphidiidæ*, *Latridiidæ*, *Derodontidæ* (including *Peltastica* and *Phlæophilus*), *Dermestidæ*, *Endomychidæ*, *Triphyllidæ* (= *Mycetophagidæ*), *Cioidæ*, *Erotylidæ*, *Atomariidæ* (including *Telmatophilus*, *Silvanus*, *Psimm-*
1873. [VOL. X.]

æcus, *Biphyllus*, *Cucujus*, and *Scalidia*), *Monotomidæ*, *Bitomidæ*, *Colydiidæ* (including *Myrmecoxenus*, *Myrmidius*, and *Cossyphus*, — unless, as to the two latter, they should form separate families), *Rhizophagidæ*, *Trogositidæ*, *Nitidulidæ* (including *Byturus*, *Hesperobænus*, *Bactridium*, *Europs*, *Nomophleus*, and *Phyconomus*), *Micropeplidæ*, *Phalacridæ*, *Coccinellidæ*, *Cistelidæ* (= *Byrrhidæ*: *Anobium*, F., = *Byrrhus* proper, and *Byrrhus*, L., = *Anthrenus*, Geoffr.; “*Chelonarium* may form a separate family”), *Georyssidæ*, *Psephenidæ*, *Parnidæ*, *Elmidæ*, *Heteroceridæ*, *Histeridæ*. The LAMELLICORNES and SERRICORNES are not discussed. The *Tetramera* include *Cerambycidæ*, *Bruchidæ*, and *Chrysomelidæ*, “and their limits are hard to define.” In the *Heteromera*, possibly *Lagria* and *Allecula* (*Cistela*) should go in the *Tenebrionidæ*, and certainly *Nilo* in the *Pythidæ*. The *Rhynchophora* are still doubtful, probably being composed of *Anthribidæ*, *Curculionidæ*, and *Scolytidæ*.

A summary of Crotch's proposed arrangement is given in *Am. Nat.* vii. p. 432.

FAUVEL, A. *Annuaire Entomologique pour 1873*. Caen : 1873. 12mo, pp. 122.

Exclusively refers to *Coleoptera*, especially with reference to the ‘Gallo-rhénane’ district. It contains an almanac, a directory of living coleopterists (France, Belgium, Holland, Rhenish provinces, and Switzerland), an account of societies publishing entomological works, &c., bibliography (chiefly for the preceding year), a list of new species for the French fauna brought forward in 1872, synonymy (reproduced), a list of critical species, captures of interesting or rare beetles (including cave frequenters, specially), habits observed, hints on collecting and preserving, necrology, &c.

GEMMINGER, MAX, & HAROLD, E. VON. *Catalogus Coleopterorum hucusque descriptorum synonymicus et systematicus*. ix. pt. ii. pp. 2751–2988 [*Cerambycidæ*: *Prionini*, *Cerambycini*], x. pp. 2989–3232 [*Lamiini*; *Bruchidæ*]. Munich : 1873, 8vo.

For corrections and additions to vols. i.–iv., by Von Harold, *cf.* C. H. xi. pp. 106–109. Remarks on the whole work, and nomenclature, by Kraatz, *B. E. Z.* xvii. pp. 446–448.

GRÖDLER, V. *Dritte Nachlese zu den Käfern von Tirol*. C. H. xi. pp. 49–78.

Localities for and names of captors of various species found in the Tyrol, of which many are here so recorded for the first time. One new species is described, and some few synonymical observations, &c., are made.

HOCHHUTH, J. H. *Enumeration der in den russischen Gouvernements Kiew und Volhynien bisher aufgefundenen Käfer*. Art. iv. *Bull. Mosc.* xlvi. pp. 124–162.

This (posthumous) article comprises the *Scarabæidæ* and *Buprestidæ*.

JEKEL, H. Coleoptera Jekeliana, adjecta Eleutheratorum Bibliotheca. Énumération systématique & synonymique des Coléoptères européens & exotiques composant la collection de Henri Jekel; Observations critiques, descriptions d'espèces nouvelles, reproduction et traduction de genres et espèces publiés dans des ouvrages rares français et étrangers de manière à former insensiblement la Bibliothèque du Coléopteriste. Livr.ⁿ i. Paris: 1873. 8vo, pp. 96.

Pp. 1-7, plan of the work: pp. 9-18, 'Coleoptera Jekeliana, *Staphilinides*, *Aleocharini*.' Pp. 19-28, observations on the author's collections, &c.; and on various *Aleocharides*, pp. 29-50, with descriptions of 11 new species of *Autalia*, *Falagria*, *Thiasophila*, *Aleochara*, *Tachyusa*, *Oxy-poda*, *Homalota*, and *Gyrophæna*, by the author; pp. 51-96, catalogue of *Coleoptera* collected in Sicily by T. Kotschy, with reproductions of descriptions by L. Redtenbacher and Klug [in error for Kollar], originally published in Joseph Russeger's 'Voyage en Europe, Asie, and Afrique, de 1835 et 1841,' vol. i. The whole work is apparently lithographed *proprio manu* by the author (each species on a separate slip); and it is to be hoped that each entomologist will not take the hint and have a separate medium of publication of his own. In this instance, such a novelty as *cursing* a synonym not understood by the writer remains, for want of an editorial pen [p. 18]. For Reviews, *cf.* Bull. Soc. Ent. Fr. (5) iii. p. cxlvii.; Pet. Nouv. p. 326.

KIESENWETTER, H. VON. [See KRAATZ.]

KIRSCH, T. Beiträge zur Kenntniss der Peruanischen Käferfauna auf Dr. Abendroth's Sammlungen basirt. B. E. Z. xvii. pp. 121-152, 339-418.

General observations on the physical geography, &c., of the German colony of Pozuzu, in Peru (10° 2' S. Lat., 75° 3' W. Long.), by Abendroth; and descriptions of new genera and species, with references to others already known, as far as the *Anthribidæ*.

KRAATZ, G. Die Käfer Europa's. Nach der Natur beschrieben von Dr. G. Kraatz, im Anschluss an die Käfer Europa's von Dr. H. C. Küster. Heft xxix. Mit Beiträgen von H. v. Kiesenwetter. Nürnberg: March, 1873. 12mo, 101 separate numbered slips, with riders.

This continuation of a long dormant periodical is referred to in Zool. Rec. viii. p. 224. The present part contains full descriptions of South European *Dasillidæ*, *Malthinidæ*, *Malachiidæ*, and *Dasytidæ*, by Kiesenwetter, mostly of species whereof diagnoses were noticed in Zool. Rec. viii. [see p. 277], and a revision of *Dorcadion*, with upwards of 30 new species by Kraatz. The 30th Heft is to contain a general index for the last 10 parts, and any continuation of the work beyond that will depend on the material forthcoming from other entomologists: Kraatz, B. E. Z. xvii. p. 222. *Cf.* V. Harold. C. H. xi. p. 145.

(KRAATZ, G.) Deutungen einiger Käferarten 1817 beschrieben in Beck's Beiträgen zur bayerischen Insekten-Fauna. B. E. Z. xvii. pp. 181-188.

The author endeavours to elucidate certain species described by Beck, *op. cit.*, and hitherto not noticed or misunderstood. These are:—*Pselaphus ruber*, = *Batrissus venustus*, Reich.; *Cryptophagus villosus*, ? = *Mycetæa*, Marsh. (*C. villosus*, Heer, is a *Paramecosoma*, and *P. pilosulum*, Er., is identical with it); *Dorcatoma zumähusense*, ? = *affinis*, Sturm, and is prior in date; *Coccinella plagiata*, = *Scymnus discoideus*, Ill.; *C. decas*, = *bothnica*, Gyll., var., *d*; *Galeruca articulata*, ? = *Graptodera hippophaes*, Aubé, or *consobrina*, Duft.; *Haltica chrysoptygis*, = *Crepidodera modeeri*, L.; *Dircæa dorsalis*, = *Dryalia fusca*, Gyll.; *Elater fulvipes*, ? = *Agriotes gallicus*, Cast.; *Lixus marginatus*, ?? = *Eirrhinus salicinus*; *Rhynchænus acanthion*, ? = *Trachodes hispidus*, L.; *R. tereti-collis*, = *Bagous tempestivus*, Hbst.

——. Beschreibungen difformer oder sogenannter monströser Käfer. *Tom. cit.* pp. 429-434, pl. i.

Describes and figures deformities in the following species:—*Carabus scheidleri*, prothorax divided into 2 lateral and widely separated plates; *C. auratus*, entirely overgrown with *Acari*; *C. roseri*, prothorax acuminate below the middle of left side, and another with basal joints of right antenna abbreviated; *C. sylvestris*, with left antenna 3-articulate; *C. arvensis*, with left antenna half the length of the right; *C. cancellatus*, with left elytron abbreviate, and bearing a process; *C. granulatus*, brachelytrous; *C. scheidleri*, var., with right fore-leg having a supplemental broad femur bearing two almost normal tibiæ and tarsi; *C. cancellatus*, var., with left middle-leg bearing two incomplete supplemental limbs, starting from the coxa; *Calosoma investigator*, with left fore-leg inverted and the tibia almost invisible; *Nebria gyllenhalii*, with the right maxillary palpus bearing two apical joints; *Hydaticus bilineatus*, with right middle-leg very minute; *H. cinereus*, with right hind-leg very short, and tarsi bi-articulate; *Geotrypes typhæus*, with left side of prothorax undeveloped; *Hopatrum* sp., with prothorax amorphous; *Clytus liciatius*, with right hind tibia very minute, thickened, and bearing two tarsi, in one of which the claw-joint is split; *Lamia fairmairii*, with head perforated by a thorn (the work of *Enneoctonus collurio*); *Aphodius plagiatus*, with hard, thick filaments at apex of elytra.

LECONTE, J. L. Synonymical remarks upon North American Coleoptera. P. Ac. Philad. 1873, pp. 321-336.

The results of the author's further examination of European collections, extending to the commencement of the *Cerambycidae*. A few new species are briefly diagnosed.

MACLEAY, W. "Miscellanea Entomologica." Tr. Ent. Soc. N. S. W. ii. pp. 319-370.

Occupies the whole of part 5 of this volume, issued in 1873, and with the exception of an ant, relates exclusively to *Coleoptera*.

MARSEUL, S. A. DE. Répertoire des Coléoptères d'Europe décrits isolément depuis 1864. L'Ab. ix. (iii. 12^{me} sér.) pp. 1-60.

Commences the 2nd part ; *Pselaphidæ*—*Cryptophagidæ*.

MOTSCHOULSKY, VICTOR. Énumération des nouvelles espèces de Coléoptères rapportés de ses voyages. 12^{me} article, Bull. Mosc. xlv. pp. 466-482 [*Diaperidæ*]. 13^{me} article, *op. cit.* xlvii. pp. 203-252 [*Bruchidæ*].

The observations in Zool. Rec. ix. pp. 232 & 233, apply also to these posthumous papers.

NOWICKI, M. Beschreibung einer neuen Käferart nebst Ausweis der Literatur über die Käferfauna Galiziens. Krakau: 1872 & 1873. [Not seen by the Recorder.]

POUJADE, G. A. Note sur le vol de quelques Coléoptères. Ann. Soc. Ent. Fr. (5) iii. pp. 523 & 524, pl. xiv.

Describes and figures the various attitudes (especially as to the elytra) of *Staphylinus maxillosus*, *Necrophorus vespillo*, *Silpha sinuata*, *Onthophagus capra*, *Aphodius erraticus*, *Hister 4-maculatus*, and *Cetonia aurata*.

ROUGET, AUGUSTE. Sur les Coléoptères parasites des Vespides. Mém. Ac. Dijon (3) i. pp. 161-288.

After discussing the economy of the species of *Vespa* and *Polistes* occurring in France, the author gives in detail the history of *Quedius dilatatus*, *Rhipidophorus paradoxus*, and *Xenus vesparum*, mentioning also other insects accidentally found in wasps' nests.

SHARP, D. The Water Beetles of Japan. Tr. E. Soc. 1873, pp. 45-67.

Describes 49 species (included in 25 genera) of the *Dytiscidæ*, *Gyrinidæ*, and *Hydrophilidæ*, found by Mr. G. Lewis in Japan, and of which several are new. The number of species common to Europe and Japan is by no means inconsiderable ; and only 3 of the genera are unrepresented in the European or Mediterranean fauna.

——. The Coleoptera of Scotland. Scot. Nat. ii. pp. 44-48, 89-96, 137-144, 185-192.

Continues the former list, discussing *Trechus* to *Homalota* (pt.).

SCHREIDER, OSCAR. Käferfauna von Ramleh bei Alexandrien. SB. Ges. Isis, 1871-72, pp. 35-49.

A list of 175 species, contained in 111 genera, with localities, short references, and indications of novelties. 34 are new to Egypt, where *Steira*, Westw., and *Arthrostenus*, Sch., respectively recorded from the Cape of Good Hope and the Caucasus, also occur (p. 29).

——. Käfer des ägyptischen Binnenlandes. *Tom. cit.* pp. 49-52 (39 spp.).

——. Palästinensische Käfer. *Tom. cit.* pp. 52-54.

On the limits of the European fauna, as regards beetles: CR. Ent. Belg. xvi. p. xiv.

Island of Skye: Roelofs, *tom. cit.* p. cxiii., records some very common species.

Hamburg: Additions to the recorded species by H. Beuthin. S. E. Z. xxxiv. pp. 117-119.

A list of 164 species new to the Netherland fauna: J. Kinker, Tijdschr. Ent. (2) viii. Versl. pp. lxxvii.-lxxxiii.

Augsburg: G. Kittel, xx. J. B. Ver. Augsb. (1869), pp. 81-84, raises the recorded species to 2177 (B. E. Z. xvii. p. 223).

Département du Nord: De Norguet has published (Lille: 1873) a 2nd supplement to the Catalogue of *Coleoptera* of this district.

Maine-et-Loire: Gallois, Bull. Soc. Angers, ii. (1872) pp. 74, 76, & 83, commences an entomological fauna-list (*Coleoptera*).

Languedoc; Marquet, Bull. Soc. Toulouse, iii. (1869), pp. 84 & 135, commences a catalogue (confined to the *Carabidae*), and gives notes on certain *Curculionide* of the district. These papers have not been seen by the Recorder.

A list of species (with observations) found during an excursion to Monte Pellegrino, near Palermo, by E. Ragusa, Bull. Ent. Ital. v. pp. 170-179.

Cuenca: a list of species taken by A. S. de Castro; Martinez y Saez, An. Soc. Esp. ii. pp. 70-75. Spanish localities for *Lagria glabrata*, *Dromius ramburi*, *Oodes hispanicus*, and *Meligethes elongatus* given by S. Uhagon, *tom. cit.* pp. 3 & 4.

St. Louis, Missouri: S. V. Summers, Canad. Ent. v. pp. 132-134, 145-147, 168-170, 190-192, commences a list of species found between St. Louis and Sedalia (omitting *Curculionide* and *Cerambycidae*).

Short account of species from Osorno, Chili: T. Kirsch, SB. Ges. Isis, 1873, pp. 83 & 84.

Canterbury, New Zealand: A list of species, many new, and some genera new. *Aphodius granarius* is now common there. C. M. Wakefield, Tr. N. Z. Inst. vi. pp. 155-157.

Captures of rare or local species are recorded from various parts of England, by J. J. Walker, Ent. M. M. ix. p. 269, x. p. 83, J. Chappell, *op. cit.* ix. p. 270, G. C. Champion, *l. c.* p. 216, and *op. cit.* x. pp. 39 & 159, T. V. Wollaston, *l. c.* p. 112, (Holy Island) G. Johnston, P. Berw. Club, vii. p. 49, & J. J. Walker, Ent. M. M. x. p. 159; from Scotland, by G. C. Champion, *l. c.* p. 158; from Texel, Vlieland, and Schelling, in Tijdschr. Ent. (2) viii. Versl. pp. xix. & xx.; from Lek, Merwede, and Velzen, including some species new to the Dutch fauna, by Everts, *ibid.* pp. xxiii.-xxv. xxviii.-xxx.; from Calvados, by L. Bedel, Bull. Soc. Ent. Fr. (5) iii. p. cxcii.; from St. Quentin sand-hills, Bull. Soc. L. N. Fr. (1873) No. 15, p. 239; from the Paris district, by L. Bedel & Clair, Bull. Soc. Ent. Fr. (5) iii. p. lxxiv., and by H. & C. Brisout, *l. c.* pp. lxxxv. cix. cxxxix. clxii. & clxiii.; from Champagne, especially as to winter collecting and on use of cloth, by Le Brun, CR. Ent. Belg. xvi. pp. xix., xxxvi., lix.; from Cleves, by H. Fuss, B. E. Z., xvii. p. 445; from Provence, by Belon, Pet. Nouv. p. 215; from the French Alps, by

Ponson, Bull. Soc. Ent. Fr. (5) iii. p. clxx.; from Styria, by Kraatz, B. E. Z. xvii. p. 201; from the Grafschaft Glatz and Riesen Mountains, by W. Koltze, *op. cit.* pp. 206–210; from Gotha, by Kellner, *op. cit.* p. 211; and from the neighbourhood of Florence, by F. Piccioli, Bull. Ent. Ital. v. p. 52.

Monstrosities. *Rhagonycha melanura* with the left antenna bifurcate after an incrassate 6th joint, and *Carabus violaceus* with right posterior leg imperfectly developed: P. de Borre, CR. Ent. Belg. xvi. pp. xviii. & xix. figs. *Geotrypes vernalis* with aborted anterior tarsi, and the anterior tibiæ pointed: Mélise, *op. cit.* p. lxxxvi. *Hydrophilus piceus* with penultimate joint of one maxillary palpus produced internally, simulating the apical joint: Desquin, *op. cit.* p. cxliv. *Melolontha vulgaris*, hermaphrodite: Kraatz, B. E. Z. xvii. pp. 425–429, pl. i. figs. 21 & 21b. *Vesperus luridus*, with head abnormally elevated, the elevation perforated, and bearing a small 3rd eye: Kiesenwetter, *op. cit.* p. 435, pl. i. fig. 18. [See also KRAATZ, *suprà*.]

Notiophilus palustris, *Amara trivialis*, *Harpalus æneus*, and *Aleochara cuniculorum*; varieties in the Isle of Man, possibly the effects of isolation, E. C. Rye, Ent. M. M. ix. p. 243.

Cave-beetles. E. Abeille de Perrin, Bull. Soc. Ent. Fr. (5) iii. pp. xciv.–cxviii., replies to various criticisms by De la Brûlerie (Zool. Rec. ix. p. 235). The latter continues his account of explorations of the grottoes of Ariège; Pet. Nouv. pp. 267 & 271.

Observations on the typical importance of the *Carabidæ* and *Lamellicornia*, by Kiesenwetter, SB. Ges. Isis, 1873, pp. 81–83.

List of species injurious to the chestnut-tree: E. Perris, Pet. Nouv. p. 270.

Results of beating hornbeam hedges in the sunshine late in autumn recorded by Des Gozis, Feuille. Nat. iii. p. 134.

Collecting. Pet. Nouv. pp. 293–316; Le Brun, *l. c.*; Bauduer, CR. Ent. Belg. xvi. p. xxxviii.

Haury's fumigator recommended by T. Kirsch for disturbing beetles when hiding: SB. Ges. Isis, 1873, p. 35.

G. R. Crotch recommends sawdust, slightly alcoholized, or with a small quantity of carbolic acid, as packing for collecting or store-bottles: he also notices the practice of pouring plaster of Paris over cyanide of potassium in making "killing bottles." P. Bost. Soc. xv. p. 253.

Bethune, Canad. Ent. v. pp. 96–99, 115–117, 129–132, 193–196, 210–213, continues his reproductions of the descriptions of species from Kirby's 'Fauna Boreali-Americana,' with synonymic and other notes (*Galerucidæ*—*Cistelidæ*).

Seidlitz's 'Fauna Baltica' is reviewed by Suffrian, S. E. Z. xxxiv. pp. 65–69.

CICINDELIDÆ.

Tetracha euphratica: larva described by E. Mulsant & V. Mayet, Mém. Ac. Lyon, xix. (1871–72), pp. 314–318.

Cicindela maura: larva described; *id. l. c.* pp. 319–322.

Cicindela littoralis, F., var. *nemoralis*, Ol., observed to be suddenly replaced by the more robust *C. hybrida*, L., on the latter arriving at the

perfect state: M. Girard, Bull. Soc. Ent. Fr. (5) iii. p. clxxxvi. A. Laboulbène, *l. c.* p. clxxxviii., notes the occurrence simultaneously of *C. hybrida* and the still more robust *C. sylvatica*.

Cicindela hybrida and *maritima* are quite distinct species, and full diagnostic characters are given for them. C. G. Thompson, Opusc. Ent. (v.) pp. 527 & 528.

Cicindela sturmi, Mén.: the lateral margins of elytra are lobed behind the shoulder in the ♀; S. Solsky, Hor. Ent. Ross. ix. p. 299.

Cicindela kaleea, Bates, occurs in China, and varr. of it are described: H. W. Bates, Tr. E. Soc. 1873, p. 323.

Cicindela lacerata, Chaud., = *hamata*; elytron of *C. pamphila*, Chaud. ("an undescribed species from Texas"), figured, with short diagnosis: J. L. Leconte, P. Ac. Philad. 1873, p. 321.

Cicindela argentata, F.; var. from Pozuzu (Peru), described by T. Kirsch, B. E. Z. xvii. p. 125.

Dromica (*Myrmecoptera*) *nobilitata*, Gerst., figured: V. d. Decken's Reisen, iii. pt. 2, pl. iv. fig. 1.

Omus leontii, sp. n., Horn, Tr. Am. Ent. Soc. iv. p. 143, California.

Cicindela magdaleneæ, Leconte, *l. c.* p. 321, ? N. Carolina; *C. lewisi*, H. W. Bates, *l. c.* p. 226, Japan: spp. nn.

CARABIDÆ.

Elaphrines.

Elaphrus punctatissimus, Lec., = *americanus*, Dej., *ex. typ.*; *Notiophilus aquaticus*, K., *nec L.*, = *semistriatus*, Say: Leconte, P. Ac. Philad. 1873, p. 321.

Notiophilus brevisculus, p. 299, E. Siberia, *sublævis*, p. 301, Samarcand, Solsky, Hor. Ent. Ross. ix.: spp. nn.

Carabides.

Nebria rubicunda: larva described by Mulsant and Mayet, Mém. Ac. Lyon, xix. pp. 322-325.

Nebria mæsta, Lec., = *castanipes*, K., = *sahlbergi*, Dej.; *Calosoma prominens*, Lec., = *peregrinator*, Guér.; *C. armatum*, Lap., = *alternans*, F.; *Carabus fulgidus*, Gebl., = *vietinghovii*, Adams, var.; *C. lapilayi*, Lap., *tatumi*, Mots., = *mæander*, Fisch. (*palustris*, Fisch., *teste* Crotch, Check List, p. 7); *C. ligatus*, K., *nec Germ.*, = *serratus*, Say: J. L. Leconte, *l. c.* p. 322.

Carabus dehaani, Chaud., var. from Japan, named *punctatistriatus*; *C. multistriatus*, Mots., = *corvinus*, Mots., = *striatus*, Chaud., = *albrechti*, Moraw., = *japonicus*, Mots., but Morawitz's name to stand; *Nebria livida* occurs in Japan: H. W. Bates, Tr. E. Soc. 1873, p. 231 *et seq.*

Carabus deckeni, Gerst., figured; V. d. Decken's Reisen, iii. pt. 2, pl. iv. fig. 2.

Carabus fabricii and *depressus*: a hybrid suggested. Stierlin, MT. schw. Ent. Ges. iv. p. 152.

Carabus laticollis, Stm., = *illigeri*, Dej.; Kraatz, B. E. Z. xvii. p. 444.

Carabus variolatus, Costa, = *cavernosus*, Friv.; C. A. Dohrn, S. E. Z. xxxiv. p. 322.

Carabus elephas, Putz., = *riffensis*, Fairm. (described fully); L. Fairmaire, R. Z. (3) i. p. 331.

Carabus preysleri, Duft. : Schaufuss, Nunq. Ot. ii. (1872), p. 278, names varieties of this species as *ambiguus*, *viridicinctus*, *improbatus*, *principatus*, and *superbus* : Harold, C.H. xi. p. 111.

Nebria macrogona, p. 235, *pulcherrima*, p. 236, spp. nn., H. W. Bates, l. c. Japan.

Leistus koziorowiczi, sp. n., C. P. de la Brûlerie, Ann. Soc. Ent. Fr. (5) iii. p. 252, Corsica.

Carabus yaconinus, p. 231, *maiyanus*, p. 232, H. W. Bates, l. c. Japan; *C. fausti*, Dohrn, S. E. Z. xxxiv. p. 781, Caucasus (? = *planipennis*, Chaud., id. op. cit. p. 322): spp. nn.

Calosoma mikado, sp. n. (? = *cyanescens*, Mots.), H. W. Bates, l. c. p. 235, Japan.

Oychrides.

Damaster fortunii, Schaum, nec Adams, from Yokohama, is renamed *pandurus*; the dilated tarsi of ♂ *D. rugipennis* connect it with the *Coptolabrus* group of *Carabus*: H. W. Bates, l. c. p. 230.

Cychnus constrictus, Lec., = *interruptus*, Mén.; J. L. Leconte, l. c.

Cychnus rugiceps, sp. n., Horn, Tr. Am. Ent. Soc. iv. p. 143, Oregon.

Odontacanthides.

Casonia ludoviciana, Sallé; re-described, and its habits in New Orleans noted, by S. V. Summers, Canad. Ent. v. pp. 61 & 62.

Casonia flavicauda, sp. n., H. W. Bates, l. c. p. 303, Japan and China.

Galeritides.

Drypta lineola, Dej., var. from Japan named *japonica*; H. W. Bates, l. c. p. 303.

Planetes belongs here, and not to the *Helluonides*: id. l. c. p. 304.

Drypta setigera, Gerst., fig. 1, *Galerita procera*, G., fig. 2, *angustipennis*, G., fig. 3; V. d. Decken's Reisen, iii. pt. 2, pl. v.

Drypta formosana, sp. n., Bates, l. c. p. 333, Formosa.

Galerita japonica, sp. n., id. l. c. p. 304, Japan.

Helluonides.

The Australian genera and species reviewed by W. MacLeay, Tr. Ent. Soc. N. S. W. ii. p. 320.

Lachnoderma, g. n., id. l. c. p. 321. No differential characters given, and no affinities suggested. *L. cinctum*, id. *ibid.* Clarence River.

Helluosoma aterrimum, sp. n., id. l. c. p. 323, Cape York.

Gigadema dameli, sp. n., id. *ibid.* Cape York.

Ænigma parvulum, sp. n., id. *ibid.* "New Holland."

Brachynides.

Brachynus bicolor, Boh., occurs in Japan, and is a *Crepidogaster*; H. W. Bates, l. c. p. 307.

Pheropsophus kersteni, Gerst., figured; V. d. Decken's Reisen, iii. pt. 2, pl. iv. fig. 9.

Brachynus stenoderus (? = *longicornis*, Mots., 1860, nec Fairm., 1859), p. 305, *incomptus* and *lewisi*, p. 306, spp. nn., H. W. Bates, l. c. Japan.

Lebiides.

Cymindis reflexa, Lec., = *marginata*, K., = *cribricollis*, Dej.; *C. hudsonica*, Lec., = *unicolor*, K.: J. L. Leconte, P. Ac. Philad. 1873, p. 322.

Cymindis. Chaudoir, B. E. Z. xvii. pp. 53-120, monographs the species of this genus as restricted by him. *C. angusticollis* and *longicollis*, W. McL., are (dubiously) referred to *Xanthophæa*; *C. castanea*, Klug, to *Glycia*; *C. cayennensis*, Buq., *coriacea* and *pallidipes*, Chev., *gadelupensis* and *maculata*, Gory, *marginalis* and *variegata*, Dej., *pallipes* and *4-punctata*, Rehe., to *Malisus*; *C. chevrolati*, Dej., and *nigrita*, Chaud., to *Pinacodera*; *C. deplanata*, Boh., and *tutelina*, Buq., to *Cymindoidea*; *C. inquinata*, Er., and *Lebia duponti*, Putz., to *benefica*, Newm.; *Dromius tridens*, Newm., and *Lebia civica*, Newm., to a new genus near *Sarothrocrepis*; *C. lineella*, Boh., (dubiously) to *Metaxymorphus*; *C. pusilla*, Dej., to *Axinopalpus*; *C. sulcicollis*, Duv., to *Apenes*. *Agonochila corticalis*, Chaud., = *curtula*, Er.; *Demetrída picea*, Chaud., = *dieffenbachi*, White; *C. servillii*, Sol., ? = *humeralis*, F., var.; *C. favieri*, Luc., ? = *axillaris*, F., local var.; a var. *armoricana* of *axillaris*, F., is described from Morbihan (p. 66); *C. seriepunctata*, Redt., = *palliatá*, Fisch., var. *omiades*, Fald.; *C. designata*, Rehe., = *marmoræ*, Géné, var.; *T. suturalis*, Mots., = *levistriata*, Luc.; *T. subovalis*, Mots., = *suturalis*, Dej., of which *setifensis*, Luc., is a var.; *C. discoidea*, Brullé, nec Dej., is renamed *discophora* (p. 72); *C. marginata*, Luc., nec Kby., is renamed *limbipennis* (p. 76); a var. *cyanoptera* of *C. miliaris*, F., is described from S. Europe (p. 88); a var. *impicta* of *C. repanda*, Zoubk., from the Baschkir district, is described (p. 93); *C. reflexa*, Lec., = *cribricollis*, Lec., = *marginata*, K.; Klug's types of *Trichis* have the tarsal claws simple, but Chaudoir's example has them distinctly pectinated on the anterior pair of legs.

Cymindis axillaris, F., var. *lineata*, Dej., from England; E. C. Rye, Ent. M. M. x. p. 83.

Synopsis of the French species: Des Gozis, Feuille. Nat. iii. pp. 128-131. The Mexican *Coptodera elevata*, Dej., is acclimatized at Marseilles.

Lebia bifenestrata, Mor., var. from Japan named *lucescens*, p. 319; *L. cruxminor* (near the var. *nigripes*) occurs in Japan, p. 320; *Scopodes*, Er., probably belongs to the *Pentagonicinae*, *ibid.* note; *Xenothorax*, Woll., = *Pentagonica*, S.-G., p. 321; H. W. Bates, Tr. E. Soc. 1873.

G. H. Horn, Tr. Am. Ent. Soc. iv. pp. 130-142, revises the species of *Lebia* found in the United States, upon the basis of Chaudoir's papers on the same genus in Bull. Mosc. *Dianchomena conjungens*, Lec., = *scapularis*, Dej., var.: *Lebia divisa*, Lec., is re-characterized; its exact generic affinities are uncertain, but it is not a *Singalis*, as Chaudoir surmised. Some of the latter author's species of *Lebia* are dubiously referred to known species.

Lebia deplanata, Gerst., fig. 4, *calycina*, G., fig. 5; V. d. Decken's Reisen, iii. pt. 2, pl. v.

Lebia poupillieri, Chev., = *maculata*, Dej., = *turcica*, F. var.; Raffray, R. Z. (3) i. p. 361.

Perigona, Cast. (*Nestra*, Mots., *Spathinus*, Nietn.), re-characterized, and *P. nigrifrons*, *ruficollis*, and *nigricollis*, Mots., and *pallida*, Cast., re-described: Putzeys, Ann. Mus. Genov. iv. pp. 218-224.

New genera and species :—

Paraphœa, H. W. Bates, *l. c.* p. 312 (*Callidinae*): closely allied to *Endynomena*, from which it differs in the distinctly lobed base of the thorax. *P. signifera*, *id. ibid.* Japan.

Taicona, *id. l. c.* p. 314 (*Callidinae*): nearest to *Bothynoptera*, but with a strongly toothed mentum. *T. aurata*, *id. l. c.* p. 315, Japan.

Mimodromius, Chaudoir, *l. c.* p. 55, note. Not characterized, but *Dromius cyanipennis*, Brullé (*Callida cyanoptera*, Sol.), *D. bicolor* and *aptinoides*, Brullé, *Callida chilensis*, Sol., and *Cymindis picta*, Dej., = *lepida*, Brullé, are referred to it.

Mnuphorus, *id. l. c.* *Tetragonoderides*: not characterized, but *Cymindis sellata*, Gebl., is stated to be its type, and a second species, from E. India, named *discophorus*, but not described, is also referred to it.

Sphalera, *id. l. c.* Separated from *Apenes* from its wanting a tooth in the emargination of the mentum. *Cymindis postica*, Dej.

Psammoxenus, *id. l. c.* p. 56. Differs from *Cymindis* in its labial palpi not being dilated, even in the ♂; its simple tarsal claws, and strong pubescence. *Tarus sabulosus*, Mots.

Trymosternus, *id. l. c.* p. 106. Differs from *Cymindis* chiefly in its excavated metasternum. *Cymindis onychina*, Dej., *C. minima*, Vuill., *C. cordata* and *truncata*, Ramb., *C. dilaticollis*, Luc.; and *T. plicipennis*, p. 109, Escorial Mountains, and *refleximargo*, p. 110, Sierra Nevada, Chaudoir, *l. c.* spp. nn.

Callida onoha, H. W. Bates, *l. c.* p. 317, Hiogo.

Stenonotum chalceum, Kirsch, B. E. Z. xvii. p. 125, Peru.

Cymindis africana, Tangiers, *distinguenda*, ? Greece, p. 63, *intermedia*, p. 78, Transcaucasia, *acutangula* [ta], p. 80, Basses Alpes, *limbatella*, p. 81, Eastern Pyrenees, *ruficeps*, p. 84, Sierra de Guadarrama, *violacea*, p. 88, no locality given (? = *Tarus perforatus*, Mots.), *villigera*, p. 96, Texas, Chaudoir, *l. c.*; *C. pictula* and *daimio*, Bates, *l. c.* p. 310, Japan; *C. œnea*, Cooma, N. S. Wales, *illawarræ*, Illawarra, W. MacLeay, Tr. Ent. Soc. N. S. W. ii. p. 320.

Singilis hirsutus, Bates, *l. c.* p. 333, Hongkong.

Dromius lateplagiatus, Fairmaire, R. Z. (3) i. p. 332, Algiers; *D. vectensis*, E. C. Rye, Ent. M. M. x. p. 73, English coast; *D. optimus*, Bates, *l. c.* p. 308, Japan; *D. (Lionychus) accentifer*, Raffray, *l. c.* p. 360, Boghari.

Apristus rufiscapis, *secticollis*, and *cuprascens*, Bates, *l. c.* p. 309, Japan.

Endynomena lewisi, *id. l. c.* p. 311, Japan.

Bothynoptera perforata, p. 313, *tripunctata*, p. 314, *id. l. c.* Japan.

Crossoglossa laticincta (also China), p. 315, *monostigma*, *cavipennis*, p. 316, *lesipennis*, p. 317, *id. l. c.* Japan.

Aphelogenia spraguii, Horn, *l. c.* p. 139, fig., Texas.

Dianchomena miranda, *id. ibid.* fig., Arizona.

Lebia idæ, p. 318, *sandaligera*, *comitata*, p. 319, Bates, *l. c.* Japan; *L. exigua* and *jucunda*, Kirsch, *l. c.* p. 126, Peru.

Lia exarata and *mesoxantha*, Kirsch, *l. c.* p. 127, Peru.

Tetragonoderus eximius, *id. l. c.* p. 128, Peru.

Pentagonica nigripennis, p. 320, *subcordicollis*, p. 321, Bates, *l. c.* Japan.

Perigona basalis, p. 223, Queensland, *livens*, p. 225, ? Coromandel, Putzeys, Ann. Mus. Genov. iv.

Pericalides.

Amphimenes, g. n., H. W. Bates, Tr. E. Soc, 1873, p. 322. (*Coptoderinæ*) Facies of *Stenognathus*, but with a bisetose ligula. *A. piceolus*, sp. n., *id. ibid.* Nagasaki.

Ozænides.

Eustra plagiata, Schm. G., occurs in Japan; *id. l. c.* p. 237.

Ditomides.

C. P. DE LA BRÛLERIE monographs this group; L'Ab. ix. (1873: sep. paging, 1-100. In the introduction, pp. i.-viii., are some synonymical rectifications in *Bembidium* and *Pristonychus*, quite out of place, and, as to the latter, already published by the author). The *Ditomides* are graminivorous, and very closely allied to the *Harpalides*, from which the author hesitates, indeed, to consider them quite distinct. *Melænus*, *Coscinia*, and *Apotomus* are not admitted as members of the group, which, as restricted, is especially found in the Mediterranean part of the old world. *Aristus haagi*, Heyd., = *capito*, Dej.; *A. perforatus*, Reche. & S., *nitidula*, Dej., and ? *talpa*, Redt., = *eremita*, Dej.; *A. trogositoides*, Duf., = *sphærocephalus*, Ol.; *A. subopacus*, Woll., ? = *clypeatus*, Brullé, nec Rossi. *A. elegans*, Coye, = *Ditomus modestus*, Schaum; *D. libanicola*, Mars., *bucidus*, Reche. & S., = *asiaticus*, Chaud.; *D. spinicollis*, Chaud., *frioli*, Sol., *calydonius*, Germ., = *3-cuspidatus*, F.; *Carterus* (a sub-genus only) *mandibularis*, *strigosus*, and *lucasi*, Reiche, = *interceptus*, Dej.; *D. affinis*, Ramb., = *rotundicollis*, Ramb., ♀; *D. cribratus*, Reche. & S., = *longipennis*, Chaud. *Chilotomus solitarius*, Peyr., is a *Penthus*. *Dregus* and *Graniger*, Mots., must be considered non-existent, as *D. nitidus* = *Pangus glebalis*, Coq., & *G. algerinus* = *Coscinia semeleleri*, Chaud. He characterizes the following new genus and species:—

Eriotomus, p. 72. Differs from *Carterus* in its villosity, simply cordiform thorax, variable ♂ anterior tarsi, &c. *Ophonus tomentosus*, Dej., *Ditomus caucasicus*, Dej., *D. rubens*, Fairm., = *Ophonus villosulus*, Reche., and *E. palestinus*, sp. n., p. 78, Jaffa.

Aristus semicylindricus, p. 24, Dzoungaria, Chodshent, Erzeroum, *moloch*, p. 26, Syria.

Ditomus (*Carterus*) *gilvipes*, p. 59, Syria, Cyprus, Bône, and *validiusculus*, p. 66, Syria, Galilee.

Penthus peyroni, p. 96, Lebanon.

Anthiides.

Anthia hexasticta, Gerst., fig. 3, *cavernosa*, G., fig. 4, *Polyhirma spatulata*, G., fig. 5, *bihamata*, G., fig. 6, *lagenula*, G., fig. 7, *4-plagiata*, G., fig. 8; V. d. Decken's Reisen, iii. pt. 2, pl. iv.

Morionides.

Morio walkeri, p. 216, Ceylon, *brevior* and *doriæ*, p. 217, Borneo, *acuticollis*, p. 218, Bogos; Putzeys, Ann. Mus. Genov. iv. spp. nn.

Scaritides.

J. Putzeys, Ann. Ent. Belg. xvi. pp. 10-18, publishes a 2nd supplement to his general revision of the *Clivinides*. *Dyschirius binotatus*, Belta, = *substriatus*, Dft.

Scarites arenarius: larva described by Mulsant & Mayet, Mém. Ac. Lyon, xix. pp. 325-329.

Philoscaphus costalis, Nicol Bay, *lateralis*, S. Australia, spp. nn., W. MacLeay, Tr. Ent. Soc. N. S. W. ii. p. 324.

Carenum parvulum, Murrurundi, *foveipenne*, Gawler, p. 325, *digglesi*, Brisbane, *planipenne*, ? Port Wakefield, *lacustre*, Wagga Wagga, p. 326, *id. l. c.* spp. nn.

Scarites pacificus, sp. n., H. W. Bates, Tr. E. Soc. 1873, p. 238, Japan (? = *arenarius*, local race).

Gnathorhys punctipennis, sp. n., W. MacLeay, *l. c.* p. 327, S. Australia.

Scolyptus oblongus, p. 10, Sydney, *abbreviatus*, p. 11, Queensland, Putzeys, *l. c.* spp. nn.

Coryza beccarii, sp. n., *id. l. c.* p. 17, Bogos.

Dyschirius cheloscelis, p. 239, *steno*, *ordinatus*, p. 240, *hiogoensis*, *daimiellus* (also China), p. 241, *spherulifer*, p. 242, H. W. Bates, *l. c.*; *D. liguriensis*, Spezia, *samharicus*, Massowah, p. 12, *stenoderus*, p. 13, Shanghai, *ovicollis*, Shanghai, *doriæ*, Sarawak, p. 14, Putzeys, *l. c.*: spp. nn.

Clivina niponensis, H. W. Bates, *l. c.* p. 239, Japan and China; *C. dolens* and *mærens*, p. 15, Shanghai, *curticollis*, p. 16, Bogos, *coronata*, p. 17, K. George's Sound, Putzeys, *l. c.*: spp. nn.

Schizogenius putzeysi, sp. n., Kirsch, B. E. Z. xvii. p. 129, Peru.

Panageides.

Craspedophorus eustalactus, Gerst., figured; V. d. Decken's Reisen, iii. pt. 2, pl. v. fig. 6.

Platylatron [*Platel-*], g. n., W. MacLeay, *l. c.* p. 327, allied to *Craspedophorus*. *P. ampliipenne*, sp. n., *id. l. c.* p. 328, King George's Sound.

Dischissus, g. n., H. W. Bates, *l. c.* p. 243. Facies of *Eudema*, but with bilobed 4th joint to all the tarsi in both sexes; differs from *Euschizomerus* in the lobes on hind feet being not so fully developed, and in the broadly toothed mentum. *D. mirandus*, sp. n., *id. l. c.* p. 244, Nagasaki, also *Peronomerus 4-notatus*, Mots.

Peronomerus nigrinus, sp. n., Bates, *l. c.* p. 245, Japan (= *fumatus*, local race).

Panageus singularis, sp. n., *id. ibid.* Japan.

Chlenniides.

Chlænien chlorophanus, Dej., = *solitarius*, Say; *C. chlorophanus*, Lec., nec Dej., = *lecontii*, Dej., = *cordicollis*, K.; *C. quadricollis*, K., = *tricolor*, Dej., var.; J. L. Leconte, P. Ac. Philad. 1873, p. 325. *C. nicanus*, Mots., = *spoliatus*, Rossi; H. W. Bates, *l. c.* p. 249. *C. (Dinodes)*

azureus, Duft., var. n. *algericus*, Raffray, R. Z. (3) i. p. 361, Algeria. *C. soricinus*, Gerst., figured; V. d. Decken's Reisen, iii. pt. 2, pl. v. fig. 7.

Pristomachærus, g. n., H. W. Bates, *l. c.* p. 323. "Facies, colours, and punctuation of the *Chlenii*"; "Pedes *Chleniorum*." Maxillæ projecting as slender straight shafts far beyond the tip of the long and acute mandibles, and hooked at apex, before which they are armed with a few horny teeth: exterior lobe seems simple, as in *Callistus*. Type, *P. messi*, sp. n., *id. l. c.* p. 324, Hong Kong.

Chlenius abstersus, p. 247, *aspericollis*, *deliciolus*, p. 248, *callichloris*, p. 250, *C. (Eponis) culminatus* (also China), *noguchii*, p. 251, *ocreatus*, p. 252, *prefectus*, p. 253, Japan, *C. (Vertagus) spathulifer*, p. 324, *C. cyaniceps*, *prostenus*, p. 325, *postscriptus*, p. 326, China, *id. l. c.*; *C. proximus*, F. Martinez y Saez, An. Soc. Esp. ii. p. 54, Cuenca: spp. nn.

Oodes vicarius and *prolixus*, spp. nn., Bates, *l. c.* p. 254, Hiogo.

Lachnœcrepis japonicus, sp. n., *id. l. c.* p. 255, Japan and China.

Coptocarpus chaudierei, Clarence River, *riverine*, Murrumbidgee, p. 329, *nitidus*, p. 330, Cape York, spp. nn., W. MacLeay, *l. c.*

Licinides.

Licinus silphoides: larva described by Mulsant and Mayet, Mém. Ac. Lyon, xix. pp. 329-333.

Dicelus intricatus, Chaud., = *sculptilis*, Say, northern race; *D. reflexus*, Lec., *opacus*, Ferté, = *ambiguus*, Fer.; *Badister peltatus*, Dej., nec Pz., = *flavipes*, Lec.; *Licinus silphoides* is certainly now American: J. L. Leconte, *l. c.* p. 324.

Rembus gigas, Japan, China, and I. Formosa (? = *zeelandicus*, Redt.), *elongatus*, China and Japan (connects *Eccoptogenius*, Chaud., with *Rembus*), spp. nn., H. W. Bates, *l. c.* p. 256.

Badister pictus, p. 257, *vittatus*, *marginellus*, p. 258, Japan, spp. nn., *id. l. c.*

Cnemacanthides.

J. PUTZEYS, Ann. Mus. Genov. iv. pp. 307-343, revises the Australian *Brosides*, in accordance with the collection of Castelnau now in the Municipal Museum of Genoa. The following synonymy is given:—*Mecodema rectilineatum*, Putz., = *howitti*, Cast.; *Maoria*, C., = *Metaglymma*, Bates; *Promecoderus morosus*, P., = *brunneicornis*, Dj.; *P. concolor*, P., = *ovicollis*, C.; *P. puella*, P., = *neglectus*, C.; *P. lucidus*, P., = *suturalis*, C.; *P. minutus*, C., = *clivinoides*, Guérin; *Parroa*, C., P., = *Adotela*, C.

Mecynognathus, g. n., W. MacLeay, Tr. Ent. Soc. N. S. W. ii. p. 335. Allied to *Diocetes*, and considered to be as much out of place here or in the *Stomidae*, as near *Acinopus*. An approach to *Luperca*, Cast., is suggested. Head and mandibles near equally the rest of the body: maxillary palpi as long as the mandibles. *N. dameli*, sp. n., *id. l. c.* p. 336, Cape York.

Brithystrernum, g. n., *id. l. c.* p. 366. In some respects resembles *Parroa*, Cast., but of very elongate form, with slight legs and largely produced sternum. *B. calcaratum*, sp. n., *id. l. c.* p. 367, Peak Down; Australia.

Promecoderus parvulus, *riverinæ*, *interruptus*, p. 331, *hunterensis*, *mastersi*, p. 332, *inornatus*, *puncticollis*, *dorsalis*, p. 333, *anthracinus*, *olivaceus*, p. 334, spp. nn., *id. l. c.* Australia.

Adotela striolata, Roebuck Bay, *carenoides*, Port Denison, Putzeys, *l. c.* p. 341; *A. nigerrima*, W. MacLeay, *l. c.* p. 335, Percy Islands: spp. nn.

Cratocerides.

Trechus similis, K., = *Agonoderus comma*, F.; J. L. Leconte, *l. c.* p. 325.

Anisodactylides.

Harpalus laticollis, K., = *Anisodactylus nigerrimus*, Dej., and not *harrisii*, Lec.; *A. nigrita*, Lec., *nec* Dej., = *lecontii*, Chaud., = *Harpalus interpunctatus*, K.; *id. l. c.* p. 325.

Dichirotrichus barbarus, Leder, = *præustus*, Dieck; V. Harold, C. H. xi. p. 146.

Maraga, Walker (re-characterized; and another species indicated), undoubtedly = *Orthogonius*: C. O. Waterhouse, Ent. M. M. x. p. 17.

Dichirotrichus tenuimanus, p. 259, Japan, *amplipennis*, p. 326, Shanghai; H. W. Bates, Tr. E. Soc. 1873, spp. nn.

Harpalides.

Acinopus revised by C. P. de la Brûlerie, Ann. Soc. Ent. Fr. (5) iii. pp. 255-266. 12 species are recognized (one new). *A. spinipes*, Fisch., = *amophilus*, Mén.; *A. lepeletieri* and *mauritanicus*, Luc., = *sabulosus*, F.; *A. rufitarsis* and *clypeatus*, Fisch., *eurycephalus*, Chaud., *tenebrioides*, Duft., *pasticus*, Germ., = *megacephalus*, Ill., *nec* Rossi, = *picipes*, Ol.; *A. lævipennis*, Fairm., = *grassator*, Coq.; *A. cylindræus*, Fairm., = *elongatus*, Luc.; *A. medius*, Reche., *emarginatus*, Chaud., = *megacephalus*, Rossi.

Isopleurus macleayi, K., is a *Selenophorus*; *Harpalus desertus*, Lec., = *ochropus*, K.; *Amara extensa*, Walker, = *H. obesulus*, Lec., = *H. basil-laris*, K.; *Trechus flavipes*, K., = *Bradycellus rupestris*, Say; *T. immunis*, K., = *Stenolophus conjunctus*, Say: J. L. Leconte, *l. c.* pp. 324 & 325.

Harpalus ruficornis and *griseus* occur in Japan; *H. capito*, Mor., is to stand for *cephalotes*, Mots., pre-occupied; a var. of *Stenolophus proximus*, Dej., from Japan, is named *fulvicornis* (p. 269); Gemminger & V. Harold are wrong in placing *Platymetopus thunbergi*, Dej., as a syn. of *Dioryche torta*, Macl., and in separating the former from Quensel's species of that name: H. W. Bates, Tr. E. Soc. 1873, p. 260, *et seq.*

Harpalus 4-punctatus, Dej., new to Britain; T. Blackburn, Ent. M. M. x. p. 68. Note on its synonymy; E. C. Rye, *ibid.*

Harpalus tenebrosus, new to the Belgian fauna [erroneously stated to have been described as *H. atricornis* and *nigricornis* by Stephens, whose insect of those names is an *Anisodactylus*]; Putzeys, CR. Ent. Belg. xvi. p. cxiii.

Daptus vittiger, Böber, re-described: Käf. Europa's, xxix. 1.

Selenophorus scaritoides, Ziegl., re-described: *op. cit.* 2.

Acinopus mniszechi, sp. n., Brûlerie, *l. c.* p. 259, Tripoli.

Harpalus roninus, p. 260, *argutoroides*, p. 261, *platynotus*, p. 262, *chal-*

centus and *tinctulus* (both also from China), p. 263, *relucens* (also China), *rubefactus*, p. 264, spp. nn., H. W. Bates, *l. c.* Japan.

Selenophorus dorsalis and *punctiger*, spp. nn. Kirsch, B. E. Z. xvii. p. 130, Peru.

Ophonus planiusculus, sp. n., Kraatz, B. E. Z. xvii. p. 197, Thuringia.

Tachycellus anchomenoides, p. 265, *grandiceps*, p. 266, spp. nn., Bates, *l. c.* Japan.

Bradycellus laticolor and *fimbriatus*, p. 267, Japan, *sinicus*, p. 328, China, *id. l. c.* spp. nn.

Acapalpus inornatus, sp. n., *id. l. c.* p. 268, Japan and China.

Stenolophus castaneipennis, p. 269, *chalcus* (also China), p. 270, Japan, *connotatus*, p. 327, China, *id. l. c.* spp. nn.

Platymetopus corrosus, sp. n., *id. l. c.* p. 270, China and Japan.

Amblystomus (Megaristerus) guttatus, sp. n., *id. l. c.* p. 327, Foochow.

Trigonotomides.

Abarys. Chaudoir, Bull. Mosc. xlvii. p. 96, *et seq.*, restricts this genus to species having the hooks of the tarsi distinctly finely serrate, an exceptional character in the '*Féroniens sensu stricto*,' with which he associates it.

Abar[eo] ilius, g. n., Chaudoir, *l. c.* p. 97, differs from *Abarys* in the tooth of its mentum being simple, and its abdominal segments transversely furrowed; type, *Abarys tachypoides*, H. W. Bates.

Abarys basistriatus, sp. n., Chaudoir, *l. c.* p. 98, Brazil, Venezuela.

Oxycrepis dimidiata, sp. n., *id. l. c.*, p. 91, no locality mentioned.

Abacetus leucotelus, sp. n., H. W. Bates, Tr. E. Soc. 1873, p. 283, Japan and China.

Stomoxys platynotus, sp. n., *id. ibid.* Japan.

Trigonotoma lewisi, p. 284, Japan, *chalceola*, p. 328, Hong Kong, *id. l. c.* spp. nn.

Feroniides.

Melanotus, Dej., *nee* Esch., = *Polpochila*, Sol.; J. Leconte, *l. c.* p. 324.

J. L. Leconte, P. Ac. Philad. 1873, pp. 302-320, revises the *Pterostichi* of the United States, chiefly with regard to his former Synopsis, of which he modifies the generic table by sinking *Pacilus* as a minor group, and elevating *Piesmus* to generic rank on account of the absolutely simple tooth of its mentum. A table is given of the 85 species of *Pterostichus* noticed, in which some synonymy is indicated. *P. castaneus* and *brunneus*, Dej., are practically identical; *P. protensus*, Lec., = *relictus*, Newm.; *P. muticus* and *simplex*, Lec., and *Brachystylus amplicollis*, Mots.; = *P. californicus*, Dej.; *P. subarcuatus* and *rejectus*, Lec., = *adoxus*, Say; *P. adjunctus*, Lec., and *flebilis*, Lec. (= *macrens*, Newm.), = *coracinus*, Newm.; *Argutor brevicornis*, K., *fastidiosus* and *ochoticus*, Mann., = *mandibularis*, K. A list of unidentified species is given (p. 317), and a table of the species of *Ecarthrus* (pp. 318 & 319). For observations on this revision, with a discussion of the sub-divisions of *Feronia*, see De Borre, CR. Ent. Belg. xvi. pp. cxxx.-cxxxii.

Feronia brunii, Crist., is a good species, and not a var. of *F. metallica*; Gredler, C. H. xi. p. 52.

Feronia (Tapinopterus) martinezi, Vuill., re-described and figured, from Cuenca : Martinez y Saez, An. Soc. Esp. ii. p. 56, pl. i. fig. 1.

Pæcilus cupreus and its allies : S. Solsky, Hor. Ent. Ross. ix. p. 303. *P. reflexicollis*, Gebl., from Eastern Siberia, must be held as a good species, if *P. cursorius*, Dej., be entitled to similar rank ; both, however, in Solsky's opinion are local forms of *versicolor*, Stm. : *P. nitidicollis*, Mots., from E. Siberia, is a good species ; and *P. cupreus*, Morawitz, from Jesso, and ? also *planicollis*, Mots., from Japan, must be referred to it.

Platyderus canaliculatus, Rott., = *Feronia sicula*, Levr. ; G. Dieck, B. E. Z. xvii. p. 422.

Orthomus. Chaudoir, l. c. pp. 103-110, revises the species of this group. *O. longulus*, Woll., nec Reiche, is re-named *longior* (p. 105). *O. monogrammus*, Chaud., = *rubicundus*, Coq. ; *O. umida*, Chaud., = *aquila*, Coq.

Phorticosomus minutus and *lateralis*, Cast., are to be referred to *Simodontus* ; other species described by Castlenau should be placed near *Heteracantha* : Chaudoir, l. c. p. 113.

Stereocerus similis, K., = *Feronia (Amara) hæmatopus*, Dej. ; *Cyrtognotus brevilabris*, K., and ? *Amara lacustris*, Lec., = *rufimanus*, K. ; *C. convexiusculus*, K., nec Msh., = *laticollis*, Lec. ; *Amara libera*, Lec., = *lævistriata*, Putz., = *C. (Bradytus) latior*, K. ; *A. vulgaris*, K. nec Pz., = *lævipennis*, Lec., nec K., and requires re-naming ; *A. discors*, K., = *chalcona*, Dej. ; *A. erratica*, Lec., = *lævipennis*, K. ; *Isopleurus nitidus*, K., = *A. subanea*, Lec. ; Leconte, l. c. pp. 323 & 324.

Zabrus gibbus. Observations on habits, especially of the larva, at Essen, near Borbeck. Das Ausland, xlii. (1869), pp. 260 & 261.

Harpalus despectus, Sahlb., is not *Amara municipalis*, Dfts., as Mäklin avers [Zool. Rec. ix. p. 246], but = *A. quenseli*, Sch., and *litorea*, Thoms. : J. Sahlberg, S. E. Z. xxxiv. p. 62.

Stolonis. Chaudoir, Bull. Mosc. xlvii. pp. 85-90, supplements H. W. Bates's observations [Zool. Rec. viii. p. 238]. *Anchonemus dimidiaticornis*, Dej., belongs to this genus.

Cynthidia, g. n., Chaudoir, l. c. p. 91. Differs from *Feronia* in its convex thick labrum, which is always metallic in front, its eyes converging in front obliquely, and its deep frontal sulci. *Feronia cancellata*, Brullé, = *Pæcilus croceipes*, Pty., *F. depressa*, Wat., = *subsulcata*, Brullé, = *P. planodiscus*, Pty. (of which a var. *pampicola* is described, p. 95), and *C. octocala*, pp. 95, interior of Brazil, and Ega, and *C. foveata*, p. 96, Amazons spp. nn.

Pseudabarys, subg. n. of *Feronia*, Chaudoir, l. c. p. 99. Facies of certain *Selenophori*, but allied to *Orthomus* and *Simodontus*, differing in the much shorter antennæ, the unipunctate 3rd interstice of the elytra, and metallic colouring. Type, *Abarys robustus*, H. W. Bates, and *P. brasiliensis*, Brazil, *mexicanus*, Mexico, p. 101, *columbicus*, Venezuela, *lebasii*, Carthagena, p. 102, *substriatus*, p. 103, Cuernavaca, Chaudoir. l. c. spp. nn.

Opfryosternus, sub-g. n. of *Feronia* : id. l. c. p. 115. Intermediate between *Simodontus* and *Ceneus*. *O. sulcatulus*, sp. n., id. *ibid.*, Moreton Bay.

Stolonis intercepta, sp. n., id. l. c. p. 87, Yucatan.

Pterostichus tarsalis, Sierra Nevada, *crenicollis*, Washington Territory and Vancouver, p. 311. *longulus*, Colorado, *scutellaris*, California, p. 312, *spraguii*, Nevada, *horni*, S. E. California, p. 313, *obesulus*, Georgia, *pennsylvanicus*, Pennsylvania, *corruscusculus*, Massachusetts, p. 315; Leconte, *l. c.* spp. nn.

Pæcilus encopoleus, sp. n., Solsky, *l. c.* p. 306, E. Siberia.

Abax (?) *sulcipennis*, sp. n., W. MacLeay, Tr. Ent. Soc. N. S. W. ii. p. 368, Richmond River, Australia.

Pterostichus (*Lagarus*) *procephalus*, p. 285, *P. (Argutor) longinquus* (also China), *P. (Lyperus) nóguchii*, p. 286, *P. (Omaseus) thorectes*, p. 287, *P. (Steropus) tropidurus*, p. 288, *P. sphodrifformis*, p. 289, *yoritomus*, p. 290, spp. nn., H. W. Bates, Tr. E. Soc. 1873, Japan.

Lophoglossus gravis, sp. n., Leconte, *l. c.* p. 316, ? Pennsylvania.

Orthomus maroccanus, p. 108, Tangiers, *sidonicus*, p. 110, Syria, Chaudoir, *l. c.*; *O. (Feronia) perezi*, Martinez y Saez, An. Soc. Esp. ii. p. 57, pl. i. fig. 2, Cuenca: spp. nn.

Evarthrus nonnitens, sp. n., Leconte, *l. c.* p. 320, Louisiana.

Simodontus orthomoides, Melbourne, *elongatus*, S. Australia, p. 111, *transfuga* and *convexus*, p. 112, *curtulus*, p. 113, Melbourne, *picescens*, p. 114 ?, Philippine Isles, Chaudoir, *l. c.* spp. nn.

Zabrus castroi, p. 60, pl. i. fig. 3, Cuenca, *notabilis*, p. 407, pl. xiii. fig. 1, Burgos, Martinez y Saez, *l. c.* spp. nn.

Amara continua, C. G. Thomson, Opusc. Ent. (v.) p. 529, Sweden; *A. (Celia) nitidiuscula*, J. Putzeys, An. Soc. Esp. ii. p. 51, Aranjuez; *A. (C.) chalcophæa*, p. 292, *laticarpus*, p. 293, *A. obscuripes*, p. 294, Bates, *l. c.* Japan: spp. nn.

Cyrtomotus hiogoensis, sp. n., Bates, *l. c.* p. 291, Hiogo.

Bradytus ampliatus, sp. n., *id. ibid.* Japan.

Antarctiides.

J. PUTZEYS, Mém. Liège (2) v. ['Novembre, 1873,' on title; received January, 1875: vol. iii. having been issued in 1873, containing articles circulated in anticipation quite two years earlier; vol. iv. from a notice on wrapper of vol. v. 'paraître dans quelques mois'], pp. 1-32, recharacterizes *Antarctia*, Dej., which he considers to belong to the *Feroniides*, near *Amara*, as the front tarsi of the male, though ciliated at the margins, are very distinctly squamose beneath. There are always traces of a tooth in the emargination of the mentum, and in many instances a very distinct tooth. *Habropus splendidus*, Guér., = *carnifex*, F., *nec* Dej. (which is a true *Antarctia*). 32 species are described, of which the following (and a var. *latior* of *A. marginata*, Dej., from Montevideo, p. 23) are new:—

A. leucoscelis, p. 9, no locality given, *nitens*, p. 10, Malouin Isles, *foveolata*, p. 14, Brazil, *brevicornis*, p. 15, *puncticollis*, p. 31, Chili, *striata*, p. 16, *incerta*, p. 18, Peru, *cordata*, p. 17, *obscura*, p. 20, *caudata*, p. 22, *parvicollis*, p. 24, *punctulata*, p. 25, Montevideo, *bonariensis*, p. 21, Buenos Ayres, Bolivia, *euryptera*, p. 25, Juan Fernandez, *crassiuscula*, p. 28, *laevigata*, p. 29, Patagonia.

Trechichides.

H. W. Bates, Tr. E. Soc. 1873, p. 282, finds this sub-family for the reception of *Trechichus* and *Mizotrechus* (and possibly *Pentoplogenius*), forming an additional link between the *Anchomenides* and *Truncatipennes*, from the former of which they are removed by the adherent paraglossæ, and from the latter by their broadly rounded, not truncate, elytra.

Trechichus japonicus, sp. n., *id. l. c.* p. 281, Japan.

Anchomenides.

J. PUTZEYS, Ann. Ent. Belg. xvi. pp. 19-96, monographs the group *Calathides*, re-characterizing *Calathus*. *Calathus barbatus*, Woll., = *angularis*, Brullé; *C. lugens*, Vuillef., *hispanicus*, *uhagoni*, *vuillefroyi*, Gaut., = *luctuosus*, Dej.; *C. subsimilis* and *intermedius*, Gaut., = *cisteloides*, Ill.; *C. algius*, Gaut., = *punctipennis*, Germ.; *C. liotrachelus*, Vuill., *angularis*, Chevr., = *uniseriatus*, Vuill.; *C. lasserrii*, Heer, *marginicollis*, Chaud., = *fulvipes*, Gyll., varr.; *C. bipunctatus*, Gaut., = *asturiensis*, Vuill.; *C. depressus* and *tappesi*, Gaut., = *granatensis*, Vuill.; *C. dilutus*, Chaud., *chevolati*, Gaut., = *fuscus*, F.; *C. angustatus*, Koll., *nec* Rambur, is re-named *kollari* (p. 72); *C. parisiensis*, Gaut., *alpinus*, Dej., *obscuricollis*, Chaud., = *melanocephalus*, L. [no mention is made of *nubigena*, Hal., though it is referred to in the index]; *C. mollis*, Msh., is a good species; *C. incommodus*, Mann., = *ingratus*, Dej.; *C. advena*, Lec., = *dulcis*, Mann., = *lenis*, Mann., var.; *C. rubrimarginatus*, Blanch., ? = *zelandicus*, Redt. *Amphigynus*, Haliday (*Calathus piceus*, Marsh.), is re-characterized, and proposed to be retained as a genus at p. 23, and as a sub-genus of *Calathus* at p. 88.

Loxocrepis celestinus, Mots., = *Dicranoncus femoralis*, Chaud.; *Limodromus*, *Platynus*, &c., should be retained; H. W. Bates, Tr. E. Soc. 1873, p. 278.

Anchomenus angusticollis, K., *nec* F., is not *stygicus*, Lec. [Zool. Rec. vii. p. 260], but = *Platynus sinuatus*, Dej.; *Agonum harrisi*, Lec., = *affine*, K.; *A. lutulentum*, Lec., ? = *picipenne*, K.; *A. fuscescens*, Chaud., ? = *sordens*, K.: J. L. Leconte, P. Ac. Philad. 1873, p. 323.

Olisthopus anomalus, Perris, is to be considered non-existent: E. Perris, Nouv. et faits (2) p. 6.

Calathidius, g. n., Putzeys, *l. c.* p. 24. Differs from *Calathus* in the paraglossæ being much more elevated than the ligula, &c. *Calathus sphaeroides* and *acuminatus*, Woll.

Thermoscelis, g. n., *id. l. c.* p. 89. Paraglossæ as in preceding; post. tibiæ of ♂ emarginate in the inner posterior half. *Pristonychus insignis*, Chaud.

Onycholabis, g. n., H. W. Bates, *l. c.* p. 329. Facies of *Anchomenus*: closely related to *Cardiomeria*, joints 3-11 of antennæ having woolly pubescence, but with claw-like and elongate mandibles and maxillæ. Type, *O. sinensis*, sp. n., *id. ibid.*, banks of the Yangtze-kiang.

Pristonychus æneolus, sp. n., *id. l. c.* p. 272, Japan.

Calathus pirazzolii, p. 43, Central Italy, *zabroides*, p. 44, Persia, *lissoderus*, Anatolia, *lævicollis*, Armenia, p. 46, *heydeni*, p. 52, Portugal.

acuticollis, p. 54, Lebanon, *thessalus*, Salonica, *libanensis*, Lebanon, p. 59, *pluriseriatus*, p. 60, Persia, *rugicollis*, p. 68, Kurdistan, *æneus*, p. 70, Turkey, *leptodactylus*, p. 75, Syria, *melanotus*, Asturias, *extensicollis*, Azores, p. 76, *coptopsophus*, p. 81, N. China, *crenatus*, p. 82, *pectiniger*, p. 86, N. India, *ovipennis*, p. 87, Mexico: Putzeys, *l. c.* spp. nn.

Dolichus callitheres, sp. n., Bates, *l. c.* p. 272, Japan.

Pristodactyla cyclodera, Japan and China, *dulcigrada*, Japan, p. 273, *cathaica*, p. 330, Foochow, *id. l. c.* spp. nn.

Taphria crassipalpis, sp. n., *id. l. c.* p. 274, Hiogo.

Colpodes atricomes, *lampros*, p. 275, *modestior*, p. 276, *sylphis*, p. 277, Japan, *olivius*, p. 330, Hong Kong, spp. nn., *id. l. c.*

Anchomenus (? g. n.) *astur*, Sharp, An. Soc. Esp. i. p. 259, Reinosa; *A. (Limodromus) magnus*, p. 278, Japan and China, *leucopus*, Japan, *A. (Agonum) daimio*, Japan and China, p. 279, *A. (Ag.) chalcomus*, Japan, p. 280, *A. (Ag.) irideus*, p. 329, Hong Kong, *ænotinctus*, p. 330, Foochow, Bates, *l. c.*: spp. nn.

Pogonides.

Platidius, Chaud., should be merged in *Diplous*: the widely dilated mesothoracic epimera afford a good generic character. H. W. Bates, *l. c.* p. 295.

Diplous caligatus, sp. n., *id. l. c.* p. 294, Japan.

Pogonus dilutus, sp. n., Fairmaire, R. Z. (3) i. p. 323, Bouksoul.

Trechides.

Anophthalmus leschenaulti: habits of the living beetle in confinement recorded, especially with regard to its insensibility to light. E. Deyrolle, Pet. Nouv. p. 280.

Trechus postilénatus and *ephippiatus* (and var. *ægrotus*) spp. nn., H. W. Bates, *l. c.* p. 295, Japan.

Perileptus japonicus, sp. n., *id. l. c.* p. 296, Hiogo.

Bembidiides.

Bembidium atriceps, W. Macl., = *Tachys triangularis*, Nietn.; Bates, *l. c.* p. 298; *B. niloticum*, Dej., and *lunatum*, Duft., occur in Japan, *id. l. c.* p. 301.

Bembidium salebratum, Lec., = *Peryphus concolor*, K.; *B. gelidum*, Lec., = *P. scopulinus*, K.; *Notaphus variegatus*, K., nec Say, = *B. pictum*, Lec.; *B. rapidum*, Lec., = *N. intermedius*, K.: J. L. Leconte, *l. c.* pp. 325 & 326.

Bembidium moschatum, Peyr., *nordmanni*, Chaud., = *elongatum*, Dej.; *B. monticulum*, Stm., = *nitidulum*, Msh., var.; *B. corpulentum*, Mots., = *ustulatum*, L.; *B. xanthomum* and *basale*, Chaud., *chaudoiri*, Mots., *persicum*, Mén., *petrosum*, Gebl., = *andreae*, F.; *B. pictum*, Fald., *fraxator*, Mén., = *femoratum*, Stm.; *B. caucasicum*, Mots., = *bruxellense*, Westm.; *B. fuscimaculatum*, Mots., *lucidum*, Fald., = *testaceum*, Duft.; *B. dimidiatum*, Mén., = *tricolor*, F.; *B. tibiale*, Duft., *atriceruleum*, Steph., *conforme*, Dej., *cyaneum* and *gotschi*, Chaud., *planipenne*, Duv., = *fasciolatum*, Duft., varr.; *B. celestinum* and *litigiosum*, Mots., = *prasinum*, Duft.;

B. æruginosum, Gebl., = *fellmanni*, Man.; *B. milleri* and *cordicolle*, Duv., = *brunnicorne*, Dej.; *B. lafertii*, Duv., is quite distinct from *siculum*, Dej.; De la Brûlerie, in Monogr. des Ditomides, L'Ab ix. preface, pp. iii. & iv.

Bembidium lætum, Brullé. On its geographical distribution, and occurrence in Spain: Perez Arcas, Act. Soc. Esp. ii. p. 22.

Bembidium mannerheimi, Sahlb., is not synonymous with *obtusum*, but a good species, for which differential characters are given. The exponents of *B. grapii* in the Sahlbergian collection (= *schuppeli*, Dej.) were taken in 1830, three years after publication of Sahlberg's species. J. Sahlberg, S. E. Z. xxxiv. pp. 63 & 64.

Bembidium riparium, Ol. and *biguttatum*, F.: differences fully discussed by Kraatz. B. E. Z. xvii. p. 215. Cf. also pp. 441 & 442, for notes on communication by Seidlitz on this subject.

Tachys exaratus, p. 296, *pallescens*, *sericans*, p. 297, *latificus*, *fuscicauda*, p. 298, *perlutus*, p. 299, Japan, *gradatus*, *pacilopterus*, *vixstriatus*, p. 331. China, spp. nn., H. W. Bates, l. c.

Tachyta microscopica, sp. n., *id. l. c.* p. 299, Japan.

Bembidium stenoderum, p. 300, *B. (Peryphus) consummatum*, p. 301, *hiogoense*, *lissonotum*, p. 302, Japan, *chloreum*, *collutum*, p. 332. China, spp. nn., *id. l. c.*

DYTISCIDÆ.

G. R. CROTCH, Tr. Am. Ent. Soc. iv. pp. 383-424, gives a "Revision of the Dytiscidæ of the United States." Several American forms are inseparable from European, and the number of species common to both continents will probably be increased. Dimorphous females occur, as in Europe; in *Dytiscus*, nearly all ♀ are permanently smooth [as in Russia; cf. Zool. Rec. vi. p. 230], whilst in *Agabus* and *Acilius* smooth and rough females are equally common. The *Amphizoidæ* and *Pseudomorphidæ* lead the author to suppose that this family is not separable from the *Carabidæ*: a tribe *Eretini* is proposed (p. 386) for the reception of *Eunectes*, Erichs., nec Wagl., for which *Eretes*, Lap., is adopted; this heads the *Dytiscides*, coming between *Cnemidotus* in the *Haliplides* and *Celina* in the *Hydroporini*: *Hydrocanthus*, *Suphis*, and *Colpius* are included in the *Noterini*; a new tribe, *Agabinini*, is proposed (p. 397), for the reception of a new genus allied to *Noterus*; and the *Colymbetides* are merged in the *Dytiscides*.

H. v. Kiesenwetter, C. H. xi. pp. 79-86, in some remarks upon the nomenclature of the *Dytiscidæ*, criticizes G. R. Crotch's alterations, &c., (C. H. x.), in the names of *Haliplus obliquus*, *Hydroporus granularis*, *reticulatus*, and *unistriatus*, *Noterus semipunctatus*, *Ilybius ater* and *fenes-tratus*, *Agabus didymus*, *Cybister costalis* and *Hydaticus stagnalis*.

Haliplides.

Haliplus nitens, Lec., = *cribrarius*, Lec., var.; *H. immaculicollis*, Harr., = *ruficollis*, Deg.; *Cnemidotus simplex*, Lec., = *callosus*, Lec., ♀: G. R. Crotch, Tr. Am. Ent. Soc. iv. pp. 384 & 385.

Haliplus japonicus, D. Sharp, Tr. E. Soc. 1873, p. 55, Japan; *H. lewisi*,

p. 384, Texas, *longulus*, p. 385, Lake Superior, Boston, Crotch, *l. c.*, spp. nn.

Brychius horni, sp. n., Crotch, *l. c.* p. 383, California.

Chemidotus intermedius, sp. n., D. Sharp, *l. c.* p. 55, Japan.

Hydroporides.

Hydroporus punctatus, Say, = *inaequalis*, F.; *H. similis*, K., = *impressopunctatus*, Schall., of which 10-*lineatus* and 4-*lineatus*, Mann., are varr.; *H. discoideus*, Lec., = *patruelis*, Lec., ♂; *H. venustus*, Lec., = *hybridus*, Aubé; *H. erythrostomus*, Mann., = *obscurus*, Lec.; *H. 12-lineatus*, Lec., = *alpinus*, Payk.; *H. hirtellus*, Lec., = *subpubescens*, Lec.; *H. lutulentus*, Lec., = *tenebrosus*, Lec.; *H. nigellus*, Mann., = *tartaricus*, Lec.; *H. puberulus*, Lec., = *caliginosus*, Lec.; *H. ruficapillaris*, Mann., *varians*, Lec., = *tristis*, Payk.; *H. pulcher*, Lec., = *concinus*, Lec.: G. R. Crotch, *l. c.* p. 387, *et seq.*

Hydroporus geminus occurs at Warmbrunn, Silesia, at a temperature of 28° Réaum.: v. Kiesenwetter, SB. Ges. Isis, 1873, p. 34.

Hyphydrus japonicus, sp. n., D. Sharp, *l. c.* p. 54, Japan.

Hydroporus japonicus, id. *ibid.* Japan; *H. alienus*, id. An. Soc. Esp. i. p. 261, La Granja; *H. dispersus*, Lower California, Texas, *plicipennis*, California, p. 388, *fuscatus*, p. 391, Lake Superior to Florida, *funereus*, p. 392, *addendus*, p. 393, Lower California, *persimilis*, p. 395, Canada, Crotch, *l. c.* spp. nn.

Hydrovatus horni, sp. n., Crotch, *l. c.* p. 387, Texas.

Colymbetides.

The generic name *Suphisellus* [*Syph-*] is proposed for *Suphis bicolor*, Say, *lineatus*, Horn, and a new species, in case *Suphis cimicoides* and *Colpius inflatus*, Lec., prove generically identical: G. R. Crotch, *l. c.* p. 397. The latter insect and *Suphis doubledayi*, B. M. Cat., are identical: J. L. Leconte, P. Ac. Philad. 1873, p. 326.

Laccophilus californicus, Mots., *truncatus*, Mann., = *decipiens*, Lec.; *Scutopterus coriaceus*, Horn, *nec Hoffm.*, is re-named *horni* (p. 405); *Colymbetes densus*, Lec., = *sculptilis*, Harr., of which *exaratus*, Lec., may be a dimorphous form; *C. strigosus*, Lec., = *strigatus*, Lec.; *C. drewseni*, Lec., = *grenlandicus*, Aubé; *Cymatopterus longulus*, Lec., ? = *paykulli* Er.; *Rhantus suturellus*, Harris, = *agilis*, Aubé, *nec F.*, = *bistriatus*, Berg.; *Ilybius unguularis*, Lec., = *ater*, Deg.; *I. pleuriticus*, Lec., = *confusus*, Aubé; *I. laramceus*, Lec. = *biguttulus*, Germ., var.; *Coptotomus difficilis*, Lec., = *interrogatus*, F.; *Agabus oblongus*, Ill., is a *Copelatus* with striate elytra; *Copelatus punctulatus*, Aubé, = *glyphicus*, Say; *Gaurodytes spilotus*, Lec. = *semivittatus*, Lec.; *G. discolor*, Lec., *nec Harris*, is re-named *lecontei* (p. 417); *G. anthracinus*, Mann., = *scapularis*, Mann.; *G. nitidus*, Say, *nec F.*, = *obtusatus*, Say; *G. dubius*, Mann., = *tristis*, Aubé, var.; *G. subfasciatus*, Lec., = *reticulatus*, K., = *arcticus*, Payk.; *G. irregularis*, Mann., = *hypomelas*, Mann. G. R. Crotch, *l. c.* pp. 400-423.

Colymbetes pulverosus, Steph., and *Laccophilus flexuosus*, Aubé, occur in Japan; D. Sharp, Tr. E. Soc. 1873, pp. 48 & 53.

Agabus desertorum, Mor., = *lineatus*, Gebl. ; S. Solsky, Hor. Ent. Ross. ix. p. 307.

Gaurodytes angusticollis, J. Sahlb., is not synonymous with *adpressus*, Aubé ; *G. hæffneri*, Thoms., nec Aubé, = *wasastjernæ*, Sahlb. ; J. Sahlberg, S. E. Z. xxxiv. pp. 63 & 64.

Agabinus, g. n., Crotch, *l. c.* p. 397. Allied to *Noterus* by form of its coxal process, but with 2 joints of the 4 anterior tarsi dilated in the ♂, and the mesothoracic side-pieces distinct. Type of a tribe, *Agabinini*, between the *Noterini* and *Dytiscini*. *A. morulus*, Lec., = *glabrellus*, Mots.

Agabetes, g. n., Crotch, *l. c.* p. 401. Lacinia linear, episterna hardly reaching coxæ. *A. acuductus*, Harr.

Ilybiosoma, g. n., Crotch, *l. c.* p. 413. Differs from *Ilybius* in the 4 anterior tarsi of ♂ being compressed, narrowly dilated, with simple claws, and from *Agabus* in its narrow lacinia. *I. regularis*, Lec. (of which *I. oblongus*, Mots., is apparently a var.), and ? *I. bifarius*, K.

Noterus japonicus, sp. n., D. Sharp, *l. c.* p. 52, Japan.

Hydrocanthus politus, sp. n., *id. ibid.* Japan.

Suphis puncticollis, sp. n., Crotch, *l. c.* p. 397, United States.

Laccophilus lewisi [an]us, p. 52. *difficilis* and *kobensis*, p. 53, Japan, Sharp, *l. c.* ; *L. apicalis*, *id.* Ent. M. M. x. p. 53, Chontales ; *L. atristernalis*, Crotch, *l. c.* p. 400, California : spp. nn.

Rhantus anisonychus and *flavigriseus*, spp. nn., Crotch, *l. c.* p. 409, United States.

Ilybius suffusus, Indian Territory, *viridiæneus*, Kansas, *id. l. c.* p. 411 ; *I. hispanicus*, Sharp, An. Soc. Esp. i. p. 260, Escorial ; *I. apicalis*, *id.* Tr. E. Soc. 1873, p. 51, Japan : spp. nn.

Agabus conspicuus, p. 48, *pictipennis*, p. 49, *japonicus* and *dissimilis*, p. 50, Japan, Sharp, *l. c.* ; *A. eminens*, Kirsch, B. E. Z. xvii. p. 131, Peru : spp. nn.

Gaurodytes disintegratus, p. 416, Kansas, Canada, *æneolus*, p. 417, Pennsylvania, Newfoundland, *ovoideus*, p. 418, Kansas, L. Superior, *lutosus*, Slave Lake, *walsinghami*, Oregon, *intersectus*, California, Oregon, p. 419, *inscriptus*, Labrador, *strigulosus*, California, p. 422, *suturalis*, p. 423, Nevada, Crotch, *l. c.*, spp. nn.

Copelatus externus and *substriatus*, Kirsch, *l. c.* p. 132, Peru ; *C. signatus*, Sharp, Ent. M. M. x. p. 53, Chontales : spp. nn.

Dytiscides.

On the habitat of certain *Dytiscides*: Delabby, Bull. Soc. L. N. Fr. 1872-73, p. 67.

Cybister. Stridulating organs, confined to the ♂, consist of 3-5 deep ridges in the hollow behind the posterior coxæ, which are rubbed by a ridge on the underside of the femora : Crotch, *l. c.* p. 398.

Cybister bimaculatus, Aubé, *binotatus*, Boh., and *owas*, Lap., = *immarginatus*, F., varr. ; A. Gerstäcker, V. d. Decken's Reisen, iii. pt. 2, p. 75.

Cybister tripunctatus, Ol., common in Japan, cannot be considered specifically identical with *C. africanus* (Gerstäcker, *l. c.* p. 74, unites

these); *C. brevis*, Aubé, also abundant in Japan, has the punctuation of head and thorax alike in both sexes; other species are probably confused under the name of *Hydaticus vittatus*; *H. rufulus*, Aubé, is queried as not conspecific with *H. leander*; *H. grammicus*, Germ., occurs in Japan: D. Sharp, Tr. E. Soc. 1873, p. 47 *et seq.*

Dytiscus marginalis, E. A. Schäfer, Phil. Trans. clxiii. pp. 429-443, pl. xxxiii. fully discusses the minute structure of the leg-muscles, regarding the less strongly refracting intermediate substance which pervades the whole fibre, as the contractile, irritable, and essential part of the muscle; and considering the more refracting substance to have merely a passive function. A review is given of the recent literature of the subject of striped muscular fibre. Highly magnified portions of the muscle are figured in rest and contraction.

Dytiscus latissimus and *marginalis* infested by *Hydrachna geographica*, Müll.; V. Frauenfeld, Verh. z.-b. Wien, xxiii. p. 7.

Acilius simplex and *latusculus*, Lec., and *abbreviatus*, Aubé, = *semisulcatus*, Aubé, varr., and a var. *oregonensis* is described; *Thermonectes laticinctus*, Lec., = *basilaris*, Harr., var., and a var. *intermedius* is described from California; *T. nigrifasciatus*, Aubé, = *ornaticollis*, Aubé, var.; *Graphoderes fasciicollis*, Harr., = *cinereus*, L., not *zonatus*, F.; *Hydaticus cinctipennis*, Aubé, = *bimarginatus*, Say; *Dytiscus latissimus*, L., occurs (? accidentally) in Canada; *D. diffinis*, Lec., and *parvulus*, Mots., = *confluens*, Say; *D. sublimbatus*, Lec., = *cordieri*, Aubé; G. R. Crotch, l. c. pp. 401-408. *Acilius maccullochi*, K., = *mediatus*, Say; J. L. Leconte, P. Ac. Philad. 1873, p. 326.

Hydaticus piciventris, Thoms., occurs in Germany; Kraatz, B. E. Z. xvii. p. 225.

Hydaticus austriacus and *cinereus*. Buddeberg, *op. cit.* pp. 423 & 424, notes the occurrence together of the first of these and a middle form between *zonatus* and *cinereus*, and gives sexual and other characters.

Cybister japonicus, p. 45, *lewisianus*, p. 46, spp. nn., Japan, D. Sharp, l. c.

Hydaticus japonicus, sp. n., *id.* l. c. p. 48, Japan.

GYRINIDÆ.

Dineutes subspinosus, Klug (?), recorded from Syria and Palestine; Leprieur, Bull. Soc. Ent. Fr. (5) iii. p. cxxvii.

Orectochilus schistazeus, Gerst., figured; V. d. Decken's Reisen, iii. pt. 2, pl. v. fig. 8.

Gyrinus japonicus, sp. n., D. Sharp, l. c. p. 55, Japan.

Dineutes marginatus, *id.* l. c. p. 56, Japan, Manchuria, *D. truncatus*, *id.* Ent. M. M. x. p. 54, Chontales: spp. nn.

HYDROPHILIDÆ.

Hydrochares flavipes, Stev., and *Laccobius minutus*, L., occur (with slight modifications) in Japan; and the structure of the abdomen of *Amphiops* is described: D. Sharp, Tr. E. Soc. 1873, p. 59, *et seq.*

G. H. HORN, P. Am. Phil. Soc. xiii. pp. 118-137, gives "a revision of the genera and species of the tribe *Hydrobiini*" found in the United

States. This 'tribe' comprises all the genera of *Hydrophilidæ* in which the middle and hind tarsi have the first joint very short, with all the joints cylindrical, or not compressed: the thorax is always as wide as the elytra at the base; and there is no metasternal spine. It is divided into sub-tribes *Hydrobiini* (*Berosus*, *Chatarthria*, *Limnocharis*, *Laccobius*, *Hydrobius*, *Philhydrus*), with head in front of eyes narrow, and labrum visible, and *Helopeltini* (new: for one new genus), with clypeus broadly dilated at sides, and labrum concealed. *Berosus immaculatus*, Zimm., *auritus*, Mels. (= *peregrinus*, Hbst.), and *pantherinus*, Lec., are possibly all one species, for which Herbst's name should be used; *B. pallescens*, Lec., = *exiguus*, Say; *B. californicus*, Mots., *punctulatus*, Lec., = *infuscatus*, Lec.; *B. fraternus* and *ordinatus*, Lec., = *striatus*, Say. *Chatarthria nigriceps*, Lec., = *pallida*, Lec. *Philhydrus maculifrons*, Mots., = *pectoralis*, Lec.; *P. simplex*, Lec., = *ochraceus*, Mels.; *P. limbalis*, Mels., = *cinctus*, Say; *P. imbellis*, Lec., ? = *dorsalis*, Mots.; *P. semistriatus*, Zimm., = *fimbriatus*, Mels.; *P. nitens*, Zimm., = *rotundus*, Say. *Sperchopsis*, Lec., and *Paracymus*, Thoms., are not generically distinct from *Hydrobius*. *H. seriatus*, *insculptus*, and *regularis*, Lec., = *fuscipes*, L.

Schwarz's paper, "Zur Kenntniss der europäischen Philhydrus-Arten," Breslau, 1872 (extr. from Z. E. Ver. schles.) has not been seen by the Recorder.

Berosus: observations on a species with spined elytra only in ♂, from Bône, by Leprieur, Bull. Soc. Ent. Fr. (5) iii. p. cxxvi.

Helopeltis, g. n., Horn, l. c. p. 137. Type of a distinct sub-tribe, with genæ at the sides broadly dilated, and labrum entirely concealed beneath the clypeus in front. But for these characters, a true *Philhydrus*, with the last tarsal joint more elongate than usual. *H. larvalis*, sp. n., *id. ibid.* Louisiana and Sonora (facies of *Peltis*, or an *Elmis* larva); a closely allied Cuban species is also mentioned, *ibid.*

Limnocharis, g. n., *id.* Tr. Am. Ent. Soc. iv. p. 144, fig., allied to *Limnebius*, but abdomen with 8 joints: hind legs not ciliate, outer edge finely spinulose. *L. piceus*, sp. n., *id. ibid.*, California.

Cyprimorphus, g. n., (? Fairmaire) R. Z. (3) i. p. 334. Allied to *Volvulus*, but more convex; shorter, with divided eyes and slender tarsi. Facies of *Cypris* (*Crustacea*) or of a small bivalve shell. *C. compressus*, sp. n., Fairmaire, l. c. Morocco.

Hydrophilus cognatus and *japonicus*, spp. nn., D. Sharp, l. c. p. 57, Japan.

Hydrochares affinis, sp. n., *id.* l. c. p. 58, Japan.

Hydrobius scabrosus, N. California, Oregon, Vancouver I., and *latus*, California, p. 133, *rufiventris*, p. 135, S. Oregon, *dissimilis*, p. 136, San Francisco, Horn, P. Am. Phil. Soc. xiii.; *H. solstitialis*, p. 133, *punctatus*, p. 134, Peru, Kirsch, B. E. Z. xvii.: spp. nn.

Philhydrus fucatus, p. 127, Utah, Arizona, *P. (Helochares) punctatistriatus*, p. 131, California, Horn, l. c.; *P. japonicus* and *simulans*, Sharp, Tr. E. Soc. 1873, p. 59, Japan; *P. nigrinus*, *id.* An. Soc. Esp. i. p. 262, Reinoso, Escorial: spp. nn.

Helochares striatus and *lewisi[an]us*, spp. nn., *id.* Tr. E. Soc. 1873, p. 60, Japan.

Berosus japonicus, and *B. (Enoplurus) lewisi[an]us*, *id. l. c.* p. 61, Japan; *B. emarginatus*, p. 120, Texas, *styliferus*, p. 121, Colorado, *rugulosus*, p. 124, Lower California, Horn, *l. c.*; *B. sculptus*, Solsky, Hor. Ent. Ross, ix. p. 308, Astracan: spp. nn.

Volvulus profundus, sp. n., Sharp, *l. c.* p. 62, Japan.

Amphiops mater, sp. n., *id. ibid.* Japan.

Hydrochus japonicus, sp. n., *id. l. c.* p. 64, Japan.

Cyclonotum latum, *id. ibid.* Japan; *C. minor*, *id. An. Soc. Esp. i.* p. 262, Escorial: spp. nn.

Cercyon brunneum [-eus], Kirsch, *l. c.* p. 134, Peru; *C. dux*, *algarum*, *aptus*, p. 65, *laminatus*, p. 66, Sharp, *l. c.* Japan: spp. nn.

Megasternum distinctum, sp. n., *id. l. c.* p. 66, Japan.

PAUSSIDÆ.

The Australian species tabulated: some are nocturnal, and *Arthropterus brevis*, Westw., is gregarious. W. MacLeay, Tr. Ent. Soc. N. S. W. ii. pp. 337-340.

Arthropterus cylindricollis, p. 340, *waterhousii*, *bisinuatus*, p. 341, *angulicornis*, *riverinæ*, p. 342, *nigricornis*, *picipes*, *montanus*, p. 343, *subampliatius*, *humeralis*, p. 344, *ovicollis*, *wyanamattæ*, p. 345, *angulatus*, *subcylindricus*, p. 346, *adelaïdæ*, *puncticollis*, *foveicollis*, p. 347, *odewahni*, *scutellaris*, p. 348, *turneri*, *hirtus*, *darlingensis*, p. 349, *depressus*, *rockhamptonensis*, p. 350, *howitti*, *brevicollis*, p. 351, *politus*, *latipennis*, p. 352, spp. nn., *id. l. c.* various parts of Australia.

STAPHYLINIDÆ.

The 4th livraison of vol. iii. of A. Fauvel's "Faune Gallo-Rhénane" (Zool. Rec. ix. p. 231) has been published, containing pp. 315-390, and supplement i. pp. 1-24. It includes from *Oxyporus* to *Xantholinus* (the usual method of classification being inverted), and the supplement enumerates additions and corrections for all the part hitherto published. New genera and species are characterized, and much synonymy (including many obviously random guesses) is given. References are made to pl. iii. not published with the above-mentioned portion.

D. Sharp, R. Z. (3) i. pp. 410-414, enumerates the species taken in Asia Minor, by T. Deyrolle.

H. Jekel, Col. Jek. pp. 21-23, proposes to exclude the abdomen from measurement in this family, and reverts to the Erichsonian enumeration of 6 segments for that portion of the body.

Aleocharides.

E. MULSANT & C. REY, Mém. Ac. Lyon, xix. (1871-72) [published in February, 1873; *sec. Jekel*, Col. Jek. i. p. 6], pp. 75 & 76, commence a descriptive revision of the French species of the 'famille Aléochariens,' 'Tribu des Coléoptères brévipennes,' which they divide into 8 'branches,' Bolitocharaires, Myrmédoniaires, Aléocharaires, Oligotaires, Hygronomaires, Diglossaires, Gymnusaires, and Dinardaires. They give a (methodical) list of the genera and species of the first of these, pp. 73

& 74, and then proceed to discuss it in detail, under the 'rameaux' Autalites, Phytosates, Bolitocharates, Placusates, Diestotates, and Gyrophénates, describing the members of the first three, pp. 78-123. The following new genus is characterized:—

Actosus, p. 234. Chiefly distinguished from *Phytosus* by its very short metasternum. *Phytosus nigriventris*, Chev., and *balticus*, Ktz.

The same authors, Ann. Soc. L. Lyon (n. s.), xix. (1872), pp. 91-411, pls. i.-v. undertake a similar revision of their 'Bolitocharaires,' subdividing that 'branche' into the same 'rameaux,' but inverting their order and discussing all of them. Another list (alphabetical, this time) is given of the genera and species; and the plates contain a figure of *Bolitochara elongata*, and much detail of structure of various species. The insects comprised in the above notice are again fully described, *Actosus* being again brought forward as a new genus with no reference to the Mém. Ac. Lyon! [for observations on the elasticity of characters relied on in this group, see H. Jekel, *l. c.*] The following new genera, &c., are characterized:—

Brachida, p. 94, to receive *Homalota notha*, considered as a member of the Gyrophénates.

Phanogyra, subg. of *Gyrophæna*, p. 166, for *G. polita* and allies.

Calpusa, subg. of *Placusa*, pp. 198 & 217, for *P. adscita*, Er. (with which *Homalota granulata*, Baudi, is queried as identical).

Epipeda, p. 226; intermediate tarsi 4-jointed, labial palpi 2-jointed: allied to *Placusa*. *Homalota plana*, Gyll., and *H. arcana*, Er.

Tachyusida, p. 278, near *Leptusa*, for *Oxyopoda gracilis*, Er.

Pasilia, p. 316, subg. of *Sipalia*, for *Leptusa testacea* and *bonvouloiri*, Bris., and *Homalota nubigena*, Kies.

Pisalia, p. 325, another subg. of *Sipalia*, for *Homalota globulicollis*, Muls., and *Leptusa pallida*, Scriba.

Placusa subdepressa, p. 207, *similata*, p. 214, France.

These authors again revert to the Mém. Ac. Lyon, xx. (1873-74), pp. 23-175, pls. i. & ii., and once more expound their views as to the subdivision of their Aléochariens (numbered as the 15th family of the 'Brévipennes'), the 8 branches above named being inverted in position. They discuss the 5 last of these, describing fully various species as new, with no reference to Ann. Soc. L. Lyon (n. s.) xx., in which some of these species are also brought forward as new, and under which heading they will here be noticed. The plates contain details of various species of these 5 subdivisions.

Alternating again with a paper in Ann. Soc. L. Lyon (n. s.) xx. (1873; 1874 on title), they describe the following new species (with indications of more new subgenera), all, except *Oligota aliena*, from France.

Myllena incisa, p. 1.

Oligota ('*Logiota*') *picescens*, *O. picipennis*, p. 2, *convexa*, p. 3, *australis*, *fuscipes*, p. 4, *pilosa*, *misella*, p. 5; *O. aliena*, p. 3, ? Senegal.

Myrmedonia ('*Myrmelia*') *excepta*, p. 6.

Kraatzia lavicollis, *ibid.*

Thamiaræa australis, p. 7.

Colpodota parens, p. 7, *piceorufa*, p. 8, *subgrisescens*, p. 9, *lacertosa* and *C. (Acrotona) negligens*, p. 10, *laticornis*, p. 11, *navicula*, and *C. (Solenia) simulans*, p. 12.

Dadura nudicornis, p. 13.

Microdota (Hilara) fulva, *M. (Philhygra) perdubia*, p. 14, *obscura*, and *M. brunripes*, p. 15, *parvicornis*, p. 16, *asperana*, *sericea*, p. 17.

Ceritaxa spissata, p. 18.

Homalota (Dimetrota) latipes, *tristicula*, p. 19, *H. (Alaobia) nutans*, p. 20, *tadula*, and *H. (Atheta) decepta*, p. 21, *fulvipennis*, p. 22, *H. ebenina*, *interrupta*, p. 23, *foliorum*, p. 24, *robusta*, p. 25.

Dinaræa (Aglypha) melanocornis [-nocera], p. 25, *D. (Glaphya) pubes*, p. 26.

Platarea geniculata, p. 27.

Halobrechta halensis, p. 27.

Ouralia picicornis, p. 28.

Meotica parasita, p. 28, *parilis*, p. 29, *misera*, and *M. (Cryptusa) capitatis*, p. 30.

Amischa arata, p. 31, *forcipata*, *filum*, p. 32, *minima*, p. 33.

Bessobia nebulosa and *B. (Trichiota) gibbera*, p. 34.

Metaxya apricans, p. 35, *marina*, p. 36.

Disopora immatura, p. 36, *D. (Aloconota) latusulcata*, p. 37.

Thinecia libitina, *hesitana*, p. 38, *merita*, and *T. (Hydrosmecta) callida*, p. 39, *T. (H.) amara*, p. 40, *T. simillima*, p. 41.

Hygræcia parva, p. 41.

Taxicera perfoliata, p. 42, *indigna*, p. 43.

The 6th division, Aléocharaires, is described in Ann. Soc. L. Lyon (n. s.) xx. pp. 285-447, divided into Homéusates, Aléocharates, Oxy-podates, Ocyusates, Phléoporates, and Calodérates; of which the two first only are discussed in the part as yet published. *Aleochara nitida*, Grav., is not only considered distinct from *bilineata*, but varr. of it are named and described as *fuscinotata*, *transita*, and *latipennis*. Thomson's genus *Baryodma*, itself a mere sub-genus of *Aleochara*, is divided into 6 sub-genera, whereof *Xenochara*, p. 344, *Polychara*, p. 348, *Homæochara*, p. 414, *Dyschara*, p. 425, and *Coprochara*, p. 430, are new. The following new species are described from France:—*Baryodma (Polychara) hæmatica*, p. 368, *alutacea*, p. 390, *B. (Homæochara) latipalpis*, p. 415, *B. (Coprochara) pauwilla*, p. 443. (? = *Aleochara longula*, Heer).

Errors in localities, &c., in the above papers are corrected by Ch. Brisout, Bull. Soc. Ent. Fr. (5) iii. p. lxvi.

H. Jekel, Col. Jek. i. pp. 9-18, gives a catalogue of species known to him, with localities, and some synonymy. A var. of *Aleochara discipennis*, Muls., from S. France, is named *basicornis*, p. 25. *A. atra*, Sol., and *lata*, Grav., are distinct from each other and from *fuscipes*.

Leptusa nigra, Baudi, *ex. typ.*, = *lapidicola*, C. Bris.; *L. simplex*, Baudi, is distinct from *curtipennis*, Aubé: C. Brisout, l. c.

Aleochara grisea, Ktz., *obscurella*, Gr., and *algarum*, Fauv. [= *kirbyi*,

Steph.] ; on synonymy and diagnostic characters, *cf.* J. Weise, B. E. Z. xvii. pp. 443 & 444 ; H. Jekel, Col. Jek. i. p. 18.

Homalota basicornis, Muls., is distinct from *autumnalis*, Er., and both sexes are described, from Austria ; Kraatz, B. E. Z. xvii. p. 213.

Autalia conura, p. 29, Sicily, *longula*, p. 31, Corfu, spp. nn., H. Jekel, Col. Jek. i.

Falagria sicula, sp. n., *id. l. c.* p. 33, Sicily.

Leptusa (Sipalia) lativentris, sp. n., Sharp, An. Soc. Esp. i. p. 265, Reinosa.

Thiasophila brunnicornis, sp. n., Jekel, *l. c.* p. 35, Corfu.

Aleochara aurivillosa, p. 27, Malta, *brachialis*, p. 39, N. S. Wales, *erectisetosa*, p. 41, Sicily, *id. l. c.* spp. nn.

Apteranillus convexifrons, sp. n., Fairmaire, R. Z. (3) i. p. 325, Dély-Ibrahim, N. Africa.

Tachyusa cingulata, sp. n., Jekel, *l. c.* p. 43, Malta.

Oxyroda quadricuspidata, sp. n., *id. l. c.* p. 45, Sicily.

Homalota procedens, p. 83, *assimilis*, p. 84, Tyrol, E. Eppelsheim, S. E. Z. xxxiv. ; *H. australis*, Jekel, *l. c.* p. 47, N. S. Wales : spp. nn.

Gyrophæna flavicincta, sp. n., Jekel, *l. c.* p. 49, N. America.

Oligota femoralis, sp. n., C. G. Thomson, Opusc. Ent. (v.) p. 520, Lund.

Tachyporides.

Tachyporus aceductus, K., = *ventriculus*, Say ; J. L. Leconte, P. Ac. Philad. 1873. p. 327.

Erchomus (Coproporus) gallicus, Perris, = *colchicus*, Kr., found abundantly on poplar, near Sos, by Bauduer ; Fauvel, Ann. Ent. 1873, p. 94.

Tachinus deyrollii, sp. n., Sharp, R. Z. (3) i. p. 411, Trebizond.

Quediides.

Quedius dilatatus. Economy in connection with *Vespa crabro* very fully discussed by A. Rouget, who has taken the perfect insect and bred it from the larva in considerable numbers. Mém. Ac. Dijon (3) i. pp. 201-229.

Staphylinides.

Staphylinus armeniicus, sp. n., Sharp, R. Z. (3) i. p. 412, Asia Minor.

Ocypus rheticus, sp. n., Eppelsheim, S. E. Z. xxxiv. p. 85, Tyrol.

Xantholinides.

Othius angustatus, Sol., is a *Philonthus*, *O. californicus*, Mann., probably a *Baptolinus*. *O. pulchellus*, Perr., a *Metoponcus* ; *O. crassus* and *suturalis*, Mots., and ? *piceus*, Heyd., and *longicornis*, Thoms., = *lapidicola*, Kies. ; *O. dilutus*, Mots., = *myrmecophilus*, Kies. ; *O. bovinus*, Coq., = *lævisculus*, Steph. ; *O. brevipennis*, Ktz., = *melanocephalus*, Grav., var. ; *Baptolinus frigidus*, Duf., and ? *dimidiatus*, Mots., = *alternans*, Gr. ; *Leptacinus amissus*, Coq., *radiosus*, Peyr., = *parumpunctatus*, Gyll. ; *L. triangulum*, *berytensis*, and *jebuseus*, Sauley, *apicalis*, Kol., *linearis*, Grav., = *batychnus*, Gyll. ; *Leptolinus sareptanus*, Stierl., *cephalotes*, Ktz., and ? *versicolor*, Solsky, = *nothus*, Er. ; *Xantholinus ruficollis*, Luc., = *collaris*,

Er.; *X. melanarius*, Fauv., *picipes*, Thoms. (*thomsoni*, Schw.), *atratus*, Heer, *ochraceus*, Gyll., = *punctulatus*, Payk. [!]; *X. tenuipes*, Baudi, ? = *gracilipes*, Duv.; *X. flavicinctus*, Hoch., = *relucens*, Gr.; Fauvel, Faune Gallo-Rhénane, iii. pp. 368-386.

Xantholinus morio, Reitter, *nec* Woll., is re-named *haroldi* by the author, C. H. xi. p. 146 [already re-named *melanarius* by Fauvel: Zool. Rec. ix. p. 253.]

Typhlodes, g. n., D. Sharp, Ent. M. M. x. p. 1 (1st June, 1873). Eyeless: between *Leptacinus* and *Leptolinus*, differing from the former in the elongate basal joints of its antennæ, its less distinct frontal grooves, and the absence of the upper side-line of the thorax; and from the latter by its undilated anterior tarsi, shorter palpi, and more distinct frontal furrows. *T. italicus*, sp. n., *id. l. c.* p. 2, Florence. The genus is not separable from *Xantholinus*, and the species = *X. myops*, Fauvel, for which priority is claimed: Fauvel, Faune Gallo-Rhénane, iii. suppl. 1, p. 24 [the 4th livraison of vol. iii. of the Faune Gallo-Rhénane, in which *X. myops* was first published, bears date July, 1873].

Xantholinus myops, p. 389, Maritime Alps, *cribripennis*, p. 390, Aubé, Italy, Caucasus; Fauvel, *l. c.* spp. nn.

Baptolinus longiceps, sp. n., *id. l. c.* p. 374, Nancy, Alps.

Pæderides.

Sunius humeralis, Rott., = *anguinus*, Baudi; *S. latus*, Fairm., *nec* Rosen., is re-named *collaris* (p. 294, note); *S. serpentinus*, Mots., = *filiformis*, Latr.; *S. diversus*, Aubé, = *pulchellus*, Heer; *S. immaculatus*, Mots., *biguttatus*, Baudi, = *bimaculatus*, Er.; *S. æmulus*, Rott., *apicalis*, Mots., = *melanurus*, Küst.; *S. neglectus*, Märk., *angustatus*, Payk., = *gracilis*, Payk.; *Mecognathus ammonita*, Saulcy, ? = *pulcher*, Aubé, and the genus is only a *Sunius* with short elytra, *sec. typ.*; *Scopeus apicalis*, Muls. & R., *erichsoni*, Kol., = *gracilis*, Sperk.; *S. pusillus*, Kies., *minutus*, Er., = *sulcicollis*, Steph., to which *S. ryei*, Woll., is also attributed [the 2 species differ *toto cælo*]; *Lithocharis aterrima* and *dido*, Saulcy, *obscurella*, Er., = *obsoleta*, Nordm.; *L. gracilis*, Muls. & R., = *aveyronensis*, Mathan; *Pæderus cephalotes*, Mots., *geniculatus*, Peyr., *moses*, Saulcy, *strictus*, Baudi, = *littoralis*, Gr.; *P. longicollis*, Gaut., = *riparius*, L.; *P. corsicus*, Gaut., = *fuscipes*, Curt.; *P. ruficollis*, F., and *sanguinicollis*, Mots., are races of one species, to which *longicornis*, Aubé, *algericus*, Mots., *gemellus*, Kr. and ? *albipilis*, Solsky, are referred; *Dolicaon truquii*, Saulcy, = *biguttulus*, Lac.; *Lathrobium lineaticolle*, Scriba, = *castaneipenne*, Kol.; *L. alpestre*, Heer, *letzneri*, Gerh., = *fulvipenne*, Gr.; *L. maurianense*, Fauv., = *dilutum*, Er., ♀; *L. solskii*, Stein, *gracile*, Solsky, *nec* Hampe, = *scutellare*, Nord.; *L. longipenne*, Fairm., = *longulum*, Gr.; *L. striatipunctatum*, Kies., = *multipunctum*, Gr.; *L. punctulatum* and *nigrum*, Lec., and ? *posticum*, Muls. & R., = *terminatum*, Gr., = *quadratum*, Payk.; *Glyptomerus etruscus*, Picc., *appeninum*, Baudi, is a race of *G. cavicola*, Müll.; *Scimbatium saintpierrii*, All., *longicolle*, Muls. & R., *grandiceps*, Duv., = *testaceum*, Er. (which is immature); *S. longipenne*, C. Bris., = *pubipenne*, Fairm.; *Achenium hæmorrhoidale* and *distinctum*, Luc., = *striatum*, Latr.: Fauvel, *l. c.* pp. 293-362.

Pæderus tumidicollis, Gerst., figured: V. d. Decken's Reisen, iii. pt. 2, pl. v. fig. 9.

Micrillus, g. n., Raffray, R. Z. (3) i. p. 362. Near *Achenium*, but with elongate posterior tarsi. Eyes almost invisible, smooth. *M. subterraneanus*, sp. n., *id. ibid.* pl. xvi. figs. 6, 6a-f, Algiers.

Nazeris, g. n., Fauvel, l. c. p. 298, note. Allied to *Sunius*, but not rugose, with 4-toothed labrum, and different tarsi. *Mecognathus cribellatus*, Fairm., = *pulcher*, Aubé.

Cephisus, g. n., *id. ibid.* Facies of *Lithocharis* and *Stilicus*, differing in the lobed 4th joint of its tarsi; differs from *Sunius* in its short antennæ, small eyes, short bidentate mandibles, &c. *C. orientis*, sp. n., *id. l. c.* p. 300, note, Syria.

Domene, g. n., *id. l. c.* p. 305. Facies of *Stilicus*, but with labrum neither toothed nor spined; differs from *Lathrobium* in the 4-dentate mandibles, the structure of the ligula and posterior tarsi. *Lathrobium scabricolle* and *stilicinum (arabicum and galilaum, Saulcy, punctatissimum, Scriba)*, Er., and *D. scopælla*, sp. n., l. c. p. 306, note, Syria.

Scotonomus, g. n., *id. l. c.* p. 327, note. Allied to *Doliceon*: eyeless, 4th joint of maxillary palpi very wide, tarsi simple. *S. raymondi*, sp. n., *id. l. c.* p. 328, note, Tuscany.

Lathrobium luteipes, sp. n., *id. l. c.* p. 342, Breda, Scotland, Piedmont.

Scopeus longicollis, p. 311, Limoges, *micropterus*, p. 313, note, Tuscany, Fauvel, l. c. spp. nn.

Pinophilides.

Edichirus stilicinus, Gerst., figured: V. d. Decken's Reisen, iii. pt. 2, pl. v. fig. 10.

Tænodema africanum, sp. n., Gestro, Ann. Mus. Genov. iv. p. 357, Bogos (the genus hitherto only recorded from S. America).

Procirrus saulcii, sp. n., Fauvel, l. c. p. 291, note, Palestine.

Stenides.

Evæsthetus dissimilis, Aubé, is referred to the N. American genus *Edaphus*, Lec. (re-characterized); *Ev. fungicola*, Mots., probably = *Gyrophaena boleti*, L.; *E. marice*, Bethe, and ? *ruficollis*, Mots., = *scaber*, Gr., = *bipunctatus*, Ljungh; *E. fulvus*, Mots., ? = *ruficapillus*, Lac.; *Dianous chalybæus*, Lec., ? = *cærulescens*, Gyl.; *Stenus tylocephalus*, Ktz., ? = *gynemeri*, Duv., ♀; *S. pygmæus*, Perris, = *incanus*, Er.; *S. pumilio*, Baudi, = *declaratus*, Er., = *nanus*, Steph.; *S. novator*, Duv., *rogeri*, Ktz., *obscurus*, Luc., = *providus*, Er.; *S. coniciventris*, Fairm., = *pusillus*, Steph.; *S. argentellus*, Thoms., *carbonarius*, Er., Ktz., *nec* Gyl.; = *palposus*, Zett.; *S. sulcatulus*, Muls. & R., = *buphthalmus*, Gr.; *S. inæqualis*, Muls., *gracilentus*, Fairm., *cinerascens*, Er., = *melanarius*, Steph.; *S. congener*, Mäkl., = *canaliculatus*, Gyll.; *S. trivialis*, Ktz., *æqualis*, Muls. & R., = *morio*, Gr.; *S. minutus*, Hoch., ? = *crassus*, Steph.; *S. sublobatus*, Muls., = *carbonarius*, Gyll.; *S. roscidus*, Snellen, = *tarsalis*, Ljung.; *S. viridans*, Baudi, is from tropical America; *S. arabicus*, Saulcy, *major*, Muls., = *canescens*, Rosenh.; *S. salinus*, C. Bris. ? = *binotatus*, Ljung.; *S. cavifrons*, Muls. & R., *plantaris*, Er., = *pallitarsis*, Steph.; *S. pulchripes*, Solsky, *longicornis*, Saulcy, = *hospes*, Er.; *S. gracilicornis*,

Baudi, *serpentinus*, Fauv., = *politus*, Aubé; *S. fauveli*, Ch. Bris., *ochropus*, Kies., = *elegans*, Rosenh.; *S. amulatus*, Crotch, *elegans*, Fairm., *aceris*, Steph., = *ærosus*, Er.; *S. carinifrons* and *gilvipes*, Mots., *angustulus*, Heer, *aceris*, Lac., = *impressus*, Germ.; *S. impressipennis*, Duv., = *ossium*, Steph.; *S. bituberculatus*, Mots., ? = *italicus*, Baudi [erroneously sunk for the author's *scaber*, to which it is long antecedent in publication]: Fauvel, *l. c.* p. 218, *et seq.*

Octavius, g. n., Fauvel, *l. c.* p. 220. Differs from *Evæsthetus* in its transverse, finely crenulated labrum, its maxillary palpi having the 3rd joint pyriform, and scarcely longer than the 2nd; the 5-jointed club of its antennæ, and its microscopic eyes. *O. pyrenæus*, *ibid.* Pyrenees, and *O. insularis*, *ibid.*, note, Corsica and Sardinia, spp. nn., and possibly *Sipalia grandiceps*, Muls. & R., [which is also stated, *l. c.*, to be rather allied to the *Aleocharides*!]

Stenus alpicola, p. 236, Alps, Pyrenees, *strigosus*, p. 239, note, Corsica, *gallicus*, p. 248, Metz, *explorator*, p. 254, France, Spain, *speculifer*, p. 288, Pyrenees, Fauvel, *l. c.* spp. nn.

Oxytelides.

Thinobius minor, Muls. & R., ? = *delicatulus*, Ktz.; *Trogophlæus tarsalis*, Hoch., = *memnonius*, Er.; *T. brevipennis*, Hoch., ? = *elongatulus*, Er.; *T. aberrans*, Ros., *atomus*, Saulcy, = *exiguus*, Er.; *Oxytelus eppelsheimi*, Bethé, = *rugifrons*, Hoch.; *O. scaber*, Ros., = *intricatus*, Er.; the larva of *Bledius atricapillus* described (p. 18); *B. crenulatus*, Stierl., = *unicornis*, Germ.; *B. fuscipes*, Rye, now considered a *sex* of *pallipes*, Gr. [!]. Fauvel, *l. c.* suppl. 1, pp. 14–21.

Syntomium æneum makes galleries in friable earth, and occurs in great quantities at Calvados: L. Bedel, Bull. Soc. Ent. Fr. (5) iii. p. clxx.

Acidota ferruginea, Er., occurs in England, and = *cruentata*, Mann., brachypterous form: observations are made on the various opinions of authors with regard to it. *A. rufa*, Grav., is apparently a like form of *A. crenata*. E. C. Rye, Ent. M. M. ix. p. 190.

Thinobius minutissimus, sp. n., Flavel, *l. c.* p. 14, R. Loire (indicated by V. Pyot under the name of *T. ligeris*, Bull. Soc. Ent. Fr. 5, iii. p. ccxxvi.).

Homaliides.

Homalium pineti, Thoms., = *planipenne*, Mäkl.; *H. marginatum*, K., is an *Olophrum*; J. L. Leconte, P. Ac. Philad. 1873, p. 327. *H. marinum*, Rag., = *rufulum*, Er.; E. Ragusa, Bull. Ent. Ital. v. p. 266.

Homalium rugulipenne, Rye, on the Scotch Coast near Aberdeen; J. W. H. Traill, Scot. Nat. ii. p. 20. *H. allardi*, Fairm., in a bird-cage: T. Morley, Ent. M. M. ix. p. 268.

Anthobium pumilio, Ros., *adustum*, Kies., = *torquatum*, Msh., from which *hispanicum*, Bris., is distinct; *Homalium sulculum*, Steph., is adopted for *striatum*, Lac., *nec* Grav.; *H. hiemale*, Fuss, = *gracilicorne*, Fairm.; *H. lagopinum*, Sahlb., *clavicorne*, Mots., ? *littorale*, Thoms., = *laticolle*, Kr.; *Arpedium gyllenhali*, Sahlb., = *brachypterum*, Grav.; *A. brunnescens*, Sahlb., = *gyllenhali*, Zett.; *Acidota quadrata*, Zett., is a good species. Fauvel, *l. c.* Supplement i. pp. 4–11.

Anthophagus cenicollis, sp. n., *id. l. c.* p. 13, Gap.

Lathrimæum macrocephalum, Eppelsheim, S. E. Z. xxxiv. p. 86, Tyrol ;
L. prolongatum, Rottenberg, B. E. Z. xvii. p. 203, Silesia : spp. nn.

Boreaphilus guadarramus [= *velox*, Heer ; Fauvel, *l. c.*], Sierra de
 Guadarrama, *astur*, Asturias, Sharp, An. Soc. Esp. i. p. 266 : spp. nn.

Phlæocharides.

Phlæocharis cæca, Fauv., = *Scotodytes paradoxus*, Saulcy ; and a new
 species, *P. corsica*, affords a passage between true *Phlæocharis* with
 developed eyes and the eyeless *Thermocharis*, identified with *Scotodytes*
 (heretofore placed among the *Scydmanidæ*). Fauvel, *l. c.* Supplement i.
 pp. 1 & 2.

Phlæocharis brachyptera, sp. n., Sharp, *l. c.* p. 267, Reinosa.

PSELAPHIDÆ.

L. W. Schaufuss, Nunq. Ot. ii. (1872), pp. 243-248, tabulates the known
 genera, according to the number of antennal joints, in the following
 groups:—*Articerides* (1), *Adranides* (2), *Goniastides* (5), *Clavigerides* (6),
Cyathigerides (7), *Pselaphides* (10 or 11).

Sintectus, Westw., = *Tmesiphorus*, Lec. ; J. L. Leconte, P. Ac. Philad.
 1873, p. 327. *Batrisus puncticollis*, Tournier, *nec* Mots., re-named
punctideres [*vox hybr.*] ; De Marseul, L'Ab. ix. p. 8. *Bryaxis tristis*,
 Hampe, ? = *nigricans*, Gredl. (which has priority) ; Gredler, C. H. xi.
 p. 58, note. *Bryaxis nigricans*, Gredl., *nec* Leach, re-named *nigrescens* ;
 Marseul, *op. cit.* p. 16. *Bythinus armatus*, Hampe, *nec* Schauf., re-named
armifer ; *id. op. cit.* p. 28.

Trimium siculum, Saulcy : notes on habits by E. Ragusa, Bull. Ent.
 Ital. v. p. 264.

Ctenistes parvipalpis, sp. n., Raffray, R. Z. (3) i. p. 363, pl. xv. figs. 4
 & 4a, Boghari.

Tmesiphorus formicinus, sp. n., W. MacLeay, Tr. Ent. Soc. N. S. W. ii.
 p. 370, Murrumbidgee, Australia.

Metopias elongatus, *traberculatus* [? *tuberculatus* vel *traberculatus*],
 p. 266, *reichii*, p. 267, Amazons, *longipennis*, p. 268, *subcarinatus*, p. 269,
 Santarem ; Schaufuss, *l. c.* spp. nn.

Batrisus trifoveolatus, p. 269, Bogota, *rugiceps*, p. 271, New Granada,
peniculus, *orion*, *ibid.*, *honestus*, p. 272, *macrocephalus*, p. 273, New
 Friburg, *4-punctatus*, p. 273, Yucatan, *5-foveolatus*, p. 274, Rio Janeiro ;
id. l. c. spp. nn.

Trichonyx lapidicola, sp. n., *id. l. c.* p. 367, *ibid.* figs. 7 & 7a, Algiers.

Rhexius brasiliensis, p. 259, *majorinus*, *insignis*, p. 260, Amazons, *id. l. c.*
 spp. nn.

Panaphantus militaris, Brazil, *gracilis*, Amazons, *id. l. c.* p. 261, spp. nn.

Bryaxis kabyliana, p. 364, pl. xv. figs. 3 & 3a, Kabylia, *tuberiventris*,
 p. 365, *ibid.* fig. 2, Algiers, Raffray, *l. c.* ; *B. pilosella*, Cumana, *sub-*
foveolata, Venezuela, p. 262, *curticornis*, p. 263, Yutacan, *binodula*, *reichii*,
 p. 264, Columbia, Schaufuss, *l. c.* : spp. nn.

Macherites procerus, sp. n., Gredler, *l. c.* p. 59, Condino, Tyrol.

Bythinus algericus, *ibid.* fig. 6, Boghari, *diversicornis*, fig. 5, Algiers,
 Raffray, *l. c.* p. 366, spp. nn.

SILPHIDÆ.

Necrophorus defodiens, Mann., = *melsheimeri*, K. ; *N. halli*, K., = *orbicollis*, Say ; *N. hebes*, K., = *vespilloides*, Hb., var. ; J. L. Leconte, P. Ac. Philad. 1873, pp. 326 & 327.

Necrophorus and *Necrodes* feeding on *Musca* larvæ ; Bell, Canad. Ent. v. p. 94.

Silpha subrotundata with a *Filaria* several inches long protruding from the anus : E. Newman, Ent. vi. p. 432.

Liodes punctistriatus, K., is an *Anisotoma*, and not a *Hydnobius* : Leconte, l. c. p. 327.

Anisotoma pallens, -Stm., new to Britain ; *A. grandis*, Fairm. ?, re-described from England, and provisionally named *anglica* ; *A. puncticollis*, Thoms., ? = *hybrida*, Er. ; and observations on habits of various species : E. C. Rye, Ent. M. M. x. pp. 135 & 136.

Choleva ovalis, sp. n., Kirsch, B. E. Z. xvii. p. 134, Peru.

Adelops piochardi and *hermensis*, Abeille de Perrin, Bull. Soc. Ent. Fr. (5) iii. p. xcvi. Ariège ; *A. triangulum*, p. 268, *perezi*, p. 269, Caves of Cuanes and Cuasande, Labra, *crotchi*, *rugosus*, p. 270, Alsasua, *uhagoni*, p. 271, Reinoso, Sharp, An. Soc. Esp. i. (cf. Uhagon, *ibid.* p. 272) : spp. nn.

Leptinus validus, sp. n., Horn, Tr. Am. Ent. Soc. iv. p. 145, fig., Hudson's Bay.

Anisotoma multipunctata, p. 131, *circinipes*, p. 132, Japan, *macropus*, p. 133, England, E. C. Rye, l. c. spp. nn.

CORYLOPHIDÆ.

Aphanocephalus, g. n., T. V. Wollaston, Ent. M. M. ix. p. 278. Dubiously referred to this family, as a gigantic and aberrant member. Tarsi 3-, antennæ 10-jointed ; thorax almost entirely concealing the head. *A. hemisphericus*, id. l. c. p. 280 ; *A. wollastoni*, E. C. Rye, *op. cit.* x. p. 167 ; Japan, spp. nn.

Phenocephalus, g. n., Wollaston, *op. cit.* x. p. 167, antennæ 11-jointed ; differs from *Sacium* and *Microstagetus* in its prothorax being deeply excavated in front. *P. castaneus*, sp. n., *id. l. c.* p. 168, Japan.

TRICHOPTERYGIDÆ.

Matthew's "Trichopterygia illustrata et descripta" reviewed by Dohrn, S. E. Z. xxxiv. pp. 398-403.

Millidium trisulcatum, Aubé, var. ; A. Matthews, Ent. M. M. ix. p. 178.

Trichopteryx carbonaria, p. 179, England, *lætitiæ*, p. 180, Belgium, *id. l. c.* spp. nn.

Ptenidium lawsoni, sp. n., *id.* Cist. Ent. (vi.) p. 123, Auckland, New Zealand.

SCAPHIDIIDÆ.

Cyparium inclinans, sp. n., Kirsch, B. E. Z. xvii. p. 135, Peru.

Scaphisoma tropicum, sp. n., *id. l. c.* p. 136, Peru.

HISTERIDÆ.

G. H. HORN'S "Synopsis of the Histeridæ of the United States" (P. Am. Phil. Soc. xiii. No. 91, pp. 273-360, pl. v.), is practically a re-revision of Leconte's paper on the same subject. The author divides the genera into two tribes: *Hololeptini*, with head proretracted and mandibles very prominent, and *Histrini*, with head retracted and deflexed, and not very prominent mandibles. *Lionota* is united to *Hololepta*. The *Histrini* are again divided into *Histrini* and *Saprinini*[ni], *Bacanius* being removed from the former and placed near *Acritus*. *Psiloscelis*, *Margarinotus*, *Hister*, *Phelister*, *Platysoma*, and *Cylistix*, are dubiously treated as subgenera, the species of *Hister* being grouped under the names of typical and common forms; *Gnathoncus* and *Pachylopus* are merged in *Saprinus*. *Heterius morsus*, Lec., pl. v. fig. 3, *Echinodes setiger*, Lec., fig. 4, *Saprinus interstitialis*, Lec., fig. 6, *S. æquipunctatus*, Horn, fig. 8, are figured; and the following observations occur:—*Hololepta princeps*, Lec. = *yucateca*, Mars.; *Hister senevillii*, Mars., = *sellatus*, Lec.: *H. arizonæ*, Horn, = *ulzii*, Horn; *H. memnonius*, Say. = *merdarius*, Hoffm.; *H. obtusatus*, Harr., = *interruptus*, Beauv.; *H. decusus* and *repletus*, Lec., = *census*, Er.; *H. hospitus*, Lec., = *dispar*, Lec.; *H. spretus*, Lec., *paykulli*, K., = *depurator*, Say; *H. permixtus*, Zimm., = *defectus*, Lec.; *Epiurus vicinus*, Lec., = *nigrellus*, Say, = *regularis*, Beauv.; *E. minor*, Lec., = *pulicarius*, Er.; *E. decipiens*, Lec., = *planulus*, Er.; *Onthophilus pluricostatus* and *nodatus*, Lec., = *alternatus*, Say, varr.; *Paromalus affinis*, Lec., = *æqualis*, Say; *P. nanus*, Lec., = *14-striatus*, Steph.; *P. corticalis*, Lec., = *tenellus*, Er., from which *gilensis*, Lec., is different; *Saprinus deletus* and *interceptus*, Lec., and *communis*, Mars., = *rotundatus*, Kugel.; *S. consimilis*, Walk., = *californicus*, Mann., = *lugens*, Er.; *S. sejunctus* and *distinguendus*, Mars., *spureus*, Lec., = *oregonensis*, Lec.; *S. latubris*, Lec., = *placidus*, Er.; *S. obductus* and *vinctus*, Lec., = *insertus*, Lec.; *S. rotundifrons*, Mars., *ex. typ.*, = *lubricus*, Lec.; *S. olidus* and *pratensis*, Lec., = *plenus*, Lec., from which *minutus*, Lec., is quite distinct; *S. desertorum* and *orbiculatus*, Mars., = *imbriatus*, Lec.; *S. bigener*, Lec., = *spheroides*, Lec.; *S. javeti*, Mars., = *patruelis*, Lec.; *S. barbipes*, Mars., = *lucidulus*, Lec.; *S. desertorum* and *deserticola*, Mars., = *dimidiatipennis*, Lec.; *Plegaderus pusillus*, Lec., *erichsoni*, Lec., = *barbelini*, Mars.; *Acritus aciculatus* and *obliquus*, Lec., *cribripennis* and *natchez*, Mars., = *exiguus*, Er.; *A. conformis*, Lec., *lateralis*, Mars., = *strigosus*, Lec.

A list of 19 species (11 known, some common in Europe) found by G. Lewis in Japan, is given by S. A. de Marseul, Ann. Soc. Ent. Fr. (5) iii. pp. 220 & 221.

All *Histeridæ* are probably carnivorous. *Hister helluo* attacks larvæ of *Agelastica*, *H. pustulosus* those of *Agrotis*. E. Revelière, Nouv. et faits, 1872, p. clxiii.

Hister marseuli, Desbr., = *tropicus*, Mars.; *H. berhardi*, Desbr., = *gehini*, Mars.; *H. compressus*, Desbr., = *striolatus*, Mars.: S. A. de Marseul, Bull. Ent. Fr. (5) iii. p. xix.

Syntelia mexicana, Westw., re-described and figured, and its analogy to *Lioderma* suggested (*cf.* also V. Harold, C. H. xi. p. 138), though

Westwood placed it in the *Trogositidæ*. A. Sallé, R. Z. (3) i. pp. 11 & 12, pl. ix. figs. 2, 2a-d.

Tribalister, g. n., Horn, *l. c.* p. 299. Differs from *Heterius* and *Scapiccelis* in its solid antennal club being pubescent and not truncate, and from the latter also in its normal first joint: legs like those of *Phelister*, and form of the body resembling *Tribalus*. *T. marginellus*, Lec.; pl. v. fig. 2.

Anapleus, g. n., *id. l. c.* p. 311. Differs from *Dendrophilus* in its slender middle and hind tibiæ, shorter prosternal lobe, mesosternum rounded in front, &c.; from *Bacanius* in having a scutellum; and from *Spharosoma* in its antennæ and their cavity. *A. marginatus*, Lec.

Teretriosoma, g. n., *id. l. c.* p. 347. Intermediate between *Teretrius* and *Xiphonotus*. *T. chalybæum*, sp. n., *id. ibid.* pl. v. fig. 9, Texas.

Æletes, g. n., *id. l. c.* p. 356. Differs from *Acritus* in its want of a scutellum. *Acritus politus*, *basalis* and *simplex* (*acupictus*, Mars.), Lec., and *A. brevisternus*, Mars.

Syntelia westwoodi, sp. n., Sallé, *l. c.* p. 13, pl. ix. figs. 3 & 3a, Oaxaca.

Platysoma lewisi, p. 222, *lineicolle*, p. 223, spp. nn., De Marseul, *l. c.* Japan.

Hister pirithous and *depistor*, *id. l. c.* p. 224, Japan; *H. lucanus*, p. 283, Lower California; *H. (Phelister) eneomicans*, p. 295, pl. v. fig. 1, Columbia; *H. (Platysoma) aurelianus*, p. 297, New Orleans, Horn, *l. c.*: spp. nn.

Epiurus nasutus, Horn, *l. c.* p. 301, Fort Yuma, Arizona; *E. marseuli*, p. 136, *ferrugineus*, p. 137, Kirsch, B. E. Z. xvii. Peru: spp. nn.

Carcinops peruvianus, sp. n., Kirsch, *l. c.* p. 138, Peru.

Paromalus mimeticus, p. 308, pl. v. fig. 5, Arizona; *tejonicus*, p. 309, California, Horn, *l. c.*; *P. musculus*, De Marseul, *l. c.* p. 225, Japan: spp. nn.

Dendrophilus xavieri, sp. n., *id. l. c.* p. 226, Japan (? = *sulcatus*, Mots.).

Saprinus behrensi, p. 315, California, *florida*, p. 318, Florida, *copii*, p. 320, pl. v. fig. 7, Wyoming Territory, *wacoensis*, p. 331, Texas, Horn, *l. c.* spp. nn.

Plegaderus consors, sp. n., *id. l. c.* p. 350, Colorado.

Abræus bonzicus, sp. n., De Marseul, *l. c.* p. 226, Japan.

Acritus arizonæ, p. 353, Arizona, *sallæi*, p. 355, Georgia, Louisiana, Horn, *l. c.* spp. nn.

PHALACRIDÆ.

Phalacrus acutangulus, p. 138, *sericeus*, p. 139, spp. nn., Kirsch, B. E. Z. xvii. Peru.

Olibrus versicolor, sp. n., *id. l. c.*, p. 139, Peru.

NITIDULIDÆ.

E. REITTER, Verh. Ver. Brünn, xii. pp. 5-194, gives a systematic arrangement of the group "*Nitidulariæ*," discussing the *Nitidulidæ*, *Strongyliidæ*, and *Ipidæ*, in continuation of Murray's treatment of the *Brachypteridæ* and *Carpophilidæ* (of both of which divisions Reitter describes new forms in an appendix). *Cybocephalus* has 4-jointed tarsi.

and must therefore be eliminated. *Thireosoma*, Chev., belongs to the *Trogositidæ*. *Stelidota nigrivaria*, Fairm., = *8-maculata*, Say, of which *alternans*, Er., is a var.; *Epuræa adumbrata*, Mann., ? = *corticina*, Er., var.; *E. nigra*, Mkl., *ex. typ.*, = *truncatella*, Mann., var.; *E. convexiuscula*, Mann., *ex. typ.*, = *æstiva*, L.; *E. infuscata*, Mkl., *ex. typ.*, = *immunda*, Stm.; *E. vulpecula*, Redt., *ex. typ.*, = *Haptoncus testaceus*, Murr.; *E. incompleta*, Mots., *ex. typ.*, = *obsoleta*, L.; *E. parallelopipeda*, Mots., belongs to a new genus near *Trimenus* (*Carpophilinæ*); *E. angustula*, Mots., *nec* Stm., is re-named *motschulskii* (p. 29); *Nitidula picea*, Boh., is an *Axyra*; *N. lateralis*, White, *nec* Sahlb., is re-named *mayendorfi* (p. 44); *Phenolia* and *Lobiopa*, Er., can only be considered as subgenera of *Soronia*; *Meligethes rubripennis*, Reitt., *cæruleus*, Msh., Reitt., and *californicus*, Reitt., = *æneus*, F.; *M. ventralis*, Baudi, = *corvinus*, Er.; *M. substrigosus*, Er., = *subrugosus*, Gyll., var.; *M. calvus*, *meridianus*, and *durus*, Reitt., = *maurus*, Stm., *varr.*; *M. natricis*, Bris., = *opacus*, Rosenh.; *M. minutus*, Bris., = *distinctus*, Stm.; *M. glauci*, Kolen., = *discoideus*, Er.; *M. solitarius*, Reitt., = *hypocrita*, Bris.; *M. brucki*, Reitt., = *punctatus*, Bris.; *M. carbonarius*, Först., = *erythropus*, Gyll., var.; *M. politus*, Mots., is not a *Meligethes*. *Amphicrossus discolor*, Er.; abd. segments figured, p. 99, fig. 2. *Camptodes thoracicus*, Er., *nec* Cast., is re-named *transversus*, p. 107; *C. phaleratus*, Er., ? = *vittatus*, Er., var.; *C. difficilis*, Kirsch, ? = *turpis*, K.; *C. lætus*, K., ? = *rubens*, Er.; *Aparomia*, Redt., = *Lioschema*, Fairm., which has (but is not allowed) priority. *A. bifasciata*, Redt., = (*Ips*) *xacarillus*, Thoms. A var. *6-pustulatus* of *Ips 4-signatus*, Say, from Florida, p. 161.

Epuræa. The same author, *op. cit.* xi. (1872) pp. 1-26. pl. i. revises the European species, of which he recognizes 28, giving a synoptical table, and figuring the thoracic outline. *E. diffusa*, Bris., = *10-guttata*, F., var.

Nitidula ossium, K., = *obscura*, K.; *Omosita inversa*, Lec. = *N. discoidea*, F.; *Nomophlæus*, Lec. = *Europs*, Woll.; *Hesperobænus testaceus*, Mots., is a *Bactridium*: J. L. Leconte, P. Ac. Philad. 1873, p. 328.

E. REITTER, *op. cit.* xi. (1872), pp. 27-48, pl. i. monographs *Rhizophagus* and its allies, of which he constitutes a new family, *Rhizophagidæ*, forming a transition to the *Trogositidæ*, distinguished from the *Ipidæ* by the 10-jointed antennæ, of which the club is solid, round, and distinctly ringed at the apex, and also by the tarsi being heteromerous either in one sex or both sexes. Their double maxillary lobe removes them from the *Nitidulidæ*. The genera so associated are *Rhizophagus*, *Europs*, Woll. (with which *Mimema*, Woll., should probably be united), and a new genus [the author, *op. cit.* xii. p. 8, remarks further on this family; and, p. 140, mentions (without characterizing them) *Tisiphore* and *Histeroschema*, as two new genera to be included in it]. *Rhizophagus punctiventris*, Baudi, = *bipustulatus*, auctt.

New genera and species :

Priops, Reitter, *op. cit.* xii. p. 167. *Brachypterides*. Near *Cercus*, but with longer maxillary and incrassate labial palpi, of which the last joint is oval, mandibles simple at apex, longer antennæ, &c. Facies of narrow

Pria, but with 3-jointed club in ♂. *P. mexicanus*, id. l. c. p. 168. Takubaya.

Cryptoræa, id. l. c. p. 57. Facies of *Epuræa*, but with apex of prosternum projecting; club of antennæ 3-jointed in both sexes, simple; allied to *Pria*. *C. americana*, id. l. c. p. 58, Columbia, Bogota.

Epuræanella, sub-g. of *Epuræa*; type, *Epuræa helvola*, Er., = *rufa*, Say; G. R. Crotch, Check-List N. A. Col. p. 48.

Perthalyera murrayi, g. & sp. nn. (names only), id. *ibid*.

Nitidulora, Reitter, l. c. p. 42 (-*osa* in table, p. 10). Between *Epuræa* and *Nitidula*; labial palpi filiform, tibiæ sub-depressed, spinulose, mandibles simple at apex, elytra almost covering abdomen. Type, *Epuræa ephippium*, Er.

Ithya, id. l. c. p. 78. Allied to *Meligaethes*; claws slender, with a strong spine at the base. *I. hirsutula*, id. *ibid*. Cape of Good Hope.

Circopes, id. l. c. p. 79. Differs from *Pocadius* in its dilated tarsi and claws slightly toothed at the base. Allied to the next genus, but semi-circular, with labrum not emarginate, elytra not truncate, &c. *C. subquadratus* and *indicus*, Mots., and ? *Pocadius pilistriatus*, MacLeay.

Macroura [*Macrura*: Latr. *Crust.* 1802], id. l. c. p. 80. Allied to *Æthina*, but with an emarginate labrum, simple mesosternum, toothed claws, and the shape of a large *Meligaethes*. *M. nigra*, p. 81, Australia, *meligaethoides*, Himalaya, *nigritula*, ? Ceylon, p. 82, *punctata*, p. 83, Bintang, id. l. c., and ? *Brachypterus subæneus* and *picinus*, Boh.

Apallodes, id. l. c. p. 130. Facies of *Pallodes*, but with a simple labrum, elongate palpi, dentate claws, &c. *A. palpalis*, id. l. c. p. 132. Parahyba, Columbia.

Paromidia, id. l. c. p. 158. Near *Ips*, but with emarginate frons, posterior tibiæ spinulose, &c. *P. nigerrima*, id. *ibid*. locality unknown.

Cnips, id. l. c. p. 163. Allied to *Cryptarcha*, but with simple mandibles. *C. marginatus*, id. l. c. p. 164, Chili.

Ipsimorpha [*Ipom-*], id. l. c. p. 165. Facies of *Ips*, thorax contracted behind as in certain *Carabidae*, antennal club 3-jointed, joints globose. *I. striatipunctata*, id. *ibid*. Mexico.

Cychocephalus, id. l. c. p. 180. *Mystropides*. Differs from *Mystrops* in its elongate head, strongly toothed mandibles, simple antennæ (♂ & ♀), and 2 exposed abdominal segments. *C. corvinus*, Mexico, *luctuosus*, Columbia, p. 181, id. l. c.

Æcion, id. *op. cit.* xi. p. 44. Facies of *Heteroceris*. *I. mandibularis*, id. l. c. p. 45, figs. 28 & 29, Cape of Good Hope.

Cercus (*Heterhelus*) *politus*, id. *op. cit.* xii. p. 167, Columbia.

Brachypterus (*Brachyleptus*) *aurisericeus*, id. l. c. p. 169, Greece and Asia Minor.

Colastus major, p. 169, Mexico, *flaveolus*, p. 170, Surinam, id. l. c.

Brachypeplus dilutus, p. 170, Columbia, *badenii*, p. 171, Cape of Good Hope, *B. (Liopeplus) fulgidus*, *ibid.*, ? Caraccas; id. l. c.

Cilleus simplex, p. 172, *sulcicollis*, p. 173, Columbia, *murrayi*, p. 172, S. Brazil, id. l. c.

Macrostola costulata, id. l. c. p. 173, Brazil.

Carpophilus luteipennis, *limbipennis*, p. 174, *mexicanus obtusicollis*, p. 175,

Mexico, *humerosus*, p. 176, Japan, *C. (Myothorax) punctipennis*, p. 176, Brazil, *pauculus*, p. 177, Cape of Good Hope, *C. (Nitops) crassicollis, distinctus*, p. 177, Columbia, *id. l. c.*

Haptoncus piceus, remotus, p. 178, Moulmein, *pauperculus*, p. 179, S. Domingo, *id. l. c.*

Mystrops basalis, *id. l. c.* p. 179, Brazil.

Enomæus haroldi, *id. l. c.* p. 182, Himalaya.

Perilopa flava, *id. l. c.* p. 11, Chili.

Epuræa silesiaca, p. 9, Silesia, *binotata*, p. 15, Switzerland, (considered a var., the type-form of which is from Silesia, and is named *nana*; *id. op. cit.* xii. p. 19, note), *excisicollis*, p. 18, Hanover, *marseuli*, Sicily, *rubrimarginata*, Tyrol and South Germany, p. 21, *id. op. cit.* xi.; *E. sericata*, p. 21, Tyrol, *suturalis*, p. 22, Silesia, *ruficollis*, p. 29, Chili, *terminata*, p. 30, Madagascar, E. India, *domina*, p. 31, *obnoxia, similis*, p. 32, *pellax, foveicollis*, p. 33, *paulula*, p. 36, *parilis, rubrinotata*, p. 37, *mandibularis*, p. 38, *japonica*, p. 39, *thiemii*, p. 41, Japan, *obtusicollis*, p. 32, *rotundicollis*, p. 34, *erichsoni*, p. 35, *macrophthalma*, p. 38, N. America, *flavicans*, p. 34, Chicago, *nitida*, p. 35, Madagascar, *minuta*, Java, and *mellitula*, Moulmein, p. 40, *id. op. cit.* xii.

Nitidula mollicella, Egypt, *rufidens*, Columbia, *id. op. cit.* xii. p. 44.

Soronia japonica, p. 47, Japan, *superba*, p. 48, Australia, *chilensis*, p. 49, Chili, *id. l. c.*

Lobiopa lineola, Kirsch, B. E. Z. xvii. p. 140, Peru.

Halepopeplus dimidiatus, *id. ibid.*, Peru.

Omosita funesta, Reitter, *op. cit.* xii. p. 45, Mexico.

Prometopia dohrniana, p. 50, Brazil, *cryptarchoïdes*, p. 51, Mexico, *id. l. c.*

Axyra perplexa, *id. l. c.* p. 53, ? Java or Africa.

Stelidota ferruginea, p. 14, "America," *biseriata*, p. 15, Baltimore, Cuba, Brazil, *rubripes*, p. 16, Orizaba, *id. l. c.*; *S. metabola*, p. 141, *thoracica*, p. 142, Kirsch, *l. c.* Peru.

Æthina major, Madagascar, *villosa*, Mexico, p. 84, *æneipennis*, p. 85, Japan, *obscura*, p. 86, Himalaya, Reitter, *l. c.*

Pria magna and *argenteola*, p. 65, Cape of Good Hope, *nigritula*, p. 66, Madagascar, *deplanata*, p. 67, New Caledonia, *id. l. c.*

Meligiethes tener, Ilyria, and *nitidicollis*, Sungaria, p. 49, *splendidulus*, Cape of Good Hope, and *niesslii*, Sydney, p. 50, *ferrugineus*, p. 51, Himalaya, *id. op. cit.* xi.; *M. violaceus*, p. 71, *japonicus*, p. 73, *lewisi*, p. 74, *flavicollis*, p. 76, Japan, *luminosus*, Ceylon, *gredleri*, Tyrol, p. 72, *letzneri*, p. 74, Germany, *luteolus*, Ceylon, *krueperi*, Smyrna, p. 75, *id. op. cit.* xii.

Hebascus vestitus, Kirsch, *l. c.* p. 142, Peru; *H. discoideus*, Reitter, *op. cit.* xii. p. 97, Mexico.

Pocadius brevis, p. 94, Cuba, *infuscatus*, *ibid.*, *limbatus*, p. 95, N. America, *japonicus*, p. 94, *nobilis*, p. 95, Japan, Reitter, *l. c.*

Strongylus camptoides, p. 128, Mexico, *coccinelloides*, Java, *notatus*, Ceylon, p. 129, *pallodoides*, p. 130, Parahyba; *id. l. c.*

Lasiodactylus tuberculifer, p. 87, Japan, *testudinarius*, *ibid.*, *caliginosus*, p. 90, Madagascar, *substriatus*, p. 89, Senegambia, *elongatus*, *ibid.*, *æthioides*, p. 91, locality unknown, *chevrolati*, p. 90, ? E. Indies, *americanus*, Brazil, *marginatus*, Australia, p. 92, *id. l. c.*

Camptodes ventralis, p. 103, *viridescens*, p. 112, *luteus*, p. 113, *auctus*, p. 115, *glaberrimus*, p. 116, *corallinus*, p. 117, *jekeli*, p. 119, *angustipennis*, p. 120, *erichsoni*, p. 124, Brazil, *brevis*, p. 104, *nigricyaneus*, p. 105, *collaris*, p. 109, *metallicus*, p. 110, *discoideus*, p. 125, Mexico, *nigriviridis*, p. 105, Mexico, Brazil, *splendens*, p. 107, *languidus*, *signaticollis*, p. 108, *atripennis*, p. 127, Columbia, *nitidipennis*, p. 126, Columbia, Brazil (? = *melanarius*, Blanch.), *rubrivittatus*, p. 111, Bolivia, *levicollis*, p. 113, Bogota, *umbripennis*, p. 120, *distinctus*, p. 122, *nitidicollis*, p. 123, Peru, *nitidus*, p. 105, *limbipennis*, p. 109, *politus*, p. 116, *apicipennis*, p. 118, *fuscipennis*, p. 125, localities unknown, *id. l. c.*; *C. dichrous*, *difficilis*, p. 143, *irritans*, *turpis*, p. 144, *pygidialis*, *obsoletus*, p. 145, *letus*, *opacus*, p. 146, *molestus*, p. 147, Kirsch, *l. c.* Peru.

Amphicrossus immaculatus, p. 99, fig. 1, locality unknown, *japonicus*, fig. 3, *lewisi*, fig. 4, p. 100, Japan, Reitter, *l. c.*

Pallodes brunnipennis and *gracilipes*, Kirsch, *l. c.* p. 148, Peru; *P. umbratilis*, p. 134, Japan, *jucundus*, Mexico, *ruficollis*, Cuba, p. 135, Reitter, *l. c.*

Oxyenemus rostratus, locality unknown, *nigriceps*, *annulipes*, p. 137, *aterrimus*, p. 138, Brazil, *id. l. c.*

Triacanus nigripennis, *id. l. c.* p. 139, Ceylon.

Cryptarcha fuscipennis, Kirsch, *l. c.* p. 148, Peru; *C. aclypta*, p. 142, *elongata*, p. 143, *clavata*, p. 144, *thalyroides*, p. 146, *omositoides*, p. 151, Mexico, *apicipennis*, p. 144, Caraccas, *camptoides*, p. 146, Senegambia, *striatipunctata*, *ephippiger*, p. 147, *nanula*, p. 155, Columbia, *australis*, p. 148, *nitidissima*, p. 156, Australia, *ovata*, p. 148, Para, *bella*, p. 150, N. America, *lewisi*, p. 152, Japan, *senegalensis*, p. 153, Senegal, *badeni*, *foveicollis*, *polita*, p. 154, *pallodoides*, p. 156, Brazil, *trucidata*, p. 145, *maculata*, p. 151, localities unknown, Reitter, *l. c.* spp. nn.

Ipis chinensis, p. 160, China, Japan, *rubrimaculatus*, p. 161, Florida, *id. l. c.*

Pityophagus rufipennis, Horn, Tr. Am. Ent. Soc. iv. p. 146, Oregon, Vancouver I.

Rhizophagus brucki, p. 30, Crefeld, Rhenish Prussia, *corpulentus*, p. 35, *adustus*, p. 39, N. America, *angulicollis*, *quadricollis*, p. 36, *subtilis*, p. 39, Columbia, *heydeni*, p. 37, Cuba, *striolatus*, *orientalis*, p. 38, localities unknown; Reitter, *op. cit.* xi.

Eurossa wollastoni, p. 41, Venezuela, *lineellus*, p. 42, ? N. America, *rhizophagoides*, Columbia, Mexico (and var. *apicalis*, Jamaica), p. 43, *id. l. c.*

TROGOSITIDÆ.

Thireosoma circulare, Chev., belongs here, and not to the *Nitidulidæ*: Reitter, *op. cit.* xii. p. 8, note.

Thireosoma cassideum, sp. n., *id. l. c.* Mexico.

Tennochila chalcea and *rugulosa*, spp. nn., Kirsch, B. E. Z. xvii. p. 149, Peru.

COLYDIIDÆ.

Tarphius humerosus, Fairm., nec Woll., re-named *wollastoni* by Fairmaire, re-re-named *fairmairii* by De Marseul, L'Ab. ix. p. 134.

Tarphisoma, Mots., ? = *Tarphiosoma*, Woll.; T. V. Wollaston, Tr. E. Soc. 1873, p. 3, note.

Ditoma, Er., nec Latr., is re-named *Synchyttodes*: G. R. Crotch, Check List N. A. Col. p. 45.

Endectus, Lec., = *Penthelispa*, Pasc.; J. L. Leconte, P. Ac. Philad. 1873, p. 328.

Cerylon forticorne, Muls. & Rey. = *fagi*, Bris.; *C. attenuatum*, Fairm., = *semistriatum*, Perris: L. Bedel, Bull. Soc. Ent. Fr. (5) iii. p. lxxxvi.

Pseudotarphius, g. n., T. V. Wollaston, l. c. p. 1. Differs from *Tarphius* in its 10-jointed antennæ, of which the club is solid, and from *Paryphus* in wanting thoracic antennal grooves, and in its maxillary palpi not having the apical joint securiform. *P. lewisi*, sp. n., *id. l. c.* p. 4, Japan.

Tarphiomimetes, g. n., *id. Ent. M. M.* x. p. 9. Differs from *Tarphius* in its 3-jointed club, conspicuous scutellum, and sub-approximated coxæ: allied also to *Endophleus*. *T. lawsoni* and *viridipicta*, spp. nn., *id. l. c.* p. 11, New Zealand.

Tarphiomimus, g. n., *id. l. c.* p. 12. Differs from *Endophleus* in its distinctly 3-jointed club, its laterally 4-lobed thorax, asperate femora, &c.; and from *Tarphiomimetes* in sculpture and outline, and in the basal joints of the tarsi being much wider and more produced beneath. *T. indentatus*, sp. n., *id. l. c.* p. 13, New Zealand.

Tarphiosoma echinatum, sp. n., *id. Tr. E. Soc.* 1873, p. 3, note, Ceylon.

Eusarcus letourneuxi, sp. n., Raffray, R. Z. (3) i. p. 368, Dellys, Algeria.

Deretaphrus oregonensis, sp. n., Horn, Tr. Am. Ent. Soc. iv. p. 146, Oregon and ? California (genus hitherto Australian).

RHYSODIDÆ.

G. R. CROTCH, P. Am. Phil. Soc. xiii. p. 77, considers this family allied to the *Scaritidæ*, laying stress upon the moniliform antennæ, and the small, sub-triangular, prominent, and separate posterior coxæ. [*Cf.* Lacordaire, Gen. Col. ii. p. 386. Crotch adopts the alteration '*Rhyssodes*' unnecessarily made by Agassiz; *Rhysodes*, as originally proposed by Dalman, being clearly $\rho\nu\sigma\acute{\omega}\delta\eta\varsigma$, not requiring the doubled σ after the long ν : *cf.* Liddell & Scott, edn. 2].

A. CHEVROLAT, Ann. Soc. Ent. Fr. (5) iii. pp. 207-218, discusses the group generally [using '*Rhysodes*,' '*Rhyzodes*,' and '*Rhizodides*' indiscriminately]. *R. piceus*, Germ., probably = *aratus*, Newm.; *R. trisulcatus*, Germ., is referred to *Clinidium*, and adopted for (the prior) *canaliculatus*, Costa, a name preoccupied in 1836 by Castelnau, but not mentioned in Gemm. & v. Harold's Cat. *Ips monilis*, Ol., referred to *Rhysodes* by Germar, is apparently a *Læmophleus*. *R. sculptilis*, Newm. [as Lacordaire suggested], and *conjungens*, Germ., are referred to *Clinidium*; *R. planus*, Chev., = *C. guildingi*, Kirby. *Stemm* [at] *oderus*, Spin., is persistently misquoted as *Stemnatoderus*. In a supplement, l. c. pp. 387 & 388, *R. canaliculatus*, Cast., is redescribed, and *R. tubericeps*, Fairm., identified with it: and the Brazilian *R. liratus*, Newm., is recorded from Honolulu.

Fairmaire, *op. cit.* p. 389, adds his own *R. parumcostatus* to Chevrolat's

list, and (p. 390) describes a new species from Brazil as "*Clinidium liratus*, Newm.," remarking that in *Clinidium* the eyes are as developed as in *Rhysodes*, only hidden. He appears to have suppressed his own specific name on Chevrolat's identifying his insect with *R. liratus*, Newm., which he refers to *Clinidium*.

Rhызodina [*Rhызodina*, correctly, *l. c.* Bull. p. xlix.], *g. n.*, Chevrolat, *l. c.* p. 208. Placed at the head of the family, but no differential characters are given. *R. mniszeehi*, *sp. n.*, *id. l. c.* p. 209, Abyssinia.

Rhызodes aterrimus, p. 209, E. India, Malacca, *quadristriatus*, Cayenne, *maderiensis*, Madereo, p. 211, *id. l. c.*; *R. taprobane*, Fairmaire, *op. cit.* p. 389, Ceylon: *spp. nn.*

Clinidium mexicanum, Orizaba, *rojasi*, Venezuela, p. 214, *curvicosta* and *humeridens*, p. 215, *granatensis* [*sic*], "Nova-Grenata," *arcuatum*, New Zealand, p. 216, *cavicole*, New Granada, Bogota, *simplex*, New Granada, p. 388, Chevrolat, *l. c.* *spp. nn.*

CUCUJIDÆ.

Ochrosanis dohrni, Pasc., = *Hemipeplus marginipennis*, Lec.; J. L. Leconte, *l. c.* p. 328.

Diochares, Reitter, = *Xenoscelis*, Woll.; *X. deplanatus*, Woll., = *costipennis*, Fairm.; *Cryptamorpha muse*, Woll., = (*Psammæcus*) *desjardinsi*, Guér.; L. Fairmaire, Bull. Soc. Ent. Fr. (5) iii. p. ccxxxv.

Ino 4-notata, H. S. Gorham, Ent. M. M. ix. p. 258, Japan; *I. melano-leuca*, p. 361, *venusta*, p. 362, R. Gestro, Ann. Mus. Genov. iv. Sarawak: *spp. nn.*

Ochrosanis klematanica, *sp. n.*, Gestro, *l. c.* p. 364, fig., Sarawak.

Psammæcus longicornis, *sp. n.*, Schaufuss, Nunq. Ot. ii. (1872), p. 277, Caffraria.

CRYPTOPHAGIDÆ.

Cryptophagus, Gyll., *nec* Hbst., is re-named *Cryptophagistes*: G. R. Crotch, Check List N. A. Col. p. 44.

Cryptophagus crenulatus, Er., ? = *crenatus*, Gyll., with which *bicolor*, Sturm, is certainly not, as Thomson states, identical: *crenatus*, Gyll., is proposed to be dropped. D. Sharp, Ent. M. M. ix. p. 244.

Atomaria atra, K., *nec* Hbst., ? = *letula*, Lec., var.; J. L. Leconte, P. Ac. Philad. 1873, p. 328.

Telmatophilus tropicus, *sp. n.*, Kirsch, B. E. Z. xvii. p. 150, Peru.

Cryptophagus bifasciatus, *id. l. c.* p. 151, Peru; *C. subtilis*, C. G. Thomson, Opusc. Ent. (v.) p. 530, Lund (in *Cannabis* seeds): *spp. nn.*

LATHRIDIIDÆ.

Reitteria lucifuga, Led., is certainly not a *Merophysia*, as Schaufuss opines; Reitter, C. H. xi. p. 113, note.

Derotoma, Reitt., ? = *Astilpnus*, Perris; L. Fairmaire, Bull. Soc. Ent. Fr. (5) iii. p. ccxxxv.

Lyreus subterraneus occurs with *Adelops aubai* under bark of wood buried in the ground at St. Maximin, Var. E. A. de Perrin, Pet. Nouv. p. 359.

MYCETOPHAGIDÆ.

Myrmecozenus latridioides, sp. n., Crotch, Tr. Am. Ent. Soc. iv. p. 363, United States.

Litargus 4-maculatus, sp. n., Kirsch, B. E. Z. xvii. p. 151, Peru.

THORICTIDÆ.

Thorictus fairmairii, sp. n., Raffray, R. Z. (3) i. p. 369, pl. xvi. fig. 5, Boghari.

DERMESTIDÆ.

Dermestes lardarius at Canterbury, New Zealand; C. M. Wakefield, Tr. N. Z. Inst. vi. p. 153; in America (larvæ, &c., described and figured); W. Saunders, Canad. Ent. v. p. 171.

Cryptorhopalum heydeni, sp. n., Kirsch, l. c. p. 152, Peru.

BYRRHIDÆ.

Byrrhus tuscanus, Dohrn, = *aureivittatus*, Reche.; C. A. Dohrn, S. E. Z. xxxiv. p. 321.

Chelonarium. Kirsch, l. c. p. 152, corrects some of Lacordaire's characters (antennæ, prothoracic furrows, and metasternal projection).

Dendrodipnis, g. n., T. V. Wollaston, Ent. M. M. x. p. 33. Doubtfully distinct from *Nosodendron*; body not fasciculated; all the tarsi received in the dilated tibiæ; club abruptly 3-jointed, the joint preceding it narrow and lenticular. *D. canosus*, sp. n., *id.* l. c. p. 34, Japan.

Chelonarium emys, sp. n., Kirsch, l. c. p. 339, Peru.

GEORYSSIDÆ.

Mulsant, Ann. Soc. Agric. Lyon (4) iv. (1871), pp. 61-78, pl. i., under the title 'Tribu des Improsternés,' revises the French species.

Georyssus siculus, sp. n., Ragusa, Bull. Ent. Ital. v. p. 233, Palermo.

PARNIDÆ.

Mulsant, l. c. pp. 137-176, pl. ii., under the title 'Tribu des Diversicornes,' revises the French species of *Potamophilus*, *Potaminus* [as usual, written *Pomatinus*], and *Parnus*.

Parnus striatipunctatus, Heer, *pilosellus*, Er., and *striatellus*, Fairm., have 10-jointed antennæ, of which the club occupies 7 joints: all others have an 8-jointed club, and 11 joints in all. C. Brisout, Bull. Soc. Ent. Fr. (5) iii. p. cviii.

Mulsant, l. c. p. 79-135, pls. i. & ii., under the title 'Tribu des Uncifères,' revises the French species of *Elmides*.

Riolus, g. n., Mulsant (& Rey), l. c. p. 107. Prothorax not laterally keeled. *Elmis cupreus*, *subviolaceus*, and *nitens*, Müll., and *sodalis*, Er.

Esolus, g. n., *id.* l. c. p. 114. Differs from *Lareynia* (= *Elmis æneus* and allies) in its non-sulcate frons, from *Elmis* in its elevated 7th

interstice, from *Riolus* in its keeled thorax, and from *Limnius* in its narrow scutellum. *Elmis parallelipedus*, *angustatus*, and *pygmaeus*, Müll.

Dupophilus [? *Dyptophilus*], g. n., *iid. l. c.* p. 119. Connects the preceding with *Limnius*, having the scutellum as wide as long. *D. brevis*, sp. n., *iid. l. c.* p. 120, Rhone.

Elmis subcarinatus, sp. n., Sharp, An. Soc. Esp. i. p. 263, Reinosa.

Limnius gigas, p. 263, *perezi*, p. 264, Escorial, *brevis*, *ibid.*, Argel, Sinai, *id. l. c.* spp. nn.

HETEROCERIDÆ.

Mulsant, *l. c.* pp. 117–234, pl. ii., under the title ‘Tribu des Spini-pèdes,’ revises the French species.

Heterocerus murinus, Kies., has 10 joints to the antennæ, and a small oval club; *H. hispidulus*, *marmota*, and *minutus*, Kies., and *curtulus*, Fairm., have also 10 joints, with a 6-jointed club, and the abdominal plates quite closed. *H. maritimus*, Guér., *pruinus*, *intermedius*, *crinitus*, and *senescens* (*punctatus*, C. Bris.), Kies., and *curtus*, Ros., have 11-jointed antennæ, and the plates closed. All these occur in France. All the other species have 11 joints, and the plates not closed on the inner side. C. Brisout, Bull. Soc. Ent. Fr. (5) iii. pp. cvii. & cviii.

Heterocerus albipennis, Fairmaire, R. Z. (3) i. p. 336, Boghari; *H. pictus*, Mulsant & Rey, Ann. Soc. L. Lyon (n. s.), xix. (1872), p. 433, Sicily: spp. nn.

LUCANIDÆ.

Mulsant, Ann. Soc. Agric. Lyon (4) iii. (1870), pp. 481–522, pl. iii., revises the French species of the ‘Tribu des Pectinicornes.’ *Lucanus pontbrianti*, *Ceruchus tarandus*, and *Æsalus scarabæoides* are figured, with various details of other species.

Dorcus punctatus, Pontopp., = *parallelipedus*, L., ♀; Von Harold, C. H. xi. p. 107.

Lissotes; general observations and table of species, p. 340: *Nigidius bubalus*, Swed., (dubious) synonymic arrangement, p. 342, table of species, p. 343; *Figulus sublavus*, Palis., synonymy; *F. trilobus*, Westw., is a *Nigidius*. F. J. S. Parry, Tr. E. Soc. 1873.

Nicagus, Lec., cannot be separated from the *Lucanidæ*; its characters are pointed out, and *N. obscurus*, Lec., figured in detail: H. Deyrolle & F. J. S. Parry, *l. c.* pp. 344 & 345, pl. v. fig. 8, a, b.

(The late) F. Stoliczka, in ‘A contribution towards a Monograph of the Indian Passalidæ,’ J. A. S. B. (n. s.) xlii. pt. 2, pp. 149–162 (abstracted, P. A. S. B. 1873, pp. 112–118, with account of discussion on Kaup’s classification, to which Phear and Blanford object, *l. c.*), follows Kaup “without prejudice.” In India, species of this group only occur where there is a Malayan fauna, none being known from the Himalayas west of Nepal, or from any part of Central India, or the Punjab. 23 species are enumerated.

Chiasognathus pubescens, sp. n., C. O. Waterhouse, Ent. M. M. x. p. 110, Venezuela.

Lucanus dybowski[i], sp. n., F. J. S. Parry, *l. c.* p. 335, R. Amur, E. Thibet.

Odontolabis lowii, sp. n., *id. l. c.* p. 336, pl. v. fig. 1, Borneo.

Metopodontus blanchardi, sp. n., *id. l. c.* p. 337, fig. 2, Mongolia.

Prosopocelus mohnikii[i], sp. n., *id. l. c.* p. 338, fig. 3, Java.

Dorcus semisulcatus, sp. n., Mulsant & Rey, Ann. Soc. L. Lyon (n. s.), xx. p. 52, Bone (? = *oblongus*, Charp.) : = *musimon*, Génée, var.; Desbr. des Loges, MT. schw. ent. Ges. iv. p. 196.

Ægus subnitidus, sp. n., C. O. Waterhouse, Ent. M. M. ix. p. 277, Japan.

Lissotes capito, sp. n., H. Deyrolle, Tr. E. Soc. 1873, p. 339, pl. v. fig. 4, ♂, Chatham Islands; ♀, F. J. S. Parry, *ibid.* fig. 5.

Nigidius cribricollis, p. 340, fig. 6, W. Africa, *distinctus*, p. 341, fig. 7, Cambodia, spp. nn., F. J. S. Parry, *l. c.*

Figulus binodulus, p. 277, *punctatus*, p. 278, spp. nn., C. O. Waterhouse, *op. cit.* ix. Japan.

Ceracupes austeni, sp. n., Stoliczka, *l. c.* p. 151, N. E. Bengal.

Comacupes masoni, *ibid.*, Johore. *felderi*, p. 152, note, "Bras." (? Philippine Islands), *id. l. c.* spp. nn.

Pleurarius brachyphyllus, sp. n., *id. l. c.* p. 152, Nilgheries and Malabar.

Semicyclus redtenbacheri, sp. n., *id. ibid.* Ceylon.

Laches gracilis, sp. n., *id. l. c.* p. 156, note, Batchian.

Ceteius australiensis, sp. n., *id. l. c.* p. 157, note, Australia.

Basilianus indicus, p. 159, Nilgheries and Malabar, *andamanensis*, p. 160, Port Blair and Nicobar Group, *sikkimensis*, p. 161, Sikkim, *id. l. c.* spp. nn.

SCARABÆIDÆ.

Mulsant, Ann. Soc. Agric. Lyon (4) iii. (1870), pp. 155–480, completes his revision of the French species of the 'Tribu des Lamellicornes' [Zool. Rec. viii. p. 260], with his accustomed prolixity. Various supposed new species are indicated in a conversational manner—in some instances only to be immediately deposited at the suggestion of the author himself. The whole work has been subsequently re-issued as Hist. Nat. Col. France, Lamellicornes, 2nd edn., 1871, and is quoted as such by Von Harold. *Scarabæus sacer*, *Onitis ion*, *Alphodius alpinus*, *Bolboceras gallicus* (pl. i.), and *Hybosorus arator*, *Hybalus dorcas*, and *Gnorimus nobilis*, with many details of various other species (pl. ii.), are figured.

Coprides.

H. Burmeister, S. E. Z. xxxiv. pp. 403–417, under the heading "Lamellicornia Argentina," commences a revision of the *Coprides* of the La Plata district, divided into 4 groups:—*Ateuchidæ*, *Coprididæ*, *Onitididæ*, and *Onthophagidæ*. The first of these only is discussed, under the divisions *Eucraniidæ* and *Coprobiidæ*.

Ateuchus æratus, Gerst., fig. 5, *catenatus*, G., fig. 4, *Gymnopleurus umbrinus*, G., fig. 6, *Sisyphus nodifer*, G., fig. 7, *Anachalcus procerus*, G., figs. 3 & 3a, *Onthophagus picticollis*, G., fig. 8, *O. aterrimus*, G., fig. 10, *O. laceratus*, G., fig. 9, figured by Gerstäcker, in V. d. Decken's Reisen, iii. pt. 2, pl. vii.

Gymnopleurus obtusus, Muls., = *geoffroyi*; Von Harold, C. H. xi. p. 118 : = *mopsus*, Pall., var., Desbr. des Loges, MT. schw. ent. Ges. iv. p. 196. *Cheeridium capistratum*, F., = *histeroides*, Weber; *Phanæus lar*, Jabl., is not recognizable, and "*Ligiceps niger occidentalis*," Voet, quoted by him, is a true *Copris*, ? *incertus*, Say; *Onitis apelles*, F., 1781, = *scabrosus*, F., 1777; *Onthophagus meleager*, F., = *Oniticellus marsyas*, Ol., and Cayenne is erroneously quoted as its locality; *Onthophagus variegatus*, Roth, n^o F., is re-named *filicornis*: Von Harold, C. H. xi. pp. 107-109. *O. mastersi*, M'L., = *thoreyi*, Harold: *id. l. c.* p. 146. *O. centrimaculatus*, Redt., = *cruciatu*s, Mén.: J. Faust, Hor. Ent. Ross. ix. p. 310.

Labroma, g. n., D. Sharp, R. Z. (3) i. p. 262. *Ateuchides*: of evident affinities to *Menthophilus* and *Cephalodesmius*. *L. horrens*, sp. n., *id. l. c.* p. 263, W. Australia.

Homodesmius, g. n., *id. l. c.* p. 264. *Ateuchides*: very near *Cephalodesmius*. *H. haroldi*, sp. n., *id. l. c.* p. 265, Rockhampton.

Saphobius, g. n., *id. l. c.* p. 265. *Ateuchides*: near *Tessarodon*. *S. edwardsi*, sp. n., *id. l. c.* p. 266, New Zealand.

Disphysema, g. n., Von Harold, C. H. xi. p. 102. Near *Macroderes*, but with epipleuræ almost absent, triangular and un-narrowed metathoracic parapleuræ, and non-dilated first joint of labial palpi. *D. candezii*, sp. n., *id. ibid.*, Malabar.

Parachorius, g. n., *id. l. c.* p. 103. Near *Canthidium*, but with dilated first joint to the labial palpi, and the posterior tibiæ only slightly widened towards the apex. *P. thomsoni*, sp. n., *id. ibid.*, East India.

Eucranium pulvinatum, sp. n., Burmeister, *l. c.* p. 405, Cordova.

Glyphoderus centralis, sp. n., *id. l. c.* p. 407, La Plata.

Megathopa candezii, sp. n., Harold, *l. c.* p. 102, Nicaragua.

Canthon pinopterus, sp. n., Kirsch, B. E. Z. xvii. p. 340, Peru.

Deltochilum variolosum, Catamarca, *valgum*, Tucuman, spp. nn., Burmeister, *l. c.* p. 409.

Coprobium principalis, p. 411, *atramentarius*, p. 415, Tucuman, Catamarca, *bipunctatus*, p. 412, Cordova, *badius*, *ibid.* note, Bolivia, *semicupreus*, p. 413, Buenos Aires, *id. l. c.* spp. nn.

Menthophilus subsulcatus, sp. n., Sharp, *l. c.* p. 264, W. Australia.

Onthophagus forcipatus, p. 103, Mangalore, E. India, *anthracinus*, Guatemala, *tristis*, Brazil, *scabriusculus*, Kiachta, p. 104, Harold, *l. c.*; *O. mniszewski*, Hochhuth, Bull. Mosc. xlvi. 1, p. 127, S. Russia: spp. nn.

Oniticellus sumptuosus, p. 104, Madagascar, *triangularis*, S. W. Africa, *africanus*, Cape of Good Hope, p. 105, Harold, *l. c.*; *O. revelieri*, Mulsant & Rey, Ann. Soc. Agric. Lyon (4) iii. (1870) p. 469 (*O. revelierei*, *id.* Ann. Soc. L. Lyon, n. s., xix. 1872, p. 430: in each case treated as new!), Corsica (= *concinus*, Gén^é; Harold, *l. c.* p. 118): spp. nn.

Aphodiides.

Aphodius plagiatus, L., var. n., *elegantulus*; Hochhuth, Bull. Mosc. xlvi. p. 131, S. Russia, *A. atramentarius*, Er., is considered as specifically distinct from *depressus*, Kugel.; *id. l. c.* p. 134. *Aphodius biguttatus*, Muls., = *sanguinolentus*, Pz.; Harold, *l. c.* p. 120. *A. preustus*, Ballion,

is a *Plagiogonus*; *A. barbarus*, Fairm., = *limbatus*, Germ.; *Amnæcius obscurus*, M'L., is an *Atenius*: id. l. c. p. 147. *A. barbarus*, Fairm., is not only distinct from *limbatus*, but belongs to a widely different group of the genus: Reiche, Bull. Soc. Ent. Fr. (5) iii. p. clx.

Aphodius. The following sub-genera are apparently intended as new by Mulsant, Hist. Nat. Col. de France, *Lamellicornes*, 2nd edn., 1871 [cf. Zool. Rec. viii. p. 263]:—*Agriolus* (type, *ater*), *Planolinus* (*piceus*), *Oromus* (*alpinus*), *Orodalus* (*pusillus*), *Emadus* (*4-maculatus*), *Nialus* (*varians*), *Mecynodes* (*parallelus*), *Eudolus* (*4-guttatus*), *Birus* (*satellitius*), *Agolius* (*mixtus*), *Amidorus* (*obscurus*), *Sigorius* (*porcus*), *Pubinus* (*lutarius*), *Limarus* (*zenkeri*), *Anomius* (*unicolor*), *Subrinus* (*sturmi*), *Erytus* (*brunneus*), *Labarrus* (*lividus*), *Bodilus* (*sordidus*), *Esymus* (*merdarius*), *Volinus* (*inquinatus*), *Nobius* (*consputus*), *Nimbus* (*contaminatus*), *Loraspis* (*sulcatus*). The latter is an *Amnæcius*, teste Von Harold (C. H. xi. p. 117), who hints that in a 3rd edn. of the author's work every French *Aphodius* will have its separate genus, and (p. 119) criticizes the adoption of the author's names *rubens* for *alpinus*, Scop., and *vernus* for *constans*, Duft.

Aphodius baticus, sp. n., Mulsant, l. c. p. 270. Spain.

Orphnides.

Hybalus doursi, Luc.: Dours, Pet. Nouv. p. 299, states that the larva feeds in roots of *Rumex patientia* and *Beta vulgaris* in Algiers.

Hybalus gazella, sp. n., Raffray, R. Z. (3) i. p. 370, pl. xvi. fig. 7, Boghari.

Geotrupidæ.

Odontæus mobilicornis: 9 specimens disgorged by lizards (*Lacerta viridis*). Hochhuth, Bull. Mosc. xlvi. 1, p. 137.

Geotrupes stercorarius and allies. Von Harold, C. H. xi. pp. 87-101, recognizes three species, for two of which he employs Marshamian names: 1, *stercorarius*, L.; 2, *mesolius*, Thoms., = *stercorarius*, Er., nec L., = *sublævigatus*, Steph., = *puncticollis*, Malin., = *spiniger*, Msh.; 3, *putridarius*, Muls., nec Er., = *intermedius*, Ferr., = *punctatistriatus*, Steph., = *foveatus*, Msh. These are differentiated, with copious bibliographical references.

Geotrupes polycerus, Pall. (*dispar*, F.). Three forms described and named *pallasi*, *menetriesi*, and *perroudi*: Mulsant, Col. Fr. Lamellic. 2nd edn. 1871 (cf. Von Harold, C. H. xi. p. 118).

Silotrupes, g. n., Mulsant (& Rey), Ann. Soc. Agric. Lyon (4) iii. (1870) p. 194. Anterior tooth of front tibia simple in both sexes. Connects *Trypocopris* and *Thorectes*. *S. epistomalis*, sp. n., *id. ibid.* ? S. France.

Bolboceras andicola, Philippi, S. E. Z. xxxiv. p. 312, Santiago; *B. armigerum*, p. 360, *puncticolle*, *laticorne*, p. 361, *angulicorne*, p. 362, *cavicolle*, *cornigerum*, p. 363, *carpentariæ*, *denticolle*, p. 364, *lacunosum*, *planiceps*, *sweeri*, p. 365, W. MacLeay, Tr. Ent. Soc. N. S. W. ii., Australia: spp. nn.

Trogides.

Antiochrus, g. n., D. Sharp, R. Z. (3) i. p. 266. Very near *Liparochrus*, but with the 4 posterior tibiæ compressed and dilated, as in *Acanthocerus*. *A. brunneus*, sp. n., *id. l. c.* p. 267, W. New Holland.

Trox græcus (Perroud), Mulsant & Rey, Ann. Soc. Agric. Lyon (4) iii. (1870) p. 223, Greece (= *transversus*, Rche.; Von Harold, C. H. xi. p. 118); *T. (Omorgus) larvatus*, Gerstäcker, in V. d. Decken's Reisen, iii. pt. 2, p. 309, Zanzibar: spp. n.

Liparochrus oblongus, sp. n., Von Harold, *l. c.* p. 105, North Australia.

Melolonthides.

Dichelonycha subvittata, Lec., = *virescens*, K.; *Rhipidandrus flabellicornis*, Stm. (*Tenebrionidæ*), = "*Melolontha*" *paradoxa*, Beauv.; *Diplo-taxis mæsta*, Blanch., = *subcostata*, Blanch.; *D. harperi*, *frondicola*, and *punctatirugosa*, Blanch., ? = *excavata*, Lec.; *Lachnosterna rugosa*, Lec., = *Ancylonycha profunda*, Blanch.; *A. consimilis*, Lec. (= *brevicollis*, Blanch.), and *puncticollis*, Blanch., = *fusca*, Fröhl.; *A. fervida*, Blanch., *nec* F., = *obesa*, Lec.; *A. fervens*, Blanch., *nec* Gyll., = *congrua*, Lec.; *A. uniformis*, Blanch., = *ephelida*, Say; *A. pruinosa*, Blanch., *nec* Melsh., = *futilis*, Lec.; *A. crenulata*, Blanch., = *hirticula*, Knoch.; *A. obesa*, Lec., = *crassissima*, Blanch.; *A. micans*, Blanch., *nec* Knoch, ? = *cerasina*, Lec.; *A. pilosicollis*, Knoch, = *tristis*, F.: J. L. Leconte, P. Ac. Philad. 1873, p. 328, *et seq.*

Diphydactylus, J. Thoms., = *Hoplia*; *Brachymys*, J. Thoms. (*B. rubens*, ex. typ.) = *Camenta*, Er.; E. Candèze, CR. Ent. Belg. xvi. p. cxliv.

Hoplia cærulea and *Rhizotrogus rufescens*. The sexes of these species couple in the air, and then fall to the ground together, the former about noon, the latter after sunset. E. Perris, Ann. Soc. Ent. Fr. (5) iii. pp. 90 & 91. Péragallo has found females of the *Hoplia* and of *Amphimallus ater* common at daybreak, on the ground, each beneath a small swarm of males: *l. c.* p. 250.

Coniopholis elephas, Gerst., pl. vi. fig. 9, *C. melolonthoides*, G., fig. 8, *Empycastes coronatus*, G., pl. vii. figs. 1, 1a, figured; V. d. Decken's Reisen, iii. pt. 2.

Rhizotrogus numidicus, Buq.; Algerian varieties described, one named *pallidicinctus*, Atlas, Kabylia. Raffray, R. Z. (3) i. pp. 371 & 372.

Polyphylla, Lac., *nec* Harris, is re-named *Macranoxia*; G. R. Crotch, Check-List N. A. Col. p. 61.

Melolontha vulgaris. The experiences of 36 years briefly recorded by Hochhuth, Bull. Mosc. xlvi. 1, p. 142. There is no periodicity of appearance in S. Russia as in Germany and elsewhere.

Pachypus cæsus, Er., is distinct from *candidæ*, Petag., *cornutus*, Ol., and *impresus*, Er., though these three may all be one species, as Mulsant & Rey (who collocate all four) state. Desbrochers des Loges, Bull. Soc. Ent. Fr. (5) iii. p. xl.

Maladera, g. n., Mulsant & Rey, Ann. Soc. Agric. Lyon (4) iii. (1870) p. 343. Differs from *Serica* in its 10-jointed antennæ and invariably denticulated claws in both sexes. *Serica holosericea*, Scop.

Flatipalpus, g. n., Fairmaire, Ann. Soc. Ent. Fr. (5) iii. p. 391. "Extremely near" *Pachydema*, from which it differs in the enormous development of its maxillary palpi; the ventral segments seem also to be soldered together, at least for their greater part. *F. albilosus*, sp. n., *id. ibid.*, Souf (Algeria).

Hymenoplia chevrolati, sp. n., Mulsant, *l. c.* p. 355, Lyons.

Serica ariasi, sp. n., Mulsant & Rey, *l. c.* p. 343, Escorial.

Calodactylus abendrothi, sp. n., Kirsch, B. E. Z. xvii. p. 341, Peru.

Philochlenia molesta, sp. n., *id. ibid.* Peru.

Pachydema lanata [-tum], sp. n., A. Chevrolat, Ann. Soc. Ent. Fr. (5) iii. p. 203, Syria.

Rhizotrogus cariosicollis, Fairmaire, R. Z. (3) i. p. 336, Morocco; *R. eburneicollis*, Raffray, *l. c.* p. 370, Bône; *R. zapateri*, p. 62, pl. i. fig. 4, Cuenca, *bolivari*, pp. 64 & 409, pl. xiii. fig. 2, Cuenca, Valencia, Martinez y Saez, An. Soc. Esp. ii.; *R. reichii*, Mulsant & Rey, *l. c.* p. 330, Allier: spp. nn.

Schizonycha capito, p. 308, *aberrans*, p. 309, Gerstäcker, in V. d. Decken's Reisen, iii. pt. 2, Zanzibar, spp. nn.

Anoxia derelicta, sp. n., Desbrochers des Loges, Bull. Soc. Ent. Fr. (5) iii. p. xli. Morocco, Oran: = *emarginata*, Coq., with which *A. lucasi*, Coq., is also apparently identical; L. Reiche, *l. c.* p. clx.

Rutelides.

Anisoplia villosa, Fourcr., *nec* Feld., is re-named *villica*; Mulsant & Rey, Ann. Soc. Agric. Lyon (4) iii. (1870) p. 386.

Anomala rugulosa, Fairm., = *junii*, var.; *id. l. c.* p. 472.

Antichira teniata, Pty., re-described; *A. pantochloris*, Blanch., from Peru: Kirsch, B. E. Z. xvii. pp. 342 & 343.

Paranonca, Castelnau (*ex. typ.*), re-characterized. It is a Rutelid, very near *Anoplognathus*, and has nothing to do with *Stethaspis suturalis*, F.: G. van Lansberge, Ann. Ent. Belg. xvi. pp. 195 & 196. The two insects are surprisingly alike, superficially; *id. op. cit.* CR. p. lxxxvii.

Anoplognathus. Australian species reviewed by W. MacLeay, Tr. Ent. Soc. N. S. W. ii. pp. 353-356.

Anoplognathus parvulus, C. O. Waterhouse, Ent. M. M. x. p. 75, E. Australia; *A. longipennis*, *montanus*, p. 356, *viridicollis*, *dispar*, p. 357, *rubiginosus*, *odewahni*, p. 358, *abnormis*, p. 359, W. MacLeay, *l. c.* Australia: spp. nn.

Calloodes prasinus, p. 359, N. Australia, *mastersi*, p. 360, Port Denison, spp. nn., W. MacLeay, *l. c.*

Macropnus mniszehi, sp. n., Sallé, R. Z. (3) i. p. 14, pl. x. figs. 1, 1a-e, Mexico.

Dynastides.

Ligyruus scarabæinus, Pty.: Burmeister & Lacordaire probably only knew the ♀; the ♂ has thickened front tarsi. Kirsch, B. E. Z. xvii. p. 345. *Theogenes neptunus*, Sch., with deformed thorax; *id.* SB. Ges. Isis, 1873, p. 34.

Xylotrypes dichotomus and *Phileurus chinensis*: on habits in Japan, cf. G. Lewis, Ent. M. M. ix. p. 289.

Syrichthus clathratus, Gerst., pl. vi. fig. 7, *Rhizoplatys ambiguus*, G., pl. vii. fig. 2, figured; V. d. Decken's Reisen, iii. p. 2.

Pseudoryctes, g. n., D. Sharp, R. Z. (3) i. p. 267. *Pimelopides*: type, *Oryctes muellerianus*, White.

Nephrodopus, g. n., Sharp, l. c. p. 268. Mentum compressed and prolonged into a straight descending plate, on each side of which is a leaflet representing the dilated apical joint of the maxillary palpi. Elytra of ♂ cornuted behind the scutellum. Most nearly allied to the preceding, but will probably form part of a group between the *Pimelopides* and *Oryctomorphides*. *N. enigma*, sp. n., id. l. c. p. 269, Cape York, N. Australia.

Teinogenys, g. n., id. l. c. p. 271. *Oryctomorphides*: resembles *Corynophyllus* in general form, but with the clypeus rounded in front, and the mentum flattened and porrect. *T. nitidus*, id. *ibid.*, W. Australia, *T. brevis*, id. l. c. p. 272, S. Australia, spp. nn.

Cyclocephala contraria, p. 343, *nodicollis*, p. 344, spp. nn., Kirsch, l. c. Peru.

Dyscinetus curtus, sp. n., id. l. c. p. 345, Peru.

Horonotus lacordairii, Arracan, *deiphobus*, ? East India, spp. nn., D. Sharp, l. c. p. 270.

Corynophyllus major, sp. n., id. l. c. p. 273, ? Australia.

Oryctes landbecki, sp. n., Philippi, S. E. Z. xxxiv. p. 309, pl. ii. figs. 2a-c, Andes, Talcaregue.

Cetoniides.

O. Mohnike, Arch. f. Nat. xxxix. 1, pp. 109-247, pls. vi.-xi., describes the Philippine species. Corrections are made in Wallace's Catalogue, and observations on geographical distribution (table, p. 247) and synonymy; *Protætia*, Burm., is not considered separable from *Cetonia*, nor *Mycteristes* from *Phædimus*. Besides new species, the author figures *Phædimus jagori*, Gerst., pl. vi. fig. 1, *Macronota vidua*, Wall., pl. vi. fig. 6, *M. guttulata*, Wall., pl. vii. fig. 9, and *Glycyphana æthiessida*, White, pl. viii. fig. 4.

Plæsiorrhina specularis, Gerst., fig. 1, *Trymodera aterrima*, G., figs. 2, 2a, *Heteroclitia corpulenta*, G., figs., 3, 3a, *Discopeltis lateralis*, G., fig. 4, *Pachnoda ephippiata*, G., fig. 5, *Cenochilus appendiculatus*, G., fig. 6, figured in V. d. Decken's Reisen, iii. pt. 2, pl. vi.

Tropi[do]nota lethierryi, Rehe., = *squalida*, L., var.; *Oxythyrea niveipicta*, Fairm., ex. typ., = *T. fatima*, Coq., ex. typ., and is not *Enoplotarsus costatus*, Luc., as De Marseul states, but the latter may be a sex of *deserti-cola*, Luc.; L. Bedel, Bull. Soc. Ent. Fr. (5) iii. p. lxxxvi.

Cetonia floricola and *metallica*. Hochhuth, Bull. Mosc. xlvi. 1, p. 151, gives his reasons for considering these as distinct species.

Pantodinus klugi, Burm. Both sexes, from Guatemala, are now known. The insect should be placed at the head of the *Trichiides*. E. Candèze, CR. Ent. Belg. xvi. p. xl.

Westwoodia, g. n., F. de Castelnau, R. Z. (3) i. p. 397. *Goliathides*: intermediate between *Mycteristes* and *Phædimus*, differing from both in

the horns and front tibiæ. *W. howitti*, sp. n., *id. l. c.* p. 398, pl. xvii. Borneo.

Astræa, g. n., Mohnike, *l. c.* p. 166. True Cetonid: differs from *Macronota* and *Glycyphana* in its small thorax, which is narrow soon after the base and still more contracted in front. *Cetonia francolina*, Burm. (pl. viii. fig. 8), and *A. margaritacea*, p. 170, fig. 9, Mindanao. *biguttulata*, p. 171, pl. ix. fig. 1, Luzon. *tigrina*, p. 172, fig. 2, Luzon and Samar, *id. l. c.* spp. nn.

Euglypta, g. n., *id. l. c.* p. 174, allied to *Cetonia*. *C. megaspilota*, Wall. (pl. ix. fig. 3), and *E. attenuata*, p. 177, fig. 4, Luzon, *biplagiata*, p. 179, fig. 5, Sulu Archipelago, *multiguttata*, p. 181, Mindanao, *id. l. c.* spp. nn.

Potosia, for *C. speciosissima*, Scop., *Melanosa*, for *C. morio*, F., subgg. nn. of *Cetonia*; Mulsant. Col. Fr. Lamellic., 2nd edn. 1871, p. 669.

Coryphocera simillima, p. 122, pl. vi. figs. 2 & 2a, *paupera*, p. 124, fig. 3, sp. nn., Mohnike, *l. c.* Mindanao.

Gymnetis pelochroma, sp. n., Kirsch, B. E. Z. xvii. p. 346, Peru.

Clinteria formosa, sp. n., Mohnike, *l. c.* p. 125, pl. vi. fig. 5, Mindanao.

Agestrata semperi, sp. n., *id. l. c.* p. 127, pl. vi. fig. 5, Mindanao.

Macronota propinqua, p. 139, pl. viii. fig. 1, *mindanoensis*, p. 140, fig. 2, *abdominalis*, p. 142, fig. 3, *tricolor*, p. 143, fig. 4, *jucunda*, p. 145, fig. 5, *sponsa*, p. 146, fig. 6, *pilosa*, p. 148, fig. 7, Mindanao, *gratiosa*, p. 149, fig. 8, Luzon, *lugubris*, p. 152, pl. viii. figs. 1 & 2, Panaon, Leyte, Luzon, *id. l. c.* spp. nn.

Hemipharis castanea, p. 133, *speciosa*, p. 134, Nicol Bay, O. E. Janson. Cist. Ent. (vi.), spp. nn.

Schizorrhina concinna, sp. n., *id. l. c.* p. 134, Nicol Bay.

Diaphonia parrii, p. 135, S. Australia, *gulosa*, p. 136, Victoria, *luteola*, p. 137, *vicina*, p. 138, *breweri*, p. 139, W. Australia, *id. l. c.*; *D. mniszewski*, p. 179, Esperance Bay, *id. l. c.* (vii.): spp. nn.

Eupæcila pullata, (vi.) p. 140, Lizard Island, *inscripta*, (vii.) p. 180, Nicol Bay, *id. l. c.* spp. nn.

Glycyphana rubrimarginata, p. 154, pl. viii. fig. 3, *pulcherrima*, p. 157, fig. 5, Mindanao, *rubriscutellaris*, p. 159, fig. 6, Bohol and Mindanao, *robusta*, p. 164, fig. 7, Samar, Leyte, Mindanao; Mohnike, *l. c.* spp. nn.

Cetonia multiguttulata, p. 185, pl. ix. fig. 6, Luzon, *ceruleisignata*, p. 186, fig. 7, *lineata*, p. 204, fig. 5, *marensis*, p. 237, pl. xi. fig. 7, *incerta*, p. 239, fig. 8, Mindanao, *ducalis*, p. 196, pl. x. fig. 1, *leucogramma*, p. 201, fig. 3, *plebeia*, p. 202, fig. 4, *flavivariegata*, p. 205, fig. 6, Luzon, *papalis*, p. 198, fig. 2, Panaon and other islands, *purpurissata*, p. 211, pl. xi. fig. 1, Babuynes, *satrapa*, p. 222, fig. 2, *compacta*, p. 234, fig. 5, *tenuicollis*, p. 236, fig. 6, Camiguin, *venerabilis*, p. 229, fig. 3, Luzon, *boholica*, p. 231, fig. 4, Bohol; Mohnike, *l. c.* spp. nn.

Callynomes niveisparsa (Westwood), sp. n., *id. l. c.* p. 241, Mindanao.

BUPRESTIDÆ.

G. R. Crotch, P. Ac. Philad. 1873, pp. 84-96, publishes "Notes on the species of Buprestidæ found in the United States," tabulating the species of *Agilus* and *Dicerca*, and giving or indicating in a more or less doubtful

way, the following (amongst other) synonymic corrections :—*Chalcophora lacustris*, Lec., and *angulicollis*, Lec., = *virginiensis*, Dr. ; *C. langeri*, Lec., = *campestris*, Say ; *Psiloptera webbi*, Lec., and *woodhousii*, Lec., = *drummondi*, Gory ; *Dicerca prolongata*, Lec., ? = *Stenura tenebrica*, Kirby ; *D. caudata*, Lec., = *divaricata*, Say ; *D. baltimorensis*, Hbst., *soror*, Lec., and *lurida*, F., = *obscura*, F. ; *D. spreta*, Lec., = *asperata*, Gory, *ex. typ.* ; *D. asperata*, Lec., = *spretta*, Gory, *ex. typ.* ; *D. tenebrosa*, Lec., is Kirby's species of that name, and not *distinguenda*, Lap. ; *D. hilaris*, Lec., = *manca*, Lec., ♀ ; *D. lacustris*, Lec., = *lugubris*, Lec., ♀ ; *D. chrysea*, Melsh., = *tenebrosa*, K., of which *bifoveata*, Lec., and the ♀ of *crassicollis*, are ♀ ♀ ; *D. leontii*, Gory, belongs to *Trachycele*, Mars., and *T. blondeli*, Mars., is perhaps identical with it ; *Pæcilonota erecta*, Gory, = *cyanipes*, Say ; *Buprestis*, L., is to be used for the group containing *Ancylochira rustica* ; *B. fasciata*, F., *6-plagiata*, Lec., and *langi*, Mann., form one species, the 2 first being merely sexes ; *B. alternans*, Lec., = *nuttalli*, K. ; *B. maculiventris*, Say, comprised several immaculate forms now regarded as species ; *B. radians*, Lec., = *lauta*, Lec., ♂ ; *Melanophila opaca*, Lec., = *notata*, Lap. ; the 6 species of Leconte's group A in *Anthaxia* are not separable ; *A. subænea*, Lec., = *viridifrons*, Gory, ♀ ; *A. quercata*, F., = *cuneiformis*, Gory, ♀ ; *Polycesta elata*, *cavata*, *californica*, and *obtusa*, Lec., form one variable species ; *Ptosima gibbicollis*, Say, is not now pre-occupied, and must be used for *luctuosa*, Gory ; *Chrysobothris soror*, Lec., *lesueuri*, Gory, *obscura*, Lec., *semisculpta*, Lec., *misella*, Lec., = *femorata*, Lec. ; *C. vulcanica*, Lec., ? = *trinervia*, K., ♀ ; *C. debilis* and *disjuncta*, Lec., are not separable ; *C. analis*, Lec., = *6-signata*, Say, var. ; *C. purpurata*, Bland, = *æneola*, Lec., var. ; the claws are not bifid in any American species of *Agrilus* ; *A. obliquus*, Lec., ? = *fulgens*, Lec., ♀ ; *A. geminatus*, Say, = *otiosus*, Say, of which *defectus* and *pusillus*, Lec., are ♀ ♀ ; *A. 4-guttatus* and *zemes*, Gory, = *granulatus*, Say ; *Brachys lugubris*, Lec., = *tessellata*, F. ; *B. ærosa*, Melsh., must be restored for *terminans*, Lap., *nec* F.

Buprestis lurida and *consimilis*, Lap. & G., = *Dicerca obscura*, F. ; *D. hilaris* and *manca*, Lec., = *tuberculata*, L. & G. ; *D. distinguenda*, L. & G., ? = *tenebrosa*, K. ; *D. soror*, Lec., = *pruinosa*, L. & G. ; *D. obscura*, Gory, = *baltimorensis*, Hbst. ; *D. molitor*, Mels., *asperata*, L. & G., = *scobina*, Chev. ; *D. impressifrons*, Mels., = *spretta*, L. & G. ; *D. dumoulini*, Gory, = *tuberculata*, Chev. ; *D. coryphæa*, Dej., = *spretta*, L. & G. ; *D. maculosa*, Gory, = *lepida*, Lec. ; *D. erecta*, L. & G., = *Pæcilonota cyanipes*, Say ; *Ancylochira dilatata*, Mots., = *lewiventris*, Lec. ; *A. crenata*, Mots., = *langi*, Mann. ; *Melanophila luteisignata*, Dej., = *notata*, Lap., var. ; *Anthaxia expansa* and *foveicollis*, Lec., = *æneigaster*, L. & G. ; *Crysobothris difficilis*, Gory, = *rugosiceps*, Mels. ; *C. ignipes*, G., = *6-signata*, Say ; *C. germari*, G., = *solieri*, var. ; *C. viridiceps*, Mels., = *femorata*, F. ; *C. viridipunctata*, G., = *hibernata*, F., var. ; *C. floricola*, G., = *calcarata*, Mels. ; *C. rugosula*, G., = *Actenodes acornis*, Say ; *Actenodes bella*, Lec., = *aureinotata*, G. ; *C. basalis*, Lec., = *atabalipa*, G. ; *C. soror*, Lec., = *lesueuri*, Gory ; *C. lesueuri*, Lec., = *fastidiosa*, G. ; *C. misella*, Lec., = *quadriimpressa*, Gory ; *C. nigrifasciata*, Lec., erroneously referred, is re-named *atrifasciata* ; *Polycesta obtusa*, Lec., = *velasco*, L. & G. ; *Acmeodera semivittata*, Lec., = *mima*, Gory ; *A. variegata* and *mixta*,

Lec., = *dispar*, Gory, = *pulchella*, Hbst.; *A. fasciatipunctata*, Chev., = *hæmorrhœa*, Lec., = *rubrinotata*, Gory, = *stellaris*, Chev.; *A. croceinotata*, Lec., = *flavisticta*, Stm.; *Haplostethus*, Lec., = *Mastogenius*, Sol.; *Agrius couesi*, Lec., = *aureus*, Chev., = *perlucidus*, Gory; *A. 4-guttatus*, G., = *zemes*, ♀; *Brachys lugubris*, Lec., = *corvina*, G.; *B. lævicauda*, Lec., = *tessellata*, F.; J. L. Leconte, P. Ac. Philad. 1873, p. 331, *et seq.*

E. C. Reed, An. Univ. Chili, xxxviii. pp. 405–429, briefly describes the Chilean species, 65 in number. *Latipalpis dufouri*, Sol., = *Psiloptera buqueti*, Spin.; *L. metallica*, Fairm., = *P. speciosa*, Germ.; *P. verrucifera*, Fairm., = *prolongata*, Cast.; *Anthaxia marginicollis*, Sol., = *verecunda*, Er.; *A. subæqualis*, *ruginosa*, and *rugifera*, Fairm., = *angulosa*, Sol.; *Conognatha splendidicollis*, Fairm., = *Stigmodera costipennis*, Germ.; *Pithiscus sagittarius*, Fairm., = *S. hastaria*, Fairm.; *S. monozona*, Fairm., = *azaræ*, Phil.; *Polycesta rubripicta*, Fairm., = *P. costata*, Sol. *Zemina vittata*, Fairm., *nec* Cast. & G., is re-named *deyrollii* (p. 416).

E. Saunders tabulates the species hitherto found in Japan, as compared with representatives of the same genera in other parts of the world. J. L. S. xi. p. 509.

Julodis variolaris, Pall., *faldermanni*, Mann., *zablodskii*, Mots.: observations by C. A. Dohrn, S. E. Z. xxxiv. pp. 317–321.

Catoxantha gigantea, var. *brunnea*, E. Saund.; ♀ from Cochin China described by H. Lucas, Bull. Soc. Ent. Fr. (5) iii. pp. vii. & viii.

Steraspis fastuosa, Gerst., figs. 1 & 1a, *Chrysobothris empyrea*, G., fig. 2, and *Aphanisticus nodosus*, G., fig. 3, figured; V. d. Decken's Reisen, iii. pt. 2, pl. viii.

Chrysobothris spuria, Mars., and *Pterotis composita*, Pall., new to the Algerian fauna: Raffray, R. Z. (3) i. p. 373.

Anthaxia viminalis, Cast., = *cræsus*, Villers; Kiesenwetter, B. E. Z. xvii. p. 440.

Anthaxia candens and *lucens*, and *Coræbus undatus*: larvæ and habits described; J. Erné, MT. schw. ent. Ges. iv. pp. 138–143.

Coræbus: larva described by Mulsant & Mayet, Mém. Ac. Lyon, xix. pp. 333–335.

Paratrachys, g. n., E. Saunders, l. c. p. 523. Differs from *Trachys* in the shoulders of its elytra not being raised and prominent, the straight base of its thorax, its short and hairy antennæ, of which the 6 apical joints are dentate; its flat, non-excavate head, and small antennary cavities. *P. hederæ*, sp. n., *id. ibid.*, Japan.

New species:—

Chalcophora doriana, C. A. Dohrn, S. E. Z. xxxiv. p. 76, Labuan; *C. querceti*, Saunders, l. c. p. 510, Japan.

Chrysodema lewisi, Saunders, l. c. p. 510, Japan.

Halecia simplex, Kirsch, B. E. Z. xvii. p. 347, Peru.

Dicerca horni, p. 86, *sexualis* and *californica*, p. 87, California, Crotch, l. c.

Buprestis japonensis [sic], Saunders, l. c. p. 511, Japan.

Ancylochira villosa, Leconte, l. c. p. 331, California.

Anthaxia proteus, Saunders, *l. c.* p. 511, Japan; *A. obscurata*, Reed, *l. c.* p. 411, Chili.

Zemina maculiventris and *pæcilogastra*, Reed, *l. c.* p. 417, Chili.

Acmaødera philippii [script. "Phil."], p. 425, *asperata* and *vittipennis*, p. 426, *id. l. c.* Chili; *A. montilloti*, Raffray, R. Z. (3) i. p. 372, Algeria.

Chrysobothris succedanea, Saunders, *l. c.* p. 512, Japan.

Colobogaster bella, Kirsch, *l. c.* p. 348, Peru.

Coræbus ignotus, Saunders, *l. c.* p. 512, Japan.

Sambus quadricolor, *id. l. c.* p. 513, Japan.

Cryptodactylus auriceps, *id. ibid.* Japan.

Stenogaster tenuis, Kirsch, *l. c.* p. 349, Peru.

Agrilus cordillerae, *id. l. c.* p. 350, Peru; *A. sperkii*, (Hockhuth) Solsky, Bull. Mosc. xlv. i. p. 159, Kiew; *A. texanus*, p. 94, Florida, *walsinghami*, p. 95, Oregon, Crotch, *l. c.*; *A. trinotatus*, p. 513, *maculifer*, *discalis*, p. 514, *cyaneiniger*, *pilosivittatus*, *viridiobscurus*, p. 515, *marginicollis*, *subrobustus*, p. 516, *auriventris*, *mærens*, *rotundicollis*, p. 517, Saunders, *l. c.* Japan.

Aphanisticus collaris, *antennatus*, and *congener*, Saunders, *l. c.* p. 518, Japan.

Cylindromorphus japanensis [sic], *id. l. c.* p. 519, Japan.

Trachys levisi, p. 519, *griseinigra*, *elegantula*, *auricollis*, p. 520, *griseifasciata*, *robusta*, *cupricolor*, *variolaris*, p. 521, *inedita*, *inconspicua*, p. 552, *id. l. c.* Japan.

Brachys tenuis, p. 351, *carinicollis*, p. 352, *nobilis*, p. 353, *ignobilis*, *aratus*, p. 354, *tristis*, p. 355, *inornatus*, *obversans*, p. 356, *bicolor*, *emarginatus*, p. 357, *brevis*, p. 358, *viridescens*, p. 359, *eneicollis*, p. 360, *jucundus*, p. 361, *austerus*, *viridulus*, p. 362, *virens*, *latus*, p. 363, *planifrons*, *cognatus*, p. 364, *compar.* p. 365, *manus*, p. 366; Kirsch, *l. c.* Peru.

Taphrocerus agriloides, Crotch, *l. c.* p. 96, Texas.

EUCNEMIDÆ.

Phænocerus americanus, sp. n., Horn, Tr. Am. Ent. Soc. iv. p. 147, Vancouver Island.

ELATERIDÆ.

E. Candèze, Mém. Liège (2) v. pp. 1-32 [see *Antarctiides*, supra, p. 242], describes 58 species found by G. Lewis in Japan, chiefly in the southern islands.

Adelocera cavicollis, Lec., = *profusa*, Cand.; *Alaus gorgops*, Lec., = *lusciosus*, Hope; J. L. Leconte, P. Ac. Philad. 1873, p. 333.

Allaus atropos, Gerst., fig. 5, and *Ludius penicillatus*, G., fig. 6, figured: V. d. Decken's Reisen, iii. pt. 2, pl. viii.

Elater coccinatus, Rye, probably = *præustus*, F., with entirely immaculate elytra; L. Bedel, Bull. Soc. Ent. Fr. (5) iii. p. lxxxvii. [No *præustus* has hitherto been found in England, from different places in which country *E. coccinatus* is recorded].

Elater pomonee, Steph.; differential characters noted. Candèze's description does not accord with Stephen's. E. C. Rye, Ent. M. M. ix. p. 268.

Megapenthes divaricatus, Desbr., = *tibialis*, Lac. var.; E. Perris, Nouv. et faits (2). p. 4.

Heteroderes tessellatus, Mor., = *rossii*, Stev.; J. Faust, Hor. Ent. Ross. ix. p. 311.

Pyrophorus noctilucus. The Marquis De dos Hermanas gives particulars of the economy of the "Cucuyo" of Cuba; CR. Ac. Sci. lxxvii. p. 333. C. Robin & A. Laboulbène, *l. c.* pp. 511-517. & Ann. Soc. Ent. Fr. (5) iii. pp. 529-536, describe the structure of the luminous parts of this insect, viz., two spots near the posterior angles of the prothorax. and a triangular plate between it and the abdomen. See also Baron, Bull. Soc. Ent. Fr. (5) iii. pp. cxlix. & cl.

Cryptotarsus. g. n., Philippi, S. E. Z. xxxiv. p. 308. Differs from *Agrypnus* and allies in its antennary sulci being closed behind; from *Lacon* in its tarsi being lamellate beneath; and from *Tylotarsus* in its penultimate tarsal joints being not cordiform. &c. *C. ater*, sp. n., *id. ibid.* pl. ii. figs. 3a-c. Rancagua, Chili.

New species :—

Lacon tumens and *scrofa*, Candèze, Mém. Liège (2) v. p. 4, Japan.

Calais nietoi, Sallé, R. Z. (3) i. p. 15. pl. ix. figs. 4 & 4a. Orizaba.

Camposternus candezii, C. A. Dohrn, S. E. Z. xxxiv. p. 77, Sarawak.

Tetrigus (nearly allied to *Ludius*) *lewisi*, Candèze, *l. c.* p. 6, Japan.

Pectocera fortunii, *id. ibid.* Japan.

Psephus desertor, *id. l. c.* p. 7, Japan.

Monocrepidius intermissus, Kirsch, B. E. Z. xvii. p. 367. Peru.

Eolus bivittatus, *id. ibid.* Peru; *Æ. agnatus*, Candèze. *l. c.* p. 8. Japan.

Anchastus aquilus, Candèze, *ibid.* Japan.

Eudactylus boucardi, Sallé. *l. c.* p. 16, pl. ix. figs. 5 & 5a, Oaxaca.

Elater hypogastricus and *bicarinatus*, Candèze, *l. c.* p. 9, Japan.

Megapenthes opacus and *gracilis*, *id. l. c.* p. 10, Japan.

Cryptohypnus cruciatus, *quadrillum*, p. 11, *albipilis curatus*, p. 12, *insulsus*, *humeralis*, p. 13, *ellipticus*, p. 14, *ovalis*, *luteipes*, p. 15; *id. l. c.* Japan.

Cardiophorus mimeticus, Horn, Tr. Am. Ent. Soc. iv. p. 147, California; *C. pullatus* and *sequens*, p. 16, *pauper* and *adjutor*, p. 17, Candèze. *l. c.* Japan.

Melanotus amussitatus, p. 19, *erythropygus*, p. 20, *spernendus*, *seniculus*, p. 21, Candèze, *l. c.* Japan.

Limonius vittatus, *id. l. c.* p. 22, Japan; *L. crotchii*, Horn. *l. c.* p. 148, Oregon.

Athous secessus, *suturalis*, p. 23, *virens*, p. 24, Candèze, *l. c.* Japan.

Pyrophorus alychnus, Kirsch, *l. c.* p. 368, Peru.

Cosmesus gracilis, *id. l. c.* p. 369, Peru.

Corymbites notabilis, *serrifer*, p. 25, *puerilis*, p. 26, Candèze, *l. c.* Japan; *C. putonis*, Cantal. *paulinoi*, Coimbra, Desbrochers des Loges, Bull. Soc. Ent. Fr. (5) iii. p. cxviii.

Ludius sieboldi, junior, p. 27, *plebeius*, *luteatus*, p. 28, Candèze, *l. c.* Japan.

Agriotes exulatus, p. 29, *leucophæatus*, *helvolus*, p. 30, *id. l. c.* Japan.

Agriotes theveneti, sp. n., Horn, *l. c.* p. 148, California.

Glyphonyx illepidus, Candèze, *l. c.* p. 31, Japan.

Silesis musculus, *id. ibid.* Japan.

CEBRIONIDÆ.

Cebrio collaris, p. 337, Algeria, *nigriceps*, *filicornis*, p. 338, *luteolus*, p. 339, Boghari, *angusticornis*, p. 338, N. Africa, Fairmaire, R. Z. (3) i.; *C. fairmairii*, Raffray, *l. c.* p. 373, Boghari: spp. nn.

DASCILLIDÆ.

Dascillus parallelus, Dohrn, = *sicanus*, Fairm. ; C. A. Dohrn, S. E. Z. xxxiv. p. 321.

Cyphon nigriceps, Thoms., Kies.; observations by Kraatz, B. E. Z. xvii. pp. 200 & 201.

Carcinognathus, g. n., T. Kirsch, B. E. Z. xvii. p. 369. Differs from *Artematopus* especially in its wider head, free eyes, long falciform mandibles, the equal 2nd and 3rd joints of its antennæ, &c. *C. sulcifrons*, sp. n. *id. l. c.* p. 370, Peru.

Artematopus variegatus, sp. n., *id. l. c.* p. 371, Peru.

Helodes signaticornis, sp. n., Baudi, Ann. Mus. Genov. iv. p. 227, Pracchia.

Ptilodactyla cisteloides, *præcellens*, p. 372, *lamellifera*, p. 373, *scutellaris*, p. 374, *angusta*, *probanda*, p. 375, *simulans*, *obscura*, p. 376, *vilis*, p. 377, *heterophya*, *omospila*, p. 378, *minuta*, *secedens*, p. 379, *nigra*, p. 380, spp. nn. (all with antennal appendages starting from the 4th joint, not the 3rd), Kirsch, *l. c.* Peru.

Hydrocyphon pallidicollis, sp. n., Raffray, R. Z. (3) i. p. 374, Algiers.

TELEPHORIDÆ.

Lycides.

Lycus congener, Gerst, fig. 8, *gravidulus*, G., fig. 9; Gerstäcker, in V. d. Decken's Reisen, iii. p. 2, pl. viii.

Lycus vallatus, sp. n., *id. l. c.* p. 310, Zanzibar.

Calopterus infirmum, p. 381, *acrocirrhum*, *humeralis*, p. 382, *fatigans*, *acroleucum*, p. 383, spp. nn., Kirsch, B. E. Z. xvii., Peru.

Cœnia peruviana, p. 384, *mirifica*, p. 385, spp. nn., *id. l. c.* Peru.

Eros bimaculatus, *patruelis*, p. 386, *parculus*, p. 387, spp. nn., *id. l. c.* Peru.

Lampyrides.

Lampyris amplicollis, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. viii. fig. 4.

Cladoceras peruvianus [-um], sp. n., Kirsch, *l. c.* p. 387, Peru.

Lucidota bicolor, p. 388, *funerea*, p. 389, spp. nn., *id. l. c.* Peru.

Photinus pectoralis, p. 389, *leontii*, *fuscicornis*, p. 390, *maculicollis*, p. 391, spp. nn., *id. l. c.* Peru.

Aspidosoma sinuaticolle and *angustum*, spp. nn., *id. l. c.* p. 392, Peru.

Drilides.

Drilus flavescens. Habits of the female in connection with apparently empty snail-shells; G. Lewis, Ent. M. M. x. p. 68.

Cosmocerus, Sol., nec Guér., re-named *Cerocosmus*; Gemminger, C. H. xi. p. 146.

Telephorides.

Telephorus picciolii, Rag., = *puncticollis*, Levrat, = *hæmorrhoidalis*, F., var.; *T. rufifrons*, Mars., = *fuscipennis*, Muls., var.; E. Ragusa, Bull. Ent. Ital. v. pp. 236 & 237.

Ichthyurus. Sexual characters of ♀ of *I. scripticollis*, *dohrni*, *inermis*, and *discoidalis* figured by R. Gestro, Ann. Mus. Genov. iv. p. 360.

Chauliognathus ? *longicornis*, sp. n., Kirsch, B. E. Z. xvii. p. 393, Peru.

Telephorus erythrocephalus, p. 394, *carinatus*, *lugens*, p. 395, *luridus*, p. 396, spp. nn., *id. l. c.* Peru.

Silis apicalis, sp. n., C. O. Waterhouse, Ent. M. M. x. p. 157, Angola, and var. ? W. Africa.

Ichthyurus doriae, sp. n., Gestro, *l. c.* p. 359, fig. 2 (p. 360), Pulo Pinang.

Malthinides.

Malthinus armipes, sp. n., Kiesenwetter, Käf. Europa's, xxix. Sardinia.

Malthodes picticollis, sp. n., *id. ibid.* Sicily.

Malachiides.

G. H. Horn, Tr. Am. Ent. Soc. iv. pp. 109-127, gives a synopsis of the species found in the United States. The tarsi of ♂ *Attalus* and *Ebæus* are figured, p. 110; *Malachius ænæus*, L., is now found in America. *Cephalistes unicolor* and *apicalis*, Mots., = *Tanaops longiceps*, Lec.; *Charopus uniformis*, Mots., ? = *Microlipus laticeps*, Lec., ♀; *Acletus*, Lec., *Scalopterus*, Mots., = *Attalus*, Er.; *Attalus elegans*, Horn, = *3-maculatus*, Mots.

Baudi, Ann. Mus. Genov. iv., describes, without naming, new species of *Malachius* from N. Persia, p. 236, Caucasus, p. 239; and describes a var. *dissimilis* of *M. viridis*, F., from the Caucasus, p. 241, and a var. *calabrus* of *M. parilis*, Er., from Catanzaro, p. 244.

Malachius pulicarius, var. *truncatellus*, Thunb., = *Axinotarsus pulicarius*, Payk., ♂; Kraatz, B. E. Z. xvii. p. 214.

Troglops corsicus, Perris, is found to come from Algeria, and is re-named *algericus*; E. Perris, Nouv. et faits (2) p. 6.

Oogines signicollis, Muls., = *bicolor*, Perris, which possibly is a var. of *saginitus*, Kies.; *Antholinus posticus*, Muls. & R., = *apicalis*, Perr.; *id. l. c.* p. 7.

Temnosophus, g. n., Horn, *l. c.* p. 111, fig. Antennæ very long, 11-jointed; tarsi 4-jointed in ♂. Represents European *Colotes*, but with basal joint long, stout, very slender and with a short inwardly projecting process at base; 2nd joint of maxillary palpi globular and emarginate for reception of triangular 3rd joint. *T. bimaculatus*, sp. n., *id. ibid.*, Louisiana.

Pseudebæus, g. n., *id. l. c.* p. 118. Tarsi simple in both sexes: apical

elytral prolongations obtusely hooked on the upper sides. *Ebaeus apicalis* and *pusillus*, Say, *bicolor* and *oblitus*, Lec.

Collops velutinus, sp. n., Gerstacker, in V. d. Decken's Reisen, iii. pt. 2, p. 311, Zanzibar.

Malachius securiclatus, p. 239, Balbeck, *carinifrons*, p. 241, Caucasus, *flexicornis*, p. 242, St. Jean D'Acre, *tricolor*, p. 244, N. Persia, Baudi, *l. c.*; *M. nitidicollis*, A. Chevrolat, Ann. Soc. Ent. Fr. (5) iii. p. 204, Syria; *M. mixtus*, p. 113, California, *ulkii*, p. 114, Dacota, Horn, *l. c.*: spp. nn.

Attalus rostratus, p. 121, California, *oregonensis*, p. 122, S. Oregon, *varians*, p. 123, Texas, Louisiana, *parallelus*, Texas, *pettiti*, p. 124, Canada, *rufiventris*, p. 125, Ohio to Texas, spp. nn., Horn, *l. c.*

Anthocomus ventralis, Horn, *l. c.* p. 118, Arizona; *A. doriae*, Baudi, *l. c.* p. 245, Teheran: spp. nn.

Microlipus levicollis, sp. n., Horn, *l. c.* p. 116, Nebraska.

Dasytides.

F. Baudi, B. E. Z. xvii. pp. 293-316, records the result of his examination of the exponents in Dejean's collection at Turin of the European and circum-Mediterranean species of this group contained in the 3rd edition of that author's catalogue [Zool. Rec. viii. p. 277], adding descriptions and observations referring to other species in the notes. He also describes various species taken by Truqui, chiefly in Cyprus; *l. c.* p. 316, *et seq.* A var. of *D. xanthocnemus*? Kol. (*moniliatus*, Kies.; Kiesenwetter, *l. c.* p. 317, note), is described as *cyprius*, p. 317.

Dasytes nobilis: larva described by Mulsant & Mayet, Mém. Ac. Lyons, xix. pp. 335-338.

Melyris nobilis, Gerst., fig. 7, *Prionocerus dimidiatus*, G., fig. 11; V. d. Decken's Reisen, iii. pt. 2, pl. viii.

Haplocnemus koziorowiczi, Desbr., *marginatus*, Rott., = *rufimarginatus*, Perris; E. Ragusa, Bull. Ent. Ital. v. p. 235.

Haplocnemus xanthopus, Kies., ? = *marginatus*, Rott., var.; *Danacœa montivaga*, Muls., = *denticollis*, Baudi; *D. aurichalcea*, Küst., = *ambigua*, Muls.: Baudi, Ann. Mus. Genov. iv. p. 250.

Phlæophilus edwardsi found in plenty near Düsseldorf in winter: Kiesenwetter, B. E. Z. xvii. p. 212.

Henicopus dentipes, sp. n., Raffray, R. Z. (3) i. p. 375, pl. xvi. figs. 3, 3a-c, Boghari.

Dasytes acutipennis, Baudi, *l. c.* Ann. Mus. Genov. iv. p. 248, Algeria; *D. rufitarsis*, p. 295, Oran, *amplipennis*, *ibid.* note, Algeria, *flavipennis*, p. 296, note, Sicily, *subalpinus*, p. 304, Austria, *dalmatinus*, p. 305, Dalmatia (? = *striatulus*, Brul., var.; Kiesenwetter, *l. c.* p. 306, note), *variolosus*, p. 307, Spain, *acutipennis*, *ibid.* note, Algeria, *timidus*, p. 318, Cyprus, *id.* B. E. Z. xvii.: spp. nn.

Lobonyx ruficollis, sp. n., Raffray, *l. c.* p. 376, pl. xv. figs. 9, 9a-c, Boghari.

Julistus curtus, sp. n., Baudi, B. E. Z. xvii. p. 297, Dalmatia, Ragusa.

Aphyctus saginatus, p. 31, *muelleri*, p. 32, spp. nn., Kiesenwetter, B. E. Z. xvii. Greece.

Dasytiscus analis, sp. n. (?), p. 313, Tartary, *virescens*, sp. n., p. 319, Cyprus; Baudi, *l. c.*

Haplocnemus tingitanus, p. 300, Tangiers, *integer*, p. 302, note, Upper Italy, *palaestinus*, p. 319, note, Jerusalem; Baudi, *l. c.* spp. nn.

Danaceæ olivacea (sp. n. ?), W. Persia, Tauria, *taurica*, sp. n., Tauria, *id. l. c.* p. 311.

Cerallus marginatus, p. 298, Syria, *tartaricus*, p. 299, Tartary, *id. l. c.* spp. nn.

Acanthocnemus (allied to *Phlæophilus*) *truquii*, sp. n., *id. l. c.* p. 321, Cyprus.

Astylus ambages, sp. n., Kirsch, *l. c.* p. 396, Peru.

Zygia klugi, sp. n., Baudi, *l. c.* p. 315, Arabia.

CLERIDÆ.

Tillus picipennis, White, = *Tarsostenus univittatus*, Rossi; *Lebasiella nigripennis*, Lec., = *pallipes*, Klug; J. L. Leconte, P. Ac. Philad. 1873, p. 334.

Trichodes sipylus, F., *4-guttatus*, Stév., *affinis*, Chevr. (distinct from *favarius*), *olivieri*, Klug, &c.: observations, especially as to synonymy, by Kraatz, B. E. Z. xvii. pp. 240-242.

Opilus mollis recorded from Missouri, U. S. A.; *Trichodes olivieri*, Chevr., var. n. *doriæ*, N. Persia; Baudi, B. E. Z. xvii. pp. 322 & 333, note.

Phlæocopus vinctus, Gerst., figured in V. d. Decken's *Reisen*, iii. pt. 2, pl. viii. fig. 10.

Corynetes pexicollis, Fairm., ? = *geniculatus*, Klg.; Desbrochers, MT. schw. ent. Ges. iv. p. 196.

Trichodes armeniacus, Baudi, Ann. Mus. Genov. iv. p. 254, Armenia, N. Persia; *T. subfasciatus*, Kraatz, B. E. Z. xvii. p. 239, Nazareth: spp. nn.

Axina fasciata, sp. n., Kirsch, B. E. Z. xvii. p. 398, Peru.

Pelonium ? *6-punctatum*, sp. n., *id. ibid.* Peru.

Corynetes (*Agonolia* ?) *hybridus*, sp. n., Baudi, B. E. Z. xvii. p. 324, note, Spain.

LYMEXYLIDÆ.

A new species from Peru briefly described (not named), for which a new genus next *Atractocerus* is apparently required: T. Kirsch, B. E. Z. xvii. p. 399.

CUPESIDÆ.

Omma, Newm., is allied to *Cupes*, and especially to *C. serrata*, Lec.; a Japanese *Cupes* resembles *C. concolor* from the Atlantic States: J. L. Leconte, P. Ac. Philad. 1873, p. 334.

PTINIDÆ.

Anobium paniceum eating *Capsicum annuum*: G. v. Frauenfeld, Verh. z.-b. Wien. xxiii. p. 192.

Anobium denticolle: larva described by Mulsant & Rey, Ann. Soc. L. Lyon (n. s.) xix. (1872), pp. 427-429.

Stagetus, Woll., should be compared with *Protheca*, Lec., and resem-

blance between the Coleopterous faunas of N. America and the Atlantic Islands is pointed out : J. L. Leconte, P. Ac. Philad. 1873, p. 334.

Ptinus testaceus, Ol., occurs in England, D. Sharp, Ent. M. M. ix. p. 268.

Rhadine, g. n., Baudi, l. c. p. 331. *Anobiides*: no differential characters given, but the under-side is stated to be constructed as in the *Dorcatomini* of Mulsant, and the facies to be that of a very small *Anobium striatum*. *R. parmata*, sp. n., id. l. c. p. 332, Cyprus.

Phoberus, g. n., Kirsch, B. E. Z. xvii. p. 400. *Anobiides*: compared with *Dorcatoma*. *P. byrrhoides*, sp. n., id. l. c. p. 401, Peru.

Anobium disruptum, sp. n., Baudi, l. c. p. 329, note, Sardinia.

Dorcatoma lanuginosa, sp. n., id. l. c. p. 263, Sardinia.

Xyletinus byssinus, sp. n., Kirsch, l. c. p. 399, Peru.

Catorama peruviana and *humeralis*, spp. nn., id. l. c. p. 401, Peru.

Hedobia tricostata, sp. n., Baudi, l. c. p. 325, Cyprus.

Ptinus obsoletus, p. 326, Cyprus, *P. (Eurostus) quisquiliarum*, p. 327, note, Piedmontese Alps, *P. (E.) apenninus*, p. 328, Tuscan Apennines, id. l. c.; *P. (Eutaphrus) damascenus*, id. Ann. Mus. Genov. iv. p. 256, Damascus; *P. comptus*, Chevrolat, Ann. Soc. Ent. Fr. (5) iii. p. 204, Syria: spp. nn.

BOSTRYCHIDÆ.

Apate ornifrons, sp. n., Baudi, B. E. Z. xvii. p. 334, Cyprus.

Rhizopertha sicula, sp. n., id. l. c. p. 336, note, Sicily.

CIOIDÆ.

Cis coriaceus, p. 337, *C. (Hadraule) pumilio* and *clavicornis*, p. 338, spp. nn., id. l. c. Cyprus.

TENEBRIONIDÆ.

F. BATES, Ann. N. H. (4) xii. pp. 472-474, in the commencement of an article on new genera and species of *Heteromera*, chiefly from New Zealand and New Caledonia (of which only some species of *Cilibe*, in the *Heleides*, were published in 1873), refers to *Astathmetus* (allied to *Hypopaulax*), *Artystona* (allied to *Titena*), and *Callismilax*, as new genera, but does not characterize them. *Titena erichsoni*, White, is not a *Titena*; *Hopatrinus convexus*, Fairm., occurs in New Zealand, and is removed from its former genus to the vicinity of *Scotoderus*, Perroud, with which *Dechius*, Pasc., is identical; *Selenopalpus chalybeus*, White, = *cyaneus*, F.

Erodiides.

Diodontes areolatus, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. ix. fig. 6.

Erodius. E. Allard, R. Z. (3) i. pp. 122-234, monographs this genus, protesting against Kraatz's sinking many of Solier's species. *E. olivieri*, Sol., = *levigatus*, Ol., ♂; *E. opacus*, Ktz. ? = *bilineatus*, Ol., ♀; *E. rugosus*, All., is re-named *rugicollis* (p. 145); *E. granulosus*, All., nec Sol.

is re-named *henoni* (p. 147); a var. *semicostatus* of *E. elegans*, Kr., is described, p. 160; *E. longus*, Sol., = *orientalis*, Brullé; *E. africanus*, *tangerianus*, and *nitidiventris*, Sol., = *lusitanicus*, Sol.; *E. latus*, Sol., = *carinatus*, Sol. ♀; *E. neapolitanus*, Kr., var. (*nec* Sol.), = *siculus*, Sol.; a var. (? sp. n.) *pulverulentus* of *E. nitidicollis*, Sol., is described, p. 209; *E. subcostatus*, Sol., = *subparallelus*, Sol., var.; *E. affinis*, Sol., = *lævis*, Sol., ♀; *E. puncticollis*, Rosenh., *nec* Sol., = *rugosus*, Ktz.; *E. pellucidus*, Muls., *ex descr.*, = *Leptonychus rufipennis*, Guér.

Erodius reichii, p. 164, Syria, *pyriformis*, p. 203, Sicily, *maximus*, p. 206, Morocco, *solieri*, p. 212, *nitidicostis*, p. 220, Algeria, *obtusus*, p. 221, Spain, *id. l. c.* spp. nn.

Adesmides.

Adesmia baccata, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. ix. fig. 1.

Tentyriides.

Eremæcus (?) *cordicollis*, sp. n., Kirsch, B. E. Z. xvii. p. 402, Peru.

Megalophrys waterhousii, sp. n., F. Bates, Ent. M. M. x. p. 47, Valdivia.

Epitragides.

Nyctipetus. Leconte, P. Ac. Philad. 1873, p. 334, notes the extraordinary resemblance between a Chilian species of this genus and the Carabideous *Amphizoa lecontii*, Matth.

Scaurides.

Emear sculpturatus, Pasc., is a *Nyctoporis*, barely differing from *N. galzeata*, Lec.; Leconte, *l. c.*

Blaptides.

Eleodes viator, Lec., = *tuberculata*, Mann.; *E. subtuberculata*, Walk., = *granulata*, Lec.; *E. latiuscula*, Walk., = *humeralis*, Lec.; *E. binotata*, Walk., = *sponsa*, Lec.; *E. conjuncta* and *convexicollis*, Walk., = *obscura*, Say; Leconte, *l. c.*

Blaps gigas: larva described by Mulsant & Mayet, Mém. Ac. Lyon, xix. pp. 340-344.

Asidides.

Machla hamaticollis, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. ix. fig. 7.

Cardigenius granulatus and *crinifer*, spp. nn., Fairmaire, Ann. Mus. Genov. iv. p. 532, Montevideo.

Asida alonensis, p. 409, pl. xiii. fig. 3, Alicante, *ricoi*, p. 412, fig. 4, spp. nn., Martinez y Saez, Ann. Soc. Esp. ii.

Nycteliides.

Gyriosomus kingi, p. 207, *affinis*, p. 208, spp. nn., E. C. Reed, Ent. M. M. ix. N. Chili.

Pimeliides.

Leucolaphus perrisi, Luc., = *nigripunctatus*, Luc., ♀, with which *lilipu-*

tanus, Luc., should probably also be united; S. A. de Marseul, Bull. Soc. Ent. Fr. (5) iii. pp. lxii-lxiv., cxx. Lucas, *l. c.* p. lxiv., demurs to this opinion; but subsequently, p. xciii., admits its correctness as to the two first insects, maintaining the specific value of the third. Leprieur, *l. c.* pp. xciv. & clxi., gives particulars of captures (*cf.* also De Marseul, p. clxx.). G. Allard, *l. c.* p. cxx., from fresh material, maintains the specific value of *L. liliputanus*.

Polpogenia laglaizii, sp. n., F. Bates, Ent. M. M. x. p. 47, Cape Verde.

Pimelia puberula, sp. n., A. Chevrolat, Ann. Soc. Ent. Fr. (5) iii. p. 203, Syria.

Molyrides.

Phynocolus petrosus, Gerst., fig. 4, *frondosus*, G., fig. 5, *Sepidium muscosum*, G., fig. 2, figured in V. d. Decken's Reisen, iii. pt. 2, pl. ix.

Trachynotus. Haag-Rutenberg, C. H. xi. pp. 1-43, monographs this genus, with which he unites *Somaticus* and *Tracheleum*, Hope, considering the rounded form of the eyes to be the only real point of difference between it and *Psammodes*, and that *Clinocranium*, Sol., is a highly developed form of it. *Pimelia leucophrys*, Hbst., = *Sepidium rugosum*, F. (Von Harold, *l. c.* p. 9, note, points out that *P. leucophrys* must be attributed to Lichtenstein, 1795, prior to Herbst); *Trachynotus elongatus*, Ol., *T. proximus*, Cast., and *T. testudinarius*, Dej. Cat., = *reticulatus*, Deg., varr.; *T. lacunosus*, Sol., *ex. typ.*, = *plicatus*, Wied. *Psammodes hirtipennis*, Haag, being preoccupied, is re-named *vulpinus* (p. 45, note).

Ethmus, g. n., *id. l. c.* p. 44. Allied to *Psammodes* and *Trachynotus*: antennæ dilated, thorax very wide behind, flat, strigilate, trisinate at the base, elytra narrow, head large and free. *E. maculatus*, Angola, *latus*, N'Gami, *id. l. c.* p. 45, spp. nn.

Trachynotus wahlbeigi, Svakop, *badeni*, Caffraria, p. 11, *bohemani*, p. 11, N'Gami, Svakop, *cinctus*, p. 12, Central Africa, *brucki*, p. 13, *tentyrioides*, p. 24, *frontalis*, p. 42, N'Gami, *punctiger*, *scaber*, p. 15, *gracilipes*, p. 19, *tibialis*, p. 20, *tricostatus*, *licinoides*, p. 23, *dilatatus*, p. 25, *contractus*, p. 27, *setulosus*, p. 31, *crinitus*, p. 32, *kraatzi*, p. 33, *similis*, *chevrolati*, p. 35, *recurvus*, *plicipennis*, p. 38, *ornatus*, p. 40, Cape of Good Hope, *stali*, p. 18, Svakop, *bipunctatus*, p. 20, *albimaculatus*, p. 42, Caffraria, *geniculatus*, p. 21, *vittiger*, p. 22, Diamond Fields, S. Africa, *vestitus*, p. 30, S. Africa; *id. l. c.* spp. nn.

Hopatrides.

Hopatrum. Kraatz, B. E. Z. xvii. pp. 436-439, discusses various unknown species. *H. patrulele*, *famelicum*, and *setulosum*, Küst., = *rusticum*, Ol.; *H. lineare*, Küst., = *costatum*, Brullé; *H. pedestre*, Ros., and *sturmi*, Küst., = *pesthiense*, Küst.; *H. graniger* and *hispidosum*, Brullé, = *verrucosum*, Germ.; *H. gibbum*, Küst., and *elevatum*, Brullé, = *dardanum*, Stern.

Phylax littoralis; larva described by Mulsant & Mayet, Mém. Ac. Lyon, xix. pp. 338-340.

Anomalipus heraldicus, Gerst., pl. ix. fig. 3, *Cyptus scabrosus*, G., pl. x. fig. i.: V. d. Decken's Reisen, iii. pt. 2.

Gonocephalum angustatum, sp. n., A. Chevrolat, Ann. Soc. Ent. Fr. (5) iii. p. 204, Syria.

Brachyesthes approximans, p. 391, *gastonis*, p. 392, spp. nn., Fairmaire, Ann. Soc. Ent. Fr. (5) iii. Souf (Algeria).

Trachyscelides.

Phaleria, Leach, nec Latr., is re-named *Halophalerus*: G. R. Crotch, Check List N. A. Col. p. 107.

Diaperides.

Hoplocephala (Neomida) striata, Montrouz., is a *Platydemia*, and *P. oriticum*, Pasc., is apparently synonymous with it. F. Bates, Ent. M. M. ix. p. 204.

Evoplus, Lec., placed by Horn in the *Ulomides*, has the mesocoxal cavities open externally, and the trochantin distinct: it must, therefore, be placed in this group, and is queried as distinct from *Hoplocephala*. *Liodema*, Horn, additionally characterized. *Id. l. c.* pp. 234 & 235.

The following genus and species are contained in the 12th article of the late Victor Motschoulsky's "Énumération des nouvelles espèces," &c., Bull. Mosc. xlv. ; but with no other indication of novelty.

Basides, p. 471. No differential characters given. *B. bifasciatus*, *plagiatus*, p. 472, *rufipiceus*, *ruficollis*, p. 473, *picicollis*, *crassicornis*, *8-maculatus*, p. 474, *ziczac*, p. 475, East Indies, *lunatus*, p. 474, *flavimaculatus*, p. 475, Natal, also *Alphitophagus 6-maculatus*, Mots., and *Diaperis bifasciata*, Say.

Diaperis fungi, p. 466, Caucasus and Siberia.

Hoplocephala quadricornis, p. 466, Georgia, *gracilis*, Ohio, *ferruginea*, East Indies, *castanea*, New Orleans, p. 467, *rufitestacea*, *testacea*, p. 468, East Indies, *spadicea*, p. 468. *atra*, p. 469, Madagascar, *callistomonis*, p. 469, New Holland.

Platydemia nigratum, New Orleans and Atlanta, *novicum*, New Holland, *oblongulum*, Florida, p. 470, *ochraceum*, p. 471, East India.

Ceropria femorata and *posticalis*, p. 476, Java.

Neomida atra, Spain, *discolor*, Brazil to Texas, *subquadrata*, Central America, p. 477, *texana*, Texas, *subsericea*, Syria, *nigrata*, California, p. 478, *flavicornis*, New Orleans and Mobile, *tricuspis*, East Indies, p. 479, *rufula*, p. 480, Egypt, *bicuspis*, p. 481, Surinam.

Pentaphyllus barbarus, p. 481, Algeria, *americanus*, p. 482, Georgia.

Heterophyllus natalis, p. 482, Natal.

Liodema, g. n., Horn, Tr. Am. Phil. Soc. xiv. (n. s.) pt. ii. (1870) p. 385 [omitted from Zool. Rec. viii.]. Differs from *Platydemia* in its unemarginate prominent mesosternum, beneath which the prosternum is received, &c. *Platydemia leve*, Hald.; also *L. kirschi*, Bogota, *obydense*, Obydos, p. 235, *horni*, Santarem, *fulvum*, Cumana, *connexum*, Colombia, *serricorne*, Cayenne, p. 236, F. Bates, Ent. M. M. ix. spp. nn.

Spiloscapa, g. n., F. Bates, *l. c.* p. 202. With a broad, truncated, intercoxal process: near *Scaphidema*. *Sp. crassicornis*, sp. n., *id. l. c.* p. 203, N. S. Wales (? = *Platydemia thalioïdes*, Pasc.).

Stenoscapa, g. n., *id. l. c.* p. 237. Differs from *Liodema* in its narrowly

oval form, the tibiæ with 2 unequal and much longer apical spines, &c. *S. tibialis*, sp. n., *id. ibid.* Ega.

Hoplocephala amazonica, p. 203, Santarem, *castanea*, New Granada, *lateralis*, Colombia, p. 204, *id. l. c.* spp. nn.

Allophasia marseuli, sp. n., *id. l. c.* p. 237, no locality mentioned.

Diaperis lewisi, Japan, *sanguineipennis*, Ceylon, spp. nn., *id. op. cit.* x. p. 14.

Apsida (re-characterized) *chrysomelina*, p. 15, *belti*, p. 16, Chontales, *purpureimicans*, p. 16, New Granada, *aneomicans*, p. 16, *boucardi*, p. 17, Mexico, *id. op. cit.* x. spp. nn.

Anemia ? *submetallica*, sp. n., Raffray, R. Z. (3) i. p. 377, pl. xv. fig. 8, Bouksoul, Boghari.

Evoplus leontii, sp. n., F. Bates, *op. cit.* ix. p. 233, Colombia.

Phrenapatides.

Delognatha brevicornis, p. 48, Espirito Santo, *puncticollis*, Brazils, *buckleyi*, Ecuador, p. 49, spp. nn., *id. op. cit.* x.

Ulomides.

Tribolium confusum, Duv., occurs in England: D. Sharp, Ent. M. M. ix. p. 268.

Tribolium ferrugineum destroying *Arachis hypogæa* (ground-nut): A. Müller, P. E. Soc. 1873, p. x.

Uloma perroudi, Muls., occurs in Germany; *Uloma laeviuscula*, Curt., ? = *Gnathoncus* [-*ocerus*] *cornutus*, var.; Kraatz, B. E. Z. xvii. p. 196.

Alphitobius (*Heterophaga*) *lateralis*, Boh., belongs to *Eutochia*, Lec.; F. Bates, Ent. M. M. ix. p. 202.

Hypophleus ratzeburgi, Wism., is probably not *Tribolium bifoveolatum*, Duft., since the latter is a *Palorus*; L. Bedel, Bull. Soc. Ent. Fr. (5) iii. p. lxxxvii.

Toxicum and *Anthracias* must be united, Australian species of the former having both 3 and 4 joints to the club; the eye, moreover, is undivided in these, and completely divided in species from Africa and elsewhere. F. Bates, *op. cit.* x. p. 45.

Ulomi [*mi*] *mus*, g. n., *id. op. cit.* ix. p. 201. Intermediate between *Alegoria* and the true *Ulomides*; distinguished from *Antimachus* and *Uloma* by the anterior tarsi being dilated and villose beneath, with the penultimate joint much smaller than the preceding, and by the anterior tibiæ being much dilated and furrowed above. *U. indicus*, sp. n., *id. l. c.* p. 202, E. India.

Metabolocerus, g. n., *id. l. c.* p. 259. Near *Ulosonia*, Cast., and *Antimachus*, Gistl. *M. pilosus*, *ibid.*, New Granada, *clypeatus* (and var. ? *brevicornis*), Cumana, *frii*, Colombia, p. 260, spp. nn., *id. l. c.*

Metulsonia, g. n., *id. l. c.* p. 261. Near *Peltoides*; prosternal process penetrating deeply into the mesosternum. *M. horni*, Panama, *egaensis*, Ega, *id. l. c.* p. 262, spp. nn.

Epitoxicum, g. n., *id. op. cit.* x. p. 46. Eyes contiguous to prothorax, epipleural fold abruptly expanded at the shoulders, antennæ long and thin, femora very elongate. *E. haplandroides*, sp. n., *id. ibid.* E. India.

Peneta cervus, sp. n., *id. l. c.* p. 50, Peru.

Alegoria sallæi, p. 181, Mexico, *quadraticollis*, p. 182, Venezuela, *parallela*, p. 183, Brazils, *id. op. cit.* ix. spp. nn.

Uloma cyprea, Kraatz. B. E. Z. xvii. p. 196, Cyprus; *U. bicolor*, Kirsch, *op. cit.* p. 403, Peru: spp. nn.

Peltoides capensis, Dej. Cat., described: F. Bates, *op. cit.* ix. p. 262.

Toxicum picticolle, sp. n., *id. op. cit.* x. p. 45, New Guinea (? = *chevrolati*, Montr., re-characterized: *id. l. c.* p. 52).

Helæides.

Mimopeus amaroides, Pascoe (*ex descr.*), and *Cilibe phosphugoides*, White, = *C. elongata*. Brême, of which a var. *granulipennis* is described from New Zealand; F. Bates, Ann. N. H. (4) xii. pp. 474 & 478.

Æthalides, g. n., *id. Ent. M. M.* x. p. 50, *Nyctozoilides*: intermediate between the typical genus and *Onosterrhus*. *Æ. punctipennis*, sp. n., *id. l. c.* p. 51, West Australia.

Styrus, g. n., *id. Tr. E. Soc.* 1873, p. 348. Near *Nyctozoilus*, but without its facies. *S. elongatulus*, sp. n., *id. l. c.* p. 350. Queensland (? = *N. elongatulus*, W. Macleay).

Amphianax, g. n., *id. l. c.* p. 350. General form of *Cilibe*. but allied to the *Onosterrhus* group: metasternum longer than in any of the related genera. *A. subcoriaceus*, sp. n., *id. l. c.* p. 351, Australia.

Agasthenes, g. n., *id. l. c.* p. 352. Facies of the *Cœlomelopides*, but with majority of characters decidedly leading to *Onosterrhus*. from which the form of its head, and its thorax being strongly constricted near the base, at once distinguish it. *A. westwoodi*, sp. n., *id. l. c.* p. 353, S. Australia.

Nyctozoilus deyrollii, sp. n., *id. l. c.* p. 348, (? W.) Australia.

Cilibe opacula, p. 474, *nitidula* and *otagensis* (and var. ? *grandis*), p. 476, *humeralis*, p. 480, *thoracica*, p. 481, *brevipennis*, p. 482, *rugosa*, p. 483, *tibialis*, p. 484, *impressifrons*, p. 485, New Zealand, *pascoii*, p. 479, Pitt's Island, *id. Ann. N. H.* (4) xii. spp. nn.

Onosterrhus punctulatus, sp. n., *id. Ent. M. M.* x. p. 51, W. Australia.

Cossyphides.

Cossyphus denticentris, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. x. fig. 2. Sexual characters of the genus referred to; Gerstäcker, *ibid.* p. 187, note.

Tenebrionides.

Tenebrio, F., *nec L.*, is re-named *Tenebrionellus*, to include *obscurus*, *molitor*, and allies: G. R. Crotch, Check-List N. A. Col. p. 105 [*Menedrio*, Motsch., Bull. Mosc. xv. 2; type, *T. obscurus*].

Encyalesthus brevicornis, Mots., = *Pachyurgus areus*, Melsh.; J. L. Leconte, P. Ac. Philad. 1873, p. 335.

Proderops, g. n., Fairmaire, Ann. Soc. Ent. Fr. (5) iii. p. 393. Very near *Zophobas*, but with very large head and small elytra, eyes widely separated from thorax, equidistant legs, &c. *P. foraminosus*, sp. n., *id. l. c.* p. 394, S. America.

Calcar raffrayi, sp. n., *id. R. Z.* (3) i. p. 340, Algiers.

Goniadera cariosa and *parvula*, spp. nn., *id. Ann. Mus. Genov.* iv. p. 533, Montevideo.

Heterotarsides.

Dichastops subaneus, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. x. figs. 3 & 3a.

Phobelius metallicus, sp. n., Kirsch, B. E. Z. xvii. p. 404, Peru.

Anadus [? *Lypros*] *angusticollis*, sp. n., *id. l. c.* p. 405, Peru.

Cyphaleides.

F. Bates, Tr. E. Soc. 1873, identifies *Cyphaleus chalybeipennis*, W. Macl., with *C. mastersi*, Pasc., and describes as new:—

Amaryg [*mo*] *mimus*, p. 354. Facies of the oblong species of *Amarygmus*. *A. duboulayi*, p. 355, Champion Bay.

Anausis, p. 355. Near *Prophanes*, Westw. *A. macleayi*, p. 356, Champion Bay, and ? *P. metallescens*, Westw.

Apomestris, p. 357. Near *Altes*, Pasc., but with dentate pro- and meta-tibiæ. *A. westwoodi*, p. 358, Victoria.

Ctimene, p. 359. *C. breweri*, p. 360, Albany, West Australia.

Oremasis haagi, p. 356, ? Queensland.

Decialma ? *pascoii*, p. 358, Queensland.

Mithippia jansonii, p. 359, W. Australia.

Helopides.

Hoplocephala (*Neomida*) *baladica*, Montr., = *Strongylium viridipenne*, Montr., which belongs to this group; *H. (N.) elongata* (= *sulcata*), Mont., is allied to *Isopus*. F. Bates, Ent. M. M. ix. p. 204.

Misolampus goudoti, Br., described from Tangiers, occurs also in Andalusia. Perez Arcas, Act. Soc. Esp. ii. p. 15.

Parablops, Rott., *nec* Schön., is re-named *Gerandryus*: Rottenberg, B. E. Z. xvii. p. 217.

F. Bates, Tr. E. Soc. 1873, re-characterizes *Isopus*, Montr., from typical specimens (its position is undoubtedly in Sect. i. of Lacordaire's *Misolampides*, and not in the *Strongyliodes*, where Gemminger & Von Harold place it), re-describing *I. blanchardi* and (? *I.*) *oxygaster*, Montr., and describing as new:—

Micrectyche, p. 362 (*Amphidorides*). Very near *Ectyche*, Pasc., but with short, compact non-perfoliate antennæ. *M. intermedia*, p. 363, Champion Bay, *ferruginea*, Swan River, and var. ? *dubia*, Champion Bay (both ? = *intermedia*, sex), *ryii*, Champion Bay, p. 364.

Metisopus, p. 370 (*Misolampides*). Near *Isopus*, but with a scutellum, of much less convex and oblong oval-form, &c.; distinguished from *Pseudhelops* by its longer epistoma and head, and concealed labrum, &c. *M. purpureipennis*, p. 371, Norfolk Island.

Chlorocamma, p. 371 (*Misolampides*). Near *Isopus*, but scutellum very distinct. *C. carenipennis*, p. 372, New Caledonia, and *Neomida sulcata*, Montr.

Episopus, p. 372 (*Misolampides*). Very near *Isopus*, but with a scutellum and a convex prosternal process. *E. politus*, p. 373, New Caledonia, and *I. convexus*, Montr.

Ectyche scabripennis, p. 360, *sculpturata*, *tuberculipennis*, p. 361, W. Australia.

Adelium (Seirotiana) strigipenne, p. 365, Australia, *nigroceneum*, *fairmairii*, p. 366, *marginatum*, p. 367, *externecostatatum*, p. 368, New Caledonia.

Dystalica subpubescens, p. 369, N. S. Wales.

Isopus robustus, p. 375, *allardi*, p. 376, *cyaneus caledonicus*, p. 377, New Caledonia.

Omolipus oblongus & *parvus*, p. 379, W. Australia.

Helops maroccanus, sp. n., Fairmaire, R. Z. (3) i. p. 341, Morocco.

Helopinides.

Micrantereus variolosus, Gerst., fig. 9, *femoratus*, G., fig. 8; V. d. Decken's Reisen, iii. pt. 2, pl. ix.

Micrantereus gerstaeckeri, sp. n., Gestro, Ann. Mus. Genov. iv. p. 354, (detail figured, p. 356), Keren, Abyssinia.

Megacanthides.

Gonocnemis brevicollis, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. x. fig. 5.

Strongyliides.

Aspidosternum festivum, Gerst., fig. 4, and *Miltoprepes latus*, G., fig. 6; V. d. Decken's Reisen, iii. pt. 2, pl. x.

Strongylium ruficorne, p. 406, *axillare*, p. 407, spp. nn., Kirsch, B. E. Z. xvii. Peru.

CISTELIDÆ.

Cistela, F., nec Geoffr. (= *Byrrhus*, auctt.), is re-named *Pseudocistela*: G. R. Crotch, Check-List N. A. Col. p. 108.

Homophlus fallaciosus, Rott., = *longicornis*, Bertol.; E. Ragusa, Bull. Ent. Ital. v. p. 236.

Podonta, Muls., revised by H. v. Kiesenwetter. B. E. Z. xvii. pp. 9-22. *P. oblonga*, Mill., nec F., is re-named *milleri*; p. 19.

Xystropus pilosus, Dej., re-described from Peru: Kirsch, B. E. Z. xvii. p. 408.

Cistela impressicollis, sp. n., Chevrolat, Ann. Soc. Ent. Fr. (5) iii. p. 205, Syria.

Podonta ambigua, p. 11, *Magnesia turcica*, p. 14, Turkey in Asia, *atrata*, p. 15, Turkey, *carbonaria*, p. 16, Mesopotamia, *heydeni*, p. 19, Asia Minor, *corvina*, Salonica, *morio*, Mt. Olympus and Asia Minor, p. 21; Kiesenwetter, l. c. spp. nn.

Heliotaurus (Gastrhæma) janthinus, sp. n., Raffray, R. Z. (3) i. p. 378, Boghari.

MONOMMATIDÆ.

Hyporhagus gilensis and *opuntiae*, spp. nn., Horn, Tr. Am. Ent. Soc. iv. p. 149, Arizona.

PYTHIDÆ.

Eupleurida, Lec., = *Ischalia*, Pasc.; J. L. Leconte, P. Ac. Philad. 1873, p. 335.

Sphalma, g. n., Horn, l. c. p. 150. Allied to *Pytho*, *Crymodes*, &c., but with a sub-quadrate, acutely margined thorax. *S. quadricollis*, sp. n., *id.* l. c. p. 151, California.

MELANDRYIDÆ.

Serropalpus striatus recorded as causing an escape of gas by perforating a leaden pipe running up a pine log containing its larvæ. E. A. de Perrin, Pet. Nouv. p. 359.

Conopalpus testaceus: habits of larvæ. J. Ern , MT. schw. ent. Ges. iv. p. 143.

LAGRIIDÆ.

Entypodera anthicoides, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. x. fig. 7.

Lagriola, g. n., Kirsch, B. E. Z. xvii. p. 409. The heteromerous tarsi and subglobose anterior coxæ point to the *Tenebrionide*; the simple penultimate tarsal joint and non-elongate apical joint of the antennæ approach *Trachelostenus*. *L. operosa* and *denticulata*, spp. nn., *id.* l. c. 411, Peru.

Statira sculpta, p. 411, *anthicoides*, p. 412, spp. nn., *id.* l. c. Peru.

ANTHICIDÆ.

Ictistygma, Pasc., ? = *Eurygenius*, Fert ; Leconte, P. Ac. Philad. 1873, p. 335.

Neogonus, g. n., C. Hampe, Verh. z.-b. Wien, xxiii. p. 165 (not characterized). *N. plasoni*, sp. n., *id. ibid.* pl. iiA, Athens.

Anthicoxenus ovalii, sp. n., Philippi, S. E. Z. xxxiv. p. 310, pl. 2, figs. 4 a & b, Chili (the tarsal claws are cleft in this genus).

Steropes (?) *hungaricus*, sp. n., Hampe, l. c. Hungary.

MORDELLIDÆ.

Mordellistena brevis, *diagonalis*, p. 413, *curvicauda*, p. 414, *dolobrata*, p. 415, spp. nn., Kirsch, B. E. Z. xvii. Peru.

RHIPIDOPHORIDÆ.

Rhipidophorus paradoxus. Economy very fully recapitulated, in connection with *Vespa germanica* and *vulgaris*: A. Rouget, M m. Ac. Dijon (3), i. pp. 229-264. The dark var. appears to occur with the latter species; *id.* Pet. Nouv. p. 336. The varieties very fully discussed; *id.* l. c. pp. 351-353.

Clinops spectabilis, sp. n., Schaufuss, Nunq. Ot. ii. (1872) p. 276, Antioch.

Rhipidophorus raffrayi, sp. n., Fairmaire, R. Z. (3) i. p. 342, Boghari.

Emenadia inferna, sp. n., Schaufuss, l. c. p. 277, Caffraria.

STYLOPIDÆ.

Xenus vesparum. Economy in connection with *Polistes gallicus* and *diadema* fully discussed: A. Rouget, *l. c.* pp. 265-276.

CANTHARIDÆ.

The larva of a supposed Vesicant, found attached to *Anthia cavernosa*, is described and figured in detail by Gerstäcker, in V. d. Decken's *Reisen*, iii. pt. 2, pp. 211-217, pl. xi. figs. i.-i.d. It probably belongs to an unknown genus, and its affinities with the larvæ of *Sitaris*, *Meloe*, and *Lytta* are discussed.

Mylabrides.

DE MARSEUL, *Mém. Liége* (2), iii. pp. 333-662, pls. i.-vi., monographs this group. In addition to the sub-genera *Lydoceras* and *Ceroctis* (both treated as new, but established by the author in L'Ab. vii. 1870 [*cf.* *Zool. Rec.* vii. p. 302]), and the latter of which now comprises 9 known and 5 new species), a new sub-genus, *Mimesthes*, is established, pp. 548 & 566, in which the thorax is transverse-quadrangle, with no constriction, the elytra are flattened on the back and truncate at apex, with a projecting sutural angle, and the 3 apical joints of the antennæ coalesce, as in *Coryna*. *M. maculicollis*, sp. n., p. 567, pl. ii. fig. 76i, Cape of Good Hope. The author figures *Mylabris* (*Lydoceras*) *fasciata*, F., pl. i. figs. 1-16, *M. zonata*, Klug, pl. i. fig. 5, *M. lactea*, Mars., pl. i. fig. 93, *M. audouini*, Mars., pl. i. fig. 94, *M. litigiosa*, Chev., pl. ii. fig. 16, *M. baulnii*, Mars., pl. ii. fig. 19, *M. dejeani*, Gyll., pl. ii. fig. 63, *M. myrmidon*, Mars., pl. ii. fig. 107, *Decatoma cæruleomaculata*, Redt., pl. ii. (ii. 18), *Coryna confluens*, Reche., pl. i. (iii. 18), *C. lata*, Reche., pl. ii. (iii. 17), giving also figures of details (chiefly elytral patterns) of upwards of 200 species. Some species are treated as new, although already characterized by the author in L'Ab. vii.

Mylabris prestans, Gerst., fig. 8, *amplectens*, G., fig. 9, *callicera*, G., fig. 10, *kersteni*, G., fig. 11, *deckenii*, G., fig. 12, *dorsalis*, G., fig. 13, *ambigua*, G., fig. 14, *parenthesis*, G., fig. 15; Gerstäcker, V. d. Decken's *Reisen*, iii. pt. 2, pl. x.

Mylabris jugatoria, Reche., new to the Algerian fauna: Raffray, *R. Z.* (3) i. p. 381.

Mylabris euphratica,⁵Mars., = *scabiosæ*, Ol., *ex. typ.*; Desbrochers, *MT. schw. ent. Ges.* iv. p. 196.

Mylabris transversalis, p. 400, Caffraria, Egypt, *scalaris*, p. 407, S. Africa, *hybrida*, p. 418, N'Gami, Natal, *abyssinica*, p. 424, Abyssinia, *bipartita*, p. 427, Mauritius, Caffraria, *palliatæ*, p. 433, Caffraria, *dispar*, p. 435, S. Africa, *gamicola*, p. 436, N'Gami, *nubica*, p. 439, Senegal, Nubia, *vicinalis*, p. 441, Chartum, *bihumerosa*, p. 442, Senegal, *orientalis*, p. 451, E. India, *rajah*, p. 452, Moradabad, *rutilipubis*, p. 453, Dinapore, *batesi*, p. 455, pl. i. fig. 36i, E. India, *trifolia*, p. 461, *testudo*, p. 462, *zigzaga*, p. 466, Caffraria, *scakopina*, p. 477, Svakop, *picteti*, p. 480, Interior of S. Africa, *macilentæ*, p. 489, Himalaya, *basibicineta*, p. 497, N'Gami, *tibialis*, p. 499, Senegal, *spuria*, p. 500, *bohemannii*, p. 558, Caffraria, *holosericea*.

p. 502, Senegal, *connexa*, p. 505, Cape of Good Hope, *dohrni*, p. 506, Bombay, *bicincta*, p. 521, N'Gami, *bella*, p. 539, Senegal, *amphibia*, p. 559, *exclamationis*, p. 562, Angola, *bivittata*, p. 560, S. W. Africa, De Marseul, *l. c.*; *M. aperta*, Gerstäcker, *l. c.* p. 311, Dafeta, Dschagga Land; *M. gemmula* and *plurivulnera*, N. Persia, C. A. Dohrn, S. E. Z. xxxiv. p. 73 (*M. gemmula* = *pallasi*, Gebl.; *id. op. cit.* p. 322); *M. hirtipennis*, p. 379, *boghariensis*, p. 380, pl. xv. fig. 1, Boghari, Raffray, *l. c.*; *M. uhagoni*, Martinez y Saez, An. Soc. Esp. ii. p. 66, pl. i. fig. 6, Cuenca, Escorial: spp. nn.

Decatoma decipiens, p. 574, *nigricornis*, p. 577, *histrion*, p. 581, Cape of Good Hope, *omega*, p. 585, Caffraria, Marseul, *l. c.* spp. nn.

Coryna guine[e]nsis, p. 599, Guinea, *cinctuta*, p. 600, *apicipustulata*, p. 602, *mixta*, p. 605, *wahlbergi*, p. 612, Caffraria, *posthuma*, p. 603, *tergemina*, p. 613, Angola, *mauritiana*[na], p. 610, Mauritius, *id. l. c.*, spp. nn.

Actenodia amena, p. 621, pl. i. (iv. 1), *villosa*, p. 625, Cape of Good Hope, *rufinigra*, p. 628, Caffraria, *id. l. c.* spp. nn.

Cantharides.

G. H. Horn, P. Am. Phil. Soc. xiii. pp. 88-117, revises the species of *Macrobasis* (with which he unites *Apteropasta*, Lec.), *Epicauta*, *Cantharis*, and *Pomphopœa* found in the United States. *M. luteicornis*, Lec., = *albida*, Say, ♂; *M. debilis* and *murina*, Lec., = *cinerea*, F. (*nec* Forst.), varr., and *unicolor*, K., is adopted instead of *fabricii*, Lec., for it; *M. fulvescens*, Lec., = *articularis*, Say, = *immaculata*, Say; *M. valida*, Lec., = *segmentata*, Say. *E. nigricornis*, Mels., = *strigosa*, Sch.; *E. immerita*, Walk., ? = *sericans*, Lec.; *E. conspersa*, Lec., = *maculata*, Say; *E. morio*, Lec., = *pennsylvanica*, Deg. *C. cooperi*, Lec., = *vulnerata*, Lec., var.; *C. fulgifer*, Lec., = *nuttali*, Say; *C. salicis*, Lec., = *cyanipennis*, Lec.; *C. fulvipennis*, Lec., = *cardinalis*, Chev.; *C. dolosa*, Lec., = *smaragdula*, Lec., = *stygica*, Lec.; *C. chalybea*, Lec., = *sphaericollis*, Say. *P. femoralis*, Lec., = *polita*, Say; *P. tarsalis*, Bland, = *filiformis*, Lec., = *nigricornis*, Lec., = *enea*, Say.

Cantharis vesicatoria. In the early stages, the individuals contain no cantharidine. Gazette médicale de Bordeaux, ii. (1873), No. 12.

Cantharis suturella, Mots., described from the Amur, occurs also in Japan. S. A. de Marseul, Ann. Soc. Ent. Fr. (5) iii. p. 221 (re-described, p. 229).

Eletica gigantea, sp. n., C. A. Dohrn, S. E. Z. xxxiv. p. 70, Assam, Bengal.

Epicauta caviceps, p. 99, Arizona, *funebri*, p. 102, Texas, Horn, *l. c.*; *E. wheeleri*, Ulke, "Explorations in Nevada and Arizona Expedition of 1871" (Horn, *l. c.* pp. 101 & 107, note), Arizona; *E. gorhami* [*gorhami*], Marseul, *l. c.* p. 227, Japan: spp. nn.

Cantharis lugubris, Ulke, *l. c.* (Horn, *l. c.* p. 107), California; *C. frontalis*, ? Chili, *griseinigra*, Tucuman, *luctifera*, Monte Video, Fairmaire, Ann. Mus. Genov. iv. p. 534; *C. antennalis*, Marseul, *l. c.* p. 230, E. India; *C. (?) philippii*, E. C. Reed, Ent. M. M. ix. p. 208, N. Chili: spp. nn.

Zonitis cothurnata, sp. n., Marseul, *l. c.* p. 228, Japan.

Sitarides.

Sitaris colletis, sp. n., V. Mayet, Bull. Soc. Ent. Fr. (5) iii. p. cxcviii. Montpellier, parasitic on *Colletes* sp. n. (cf. Lichtenstein, l. c. pp. xx. & xxi.).

CEDEMERIDÆ.

Nacerdes saundersi, sp. n., E. C. Reed, Ent. M. M. ix. p. 208, N. Chili (= *N. servillii*, Fairm. & G., nec Sol.).

Anoncodes versicolor, sp. n., Chevrolat. Ann. Soc. Ent. Fr. (5) iii. p. 205, Syria.

Mecopselaphus lycoides, sp. n., Kirsch, B. E. Z. xvii. p. 416, Peru.

Stenaxis vittata, sp. n., *id. ibid.* Peru.

CURCULIONIDÆ.

G. H. HORN'S "Contributions to a Knowledge of the Curculionidæ of the United States" (P. Am. Phil. Soc. xiii. No. 91, pp. 407-469) are intended as a commencement of a systematic study of the indigenous species, the genera being left to Leconte. The first part contains the *Calandrides* and *Cossonides* (the remainder being devoted to isolated genera of other groups); in which, as in all the "*Brachyrhynques*" examined, the author finds a departure from the sexual rule, prevailing in most "*Mecorhynques*," that the ♂ should have 8 and the ♀ 7 dorsal abdominal segments. In *Ithycerus noveboracensis*, the ♂ has apparently 6 segments and the ♀ 5; and the pygidium projects markedly.

W. ROELOFS, Ann. Ent. Belg. xvi. pp. 154-193, pls. ii. & iii., commences to describe the species found in Japan by G. Lewis (except the *Cossonides*).

VAN SEGVELT, CR. Ent. Belg. xvi. pp. cxlv. & cxlvi., notes various species new (or rare) for the Belgian fauna.

Brachyderides.

Cheorhinus viridimetallicus, Mots., is a *Catapionus* (generic characters amended); Roelofs, l. c. p. 155.

Liophleus maroccanus, Fairm., is a *Barynotus*; *B. maculatus*, Boh., = *margaritaceus*, Germ., var.; Desbrochers, MT. schw. ent. Ges. iv. p. 196 (Stierlin, *ibid.* note, contradicts the latter statement). *Brachyderes quercus*, Chavign., *ex. typ.*, = *pubescens*, Boh.; *id. l. c.* p. 197.

Sitones. L. Bedel, Bull. Soc. Ent. Fr. (5) iii. pp. l.-lii., indicates food plants of various common species, and gives differential characters for *S. ononidis*, Sharp, and *S. suturalis*. He mentions the interocular setæ as assisting in diagnosis. *S. punctiger*, Thoms., 1868, = *puncticollis*, Steph.; *id. l. c.* p. lxxxvii. [this identification already made by Thomson. Opusc. Ent. iv. p. 390, Zool. Rec. ix. p. 285; the synonymy is also indicated by the Recorder, *op. cit.* vii. p. 304]. *S. punctiger*, Woll., 1863, = *bituberculatus*, Mots.; *id. ibid.* *S. ocellatus*, Küst., has nothing to do with *gemellatus*, Gyll., as Kraatz has stated, but also = *bituberculatus*, Mots.; *S. niger*, All., is distinct from *ellipticus*, All.; *S. cinerascens*, Fahr., = *cambricus*, Steph., var.; larvæ supposed to belong to *S. cambricus* and *water-*

housii are recorded from old roots of *Lotus corniculatus*; and observations are made on the food plants of *S. regensteinensis*, *tibialis*, *cambricus*, *griseus*, and *gressorius*: *id. l. c.* pp. ccxxviii. & ccxxix.

Thylacites congener, Desbr., has nothing to do with *persulcatus*, Fairm.; Desbrochers, Bull. Soc. Ent. Fr. (5) iii. p. ccxvi.

Amomplus dissimilis, Desbr., = *vestringi*, Küst. (*nec* Schön., which is *concinus*, Küst.); Harold, C. H. xi. p. 135.

Syntapoplus cervinus, Gerst., fig. 2, *Siderodactylus falciger*, G., fig. 3; V. d. Decken's Reisen, iii. pt. 2, pl. xi.

Ottistira, Pasc., should be placed near *Psolidium*, but is still more aberrant. Its members are very variable. H. Jekel, Ann. Soc. Ent. Fr. (5) iii. p. 272.

Rhinognathus, g. n., (? Fairmaire) R. Z. (3) i. p. 343. Very near *Strophosomus*, but with highly developed mandibles, the joints of the funiculus short, compact, almost merging in the club, the suture of 1st abdominal segment slightly angulated, scrobes shorter, and eyes less round and less prominent. *R. globulatus*, sp. n., Fairmaire, *l. c.* p. 344, Bône.

Septicus, g. n., Roelofs, *l. c.* p. 158. True *Brachyderides*: near *Eury-metopus* and *Prosayleus*. *S. insularis*, sp. n., *id. l. c.* p. 159, pl. ii. figs. 1, 1a, Japan.

Amystax, g. n., *id. l. c.* p. 159. Facies of *Piazomias*; next *Prosayleus*. *A. fasciatus*, sp. n., *id. l. c.* p. 160, pl. ii. figs. 2, 2 a & b, Japan.

Catapionus modestus, p. 156, *clathratus* and *gracilicornis*, p. 157, *id. l. c.* Japan, spp. nn.

Strophosomus (Neliocarus) elongatus, sp. n., Martinez y Saez, An. Soc. Esp. ii. p. 414, pl. xiii. fig. 5, La Palma.

Sitones japonicus, sp. n., Roelofs, *l. c.* p. 160, Japan.

Piazomias tigrinus, p. 161, Japan and Formosa, *griseus*, p. 162, Japan, *id. l. c.* spp. nn. (possibly forming a new genus).

Chlorophanus grandis, sp. n., *id. l. c.* p. 162, Japan.

Geonomus olcesii, sp. n., Tournier, MT. schw. ent. Ges. iv. p. 170, Tangers.

Evas lineatus, sp. n., Pascoe, Ann. N. H. (4) xi. p. 179, Queensland.

Otiorhynchides.

DE MARSEUL, L'Ab. pp. 105-452 (separate pagination), continues his compiled monograph of this group [Zool. Rec. ix. p. 286], completing the first part, including all the genus *Otiorhynchus*. This first part is supposed to form vol. x. of 'L'Abeille' (vol. iv. of the 2nd series), which bears 1872 on the title and separate sheets, the concluding one of which was issued in 1874. *O. montanus*, Chevr., *nec* Schön., is re-named *montigena* (p. 173); *O. affinis*, Stierl., *nec* Dej., is re-named *assimilis* (p. 201); *O. rudis*, Stierl., *nec* Sch., is re-named *rodus* (p. 220); *O. squamifer*, Boh., *nec* F., is re-named *squamulifer* (p. 244); and other changes in nomenclature are made, which are not noticed here for the reason stated in Zool. Rec. viii. p. 299.

Diatmetus premorsus, Gerst., fig. 4, *Chaunoderus stupidus*, G., fig. 5, *Sphrigodes margaritaceus*, G., fig. 6, *Systates pollinosus*, G., fig. 7, S.

amplicollis, G., fig. 8, *Peribrotus pustulosus*, G., fig. 9; Gerstäcker, in V. d. Decken's Reisen, iii. pt. 2, pl. xi.

Otiorhynchus. Stierlin, B. E. Z. xvii. pp. 261-292. gives an analytical table of the known species. *O. jovis*, Mill., ? = *prolongatus*, Stier.; *O. decussatus*, Hoch., ? = *tomentifer*, Boh. *O. tenebricosus* doubtful as British: E. C. Rye, Ent. M. M. ix. p. 269. *O. blandus*, Sch., nec *monticola*, Germ., occurs in Britain: D. Sharp, *op. cit.* p. 290.

Omius lepidotus, Perris, is a *Foucattia*; Perris, Nouv. et faits, 1873, p. clxv.

Trachyphleus maculatus, Perris, = *setiger*, Seidl.; Marseul, Nouv. et faits, 1873, p. clxv. *T. alternans* occurs at roots of *Helianthemum vulgare*: W. Tylden, Ent. M. M. ix. p. 290.

Arrhaptogaster, g. n., Roelofs, Ann. Soc. Ent. Belg. xvi. p. 163. *Celeuthetides*: near *Celeuthetes*, but with different antennæ, elytra, and abdomen, and the metasternum like that of *Siteytes*. *A. pilosus*, sp. n., *id. l. c.* p. 164, pl. ii. figs. 3, 3a & b, Japan.

Myosides, g. n., *id. l. c.* p. 164. *Trachyphlæides*: near *Scoliocerus*, but with different rostrum and scrobes. *M. seriehispidus*, sp. n., *id. l. c.* p. 165, pl. ii., figs. 4, 4a, Japan.

Trachyphleops, g. n., *id. l. c.* p. 165. No differential remarks made. *T. setosus*, sp. n., *id. l. c.* p. 166, pl. ii. fig. 5, Japan.

Hyperstylus, g. n., *id. l. c.* p. 171. *Phyllobiides*: differs from *Myllocerus* in the form of the scape and rostrum, and in its non-dentate femora. *H. pallipes*, sp. n., *id. l. c.* p. 172, pl. ii. figs. 6, 6a, Japan.

Otiorhynchus jaenensis, p. 268, note, Andalusia, *brucki*, p. 281, note, Greece, *ledereri*, p. 286, note, Asia Minor, Stierlin, *l. c.*; *O. amputatus*, Chevrolat, in De Marseul's Monogr. pt. 1, p. 174, Spain; *O. tenuicornis* (Miller), De Marseul, *op. cit.* p. 383, Styria; *marseuli* (Stierlin), *id. l. c.* p. 400, locality unknown; *paradoxus* (Stierlin), *id. l. c.* p. 401, Syria; *allardi* (Stierlin), *id. l. c.* p. 405, Algeria: spp. nn.

Holcorhinus otiorhynchoides, sp. n., Fairmaire, R. Z. (3) i. p. 344, Bône.

Phyllobius longicornis, p. 166 (? = *prolongatus*, Mots.), *rotundicollis*, p. 167, Roelofs, *l. c.* Japan, spp. nn.

Myllocerus variabilis, *castaneus*, p. 168. *nigrimaculatus*, p. 169, *griseus*, *elegantulus*, p. 170, *viridulus*, p. 171, Japan, *id. l. c.* spp. nn.

Arhinus [*Arrhines*] *callizonatus*, sp. n., Fairmaire, Ann. Soc. Ent. Fr. (5) iii. p. 392, Algeria.

Systates conspersus, sp. n., Gerstäcker, *l. c.* p. 232, note, Tette, Mosambique.

Eremnides.

Canoixus, g. n., Roelofs, Ann. Ent. Belg. xvi. p. 172. *Cyphicerides*: allied to *Cyphicerus*, differing in the form of the rostrum, especially of the scrobes, and in the posterior corbels being open. *C. japonicus*, sp. n., *id. ibid.* pl. iii. figs. 7, 7a, Japan (and various species usually referred to *Cyphicerus*).

Anosimus, g. n., *id. l. c.* Nearer *Cyphicerus* than the preceding: lobes of prothorax very weak. *A. decoratus* (pl. iii. figs. 8, 8a) and *pallidus*, spp. nn., *id. l. c.* p. 174, Japan.

Calomycterus, g. n., *id. l. c.* p. 175. Placed in the *Cyphicerides* from the width of its rostrum; but with the facies of the true *Eremnides*. *C. setarius*, sp. n., *id. ibid.* pl. iii. figs. 9, 9a, Japan.

Phytoscaphus ciliatus, sp. n., *id. l. c.* p. 176, Japan.

Leptopides.

Curculio clavus, F., is a *Leptops*; *L. hopii*, Fahr., = *squalidus*: F. P. Pascoe, Ann. N. H. (4) xii. p. 231.

Cyphometopus, Blanch., belongs to the *Strangalioidides*: H. Jekel, Bull. Soc. Ent. Fr. (5) iii. p. cxxxviii.

Pseudocneorhinus, g. n., Roelofs, *l. c.* p. 177. Scrobes touching lower angle of eye at their hinder edge; tarsi soldered, as in *Tropidophorus*. *P. obesus*, sp. n., *id. ibid.* pl. iii. figs. 10, 10a, Japan.

Leptops argillaceus, Queensland, and *musimon*, Rockhampton, p. 231, *muricatus*, Nicol Bay, p. 232, Pascoe, *l. c.* spp. nn.

Brachycerides.

Brachycerus atrox, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. xi. fig. 10.

Byrsopides.

Entomoderus [*Entomoderes*, Sol.], sub-g. n. of *Rhytidorhinus*; Raffray, R. Z. (3) i. p. 383. Anterior tibiæ deeply incised, with two large apical spines, the outer one very robust, &c. *R. sabulicola*, sp. n., *id. l. c.* p. 382, Boghari.

Rhytidorhinus kirschi, p. 170, Upper Egypt, *similaris*, p. 171, Tan-giers, spp. nn., Tournier, MT. schw. ent. Ges. iv.

Gronops pretiosus, sp. n., *id. l. c.* p. 172, Morocco, Portugal.

Rhyparosomides.

Dysostines cellaris, sp. n., Pascoe, *l. c.* p. 232, Sydney.

Dichotrachelus koziorowiczi, sp. n., Desbrochers, Bull. Soc. Ent. Fr. (5) iii. p. cxix., Corsica.

Cylindrorhinides.

Ocynoma, g. n., Pascoe, Ann. N. H. (4) xii. p. 233. Differs from *Perperus* in having no ocular lobes, and in the greater length of the scape. *O. antennata* and *cordipennis*, spp. nn., *id. l. c.* p. 234, Swan River.

Decienus, g. n., *id. l. c.* p. 234. Facies of *Prosayleus*, but phanerognathous. *D. sphasodes*, sp. n., *id. l. c.* p. 235, W. Australia.

Perperus urticarum, p. 232, Queensland, *variegatus*, p. 233, Rockhampton, *id. l. c.* spp. nn.

Listroderes superbus, sp. n., Reed, An. Univ. Chil. xli. p. 354 (May, 1872), and Ent. M. M. ix. p. 209 (Feb. 1873), South Chili.

Molytides.

Aphela, *Emphyastes*, and *Psaldus*, should form a separate sub-family near the present one. Pascoe, *op. cit.* xi. p. 179.

Liosomus oblongulus, Boh., and var. n. *collaris* of *L. ovatulus* described, both from England: E. C. Rye, Ent. M. M. ix. p. 242, x. p. 138.

Molytes lewisi, sp. n., Roelofs, Ann. Ent. Belg. xvi. p. 178, Japan.

Liosomus troglodytes, sp. n., E. C. Rye, *op. cit.* x. p. 136, England.

Trachodes ægypticus, sp. n., Tournier, MT. schw. ent. Ges. iv. p. 173, Upper Egypt.

Psaldus ammodytes, sp. n., Pascoe, *l. c.* Champion Bay.

Scythropides.

Eugnathus distinctus, sp. n., Roelofs, *l. c.* p. 179, Japan.

Scythropus desbrochersi, Raffray, R. Z. (3) i. p. 382, Boghari; *S. scutellaris*, Roelofs, *l. c.* Japan: spp. nn.

Gonipterides.

Oxyops mastersi, N. S. Wales, *memnonius*, Champion Bay, p. 235, *calidus* and *pruinus*, p. 236, Nicol Bay, *meles*, p. 236, *sparsutus* and *rutilus*, p. 237, Champion Bay, *floreus*, p. 237, W. Australia, Pascoe, *op. cit.* xii. spp. nn.

Syarbis semilineatus, W. Australia, *nervosus*, Queensland, *id. l. c.* p. 238, spp. nn.

Pantorites cretatus, Champion Bay, *breweri*, Swan River, *id. l. c.* p. 239, spp. nn.

Hyperides.

Hypera (Phytonomus) subcostatus, Cap., occurs in Japan; Roelofs, *l. c.* p. 180.

Pheopholus, g. n., *id. l. c.* Very close to *Chloropholus*, but smaller. Allies the species of Madagascar and Cochin China with the European *Hypera*. *P. ornatus*, sp. n., *id. l. c.* p. 181, pl. iii. figs. 11, 11a, Japan.

Hypera acacie, sp. n., Pascoe, *op. cit.* xi. p. 180, Queensland.

Prophesia confusa, sp. n., *id. ibid.* Tasmania.

Aterpides.

Rhinaria perdis, Victoria, *fasciata*, interior of Australia, Pascoe, *op. cit.* xii. p. 278, spp. nn.

Æsiotes (removed from vicinity of *Leptops*, as the maxillæ are not covered by the mentum) *leucurus*, p. 278, Sydney, *morosus*, p. 279, Victoria, *id. l. c.* spp. nn.

Cleonides.

Capiomont's monograph of part of this family is commenced after his death, under the supervision of C. E. Leprieur, Ann. Soc. Ent. Fr. (5) iii. pp. 273-296. A group named *Rhinocyllides* is discussed, composed of *Rhinocyllus* and a new genus [it is very doubtful, from the preliminary observations, whether the novelties must not be considered as published solely by Leprieur]. *R. olivieri*, Gyll., and *latirostris*, Latr., = *antiodontalgicus*, Gerbi, varr.

Cleonus mitis, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. xi. fig. 11.

Celostethus [Dej., Col.], g. n., Capiomont, *l. c.* p. 275. Pectus considerably excavated in front of the anterior coxæ; the sides of the excavation projecting, auriculate, the bottom smooth. *Rhinocyllus plani-*

frons, Dej., and *provincialis*, Fairm.; also *C. villosus*, p. 279, Algeria, and var. *hispanicus*, p. 280, Spain, *siculus*, Sicily, *diecki*, S. Spain, p. 282, *orientalis*, p. 283, Austria and Turkey, and var. *smyrnenensis*, p. 284, Smyrna. *id. l. c.* spp. nn.

Stolatus, g. n., Mulsant and Godart, Ann. Soc. L. Lyon (n. s.) xx. p. 44. Aspect of *Tychius*; allied to *Larinus* and *Rhinocyllus*. *S. nicolasi*, sp. n., *id. l. c.* p. 46, Beaucaire [is a *Larinus*; ? *crinitus*, Boh.: Desbrochers, MT. schw. ent. Ges. iv. p. 197].

Cleonus bisignatus, p. 181, *acutipennis*, p. 182, spp. nn., Roelofs, Ann. Ent. Belg. xvi. Japan.

Rhinocyllus schenherri, p. 288, Caucasus, *oblongus*, p. 290, Greece, Turkey, Algeria, Spain, Capiomont, *l. c.* spp. nn.

Microlarinus humeralis, sp. n., Tournier, MT. schw. ent. Ges. iv. p. 174, Upper Egypt.

Larinus crassus, C. A. Dohrn, S. E. Z. xxxiv. p. 74, N. Persia; *L. griseipilosus*, p. 182, *latissimus*, *ovalis*, p. 183, Roelofs, *l. c.* Japan: sp. nn.

Lixus depressipennis, p. 184, *impressiventris*, *maculatus*, p. 185, spp. nn., Roelofs, *l. c.* Japan.

A. CHEVROLAT, Mém. Liège (2) v. pp. i.-viii., 1-118 [see *Antarctiides*, supra, as to date of publication], in a memoir upon the *Cleonides*, not intended as a monograph, divides the species into 'Faux Cléonides' (*Epirhynchus*, *Leucochromus*, and *Hypsosternus*), with simple detached claws, and *Bothynoderides*, *Conorhynchides*, *Cossinoderides*, and true *Cléonides*, in which the claws are approximate at the base or connate. *Cleonus dehaani*, Sch., is a *Peribleptus*; *C. ornatus*, Reiche, = *Lixus pulvisculosus*, Boh.; *C. soricinus*, Mars., is also a *Lixus*. *Bothynoderes conicicollis*, Gyll., nec Ol., is re-named *meridionalis*, p. 13 [Olivier's insect is a *Temnorhinus*, teste Chevrolat; Gyllenhal's species, therefore, apparently does not require re-naming]; Fahræus's var. of *B. vecatus*, Sch., from W. Siberia, is named *lugens*, p. 14. *Stephanocleonus marginatus*, Fisch., *pruinosis* and *hexastictus*, Sch., given as distinct in the catalogue, are considered conspecific in the text, p. 26; *S. rubrifrons* and *fossulatus*, Fisch., are specifically distinct, as are *Cyphocleonus adumbratus*, Sch., and *trisulcatus*, Hbst. All Motschoulsky's genera are adopted, and 17 more characterized as new; but the author unconsciously anticipates the instability of these groups by renaming various well-known species, because of others of prior date, though the latter are referred by him to different genera. He gives a Catalogue, with localities, bibliographical references, and much synonymy, pp. 99-113; a table of doubtful species, and a table of geographical distribution.

The following new genera and species are characterized:—

Exochus, p. 2. *Bothynoderides*: eyes straight in front, rounded behind; joints 1 & 2 of posterior tarsi triangular, rather wide. Type, *Leucochromus gigas*, Mars., also *Cleonus ellipticus* and *basigranatus*, Fairm., *C. anxius*, Sch., and *E. latus*, p. 3, Siberia, *simplicirostris* and *persicus*, p. 4, Persia, spp. nn.

Plagiographus, p. 21. *Bothynoderides*: no differential characters given. Type, *Cleonus fastigiatus*, Er. (according to Catalogue), *nebulosus*, L., and many other known species; also *P. albirostris*, Egypt, *podolicus*.

Podolia, p. 23, *lethierryi*, p. 24. Reinoso, *graellsii*, p. 25, Spain, France, spp. nn.

Stephanophorus, p. 39. *Conorhynchides*: no differential characters given (? = *Entymetopus*, Mots.). Type, *Cleonas roridus*, Pall.

Tennorhinus, p. 41. *Conorhynchides*: rostrum longitudinally keeled in the middle, deeply emarginate at apex. Type, *Cleonus mimosæ*, Ol.; also *C. jekeli*, Woll., = *orbitalis*, Fhs., = *conicicollis*, Ol., and other known species; and *T. pilosus*, p. 42, *kirguisicus*, p. 43, Kirguise Steppes, *rufulus*, p. 43, Kordofan, *saucerottii*, Sennaar, *albifimbriatus*, Algeria, p. 44, *egyptius*, p. 45, Egypt, spp. nn.

Cossinoderus, p. 49. No rostral keel; a small pit between the eyes. Type, *Lixus candidus*, Ol.

Pycnodactylus, p. 50. Allied to *Leucomigus* and *Conorhynchus*, but with different rostrum and tarsi. Type, *C. pacificus*, Ol.; also *tomentosus*, Sch., *cretosus*, Fairm., and *P. fuscoirroratus*, sp. n., p. 51, Persia (the 3 last all one species, and queried as not distinct from the first; Desbrochers, MT. schw. ent. Ges. iv. p. 197).

Cylindropterus, p. 57. True *Cleonides*. *C. luxerii*, sp. n., p. 58, Egypt, Syria.

Trachydemus, p. 59. Type, *Pachycerus rugosus*, Luc.

Centrocleonus, p. 62. Type, *Cleonus fallax*, Sch.

Tetragonothorax, *ibid.* Type, *C. retusus*, F.

Gonocleonus (Jekel, MS.), p. 63. Type, *C. helferi*, Chev., and *C. angulatus*, sp. n., p. 64, Oran.

Neocleonus, p. 66. Type, *C. mucidus*, Germ., and other African species; also *N. frater*, p. 67, *hypocrita*, p. 75, Pondicherry, *consimilis*, p. 68, Benguela (? = *C. velatus*, Gyll., var.), *coquereli*, Madagascar, *costulatus*, ? Senegal, p. 69, *pudendus*, p. 70, Senegal, Kordofan, *thibetanus*, p. 71, Thibet, *bimaculatus*, Siam, *orientalis*, China, E. India, p. 72, *zebra*, p. 73, E. India, Ceylon, *rufrostris*, p. 74, Senegal, *sordidus*, Amboina, *trifasciatus*, White Nile, p. 76, spp. nn.

Apleurus, p. 78. *A. fossus*, *ibid.*, *boucardi*, p. 79, Mexico, *quadri-lineatus*, p. 80, Texas.

Pseudocleonus, p. 88 (= *Oosomus*, Mots., nec Sch.). Type, *C. cinereus*, F., = *costatus*, F.

Priorhinus (script. *Prionorhinus*, p. 112), p. 91. Type, *Lixus canus*, Wied.

Cnemodontus, p. 92. Type, *C. limpidus*, Gyll.; also *Pachycerus sparsus*, Sch., re-named *denominandus*, p. 92, because of *C. sparsus*, Gyll. [which the author himself states to be a *Cyphocleonus*], and *Cn. gypsatus* and *oblongus*, spp. nn., p. 93, Cape of Good Hope.

Xanthochelus, p. 94. Winged, with florescence as in *Lixus*; form of certain *Larini*. Type, *X. canescens*, p. 95, Egypt (*C. cinerascens*, Dej. Cat.), *longus*, ? Syria, *niloticus*, Upper Egypt, p. 96, *montivagus*, Siberia, *calestis*, China, p. 97, spp. nn., and, among other known species, *Cleonus mixtus*, Sch. [re-named *sulphurifer*, p. 95, because of *C. mixtus*, F., which the author states, *l. c.*, to be a *Pachycerus*, and at p. 110 places in *Rhabdorhynchus*, Mots.].

Bothynoderes sareptensis, Sarepta, *nigricinctus*, S. Russia, p. 8, *menetriesi*, Turcomania, *betavorus* [*betiv-*], Crimea, Caucasus (larva very injurious to

beetroot ; imago devours other larvæ on that plant, p. 6), p. 9, *caucasicus*, p. 10, Caucasus, *crotchi*, p. 11, Carthage, *uniformis*, *hispanus*, p. 12, Spain, *fissirostris*, p. 14, N. Persia, *maculicollis*, p. 15, Malta, *genæi*, p. 18, *mus*, p. 20, Sardinia, *peregrinus*, p. 19, Montpellier, *angulicollis*, p. 20, Turkey.

Stephanocleonus anceps, p. 27, *marginiguttatus*, (? præc. var.), p. 28, *loratus*, p. 31, *foveifrons*, p. 34, *indutus*, p. 35, Mongolia, *deportatus*, p. 29, E. Siberia, *lineirostris*, p. 30, Dauria, *mannerheimi*, p. 32, Kiakhtha, *semicostatus*, *niveus*, p. 33, Siberia.

Conorhynchus plumbeicollis, S. E. Russia, *lacerta*, Caucasus, p. 46, *gibbirostris*, N. Persia, *pistor*, Syria, p. 47, *fahrei*, p. 49, Tartary.

Eumecops spicatus, p. 52, Siberia.

Leucomigus lucasi, p. 53, Algeria, *cristatus*, p. 98, S. W. Africa.

Liocleonus umbrosus, p. 57, E. India.

Porocleonus insidiosus, p. 61, Sarepta (? = *scrobicollis*, Mots.).

Leucosomus heros, p. 66, S. Algeria.

Pachycerus echii, p. 81, France (= *albarius*, Gyll., var.; Desbrochers, l. c.), *abeillii*, p. 82, Marseilles.

Rhabdorhynchus seriegranosus, p. 86, Oran.

Mecaspis albivirgatus, p. 87, Algeria.

Cyphocleonus achatesides, p. 90, Sarepta.

Hylobiides.

Hylobius abietis, L., var., occurs in Japan; Roelofs, Ann. Ent. Belg. xvi. p. 187.

Scaphostethus, g. n., *id. l. c.* p. 191. Differs from *Hylobius* in its prosternum being excavated, with projecting borders; hooks of tarsi appendiculated, as in *Niphades*, Pasc. *S. variegatus*, sp. n., *id. l. c.* p. 192. pl. iii. figs. 12, 12a-c, Japan.

Lepyryus japonicus, sp. n., *id. l. c.* p. 186, Japan.

Hylobius signatipennis, p. 187, *rectirostris*, *perforatus*, p. 188, *cribratus*, *elongatus*, p. 190, *id. l. c.* Japan; *H. sparsutus*, p. 175, *longicollis*, p. 176, Morocco, Tournier, MT. schw. ent. Ges. iv.: spp. nn.

Orthorhinus tenellus, p. 180, Champion Bay, *infidus*, Richmond River, *carinatus*, Wide Bay, p. 181, Pascoe, *op. cit.* xi. spp. nn.

Eirrhinides.

Pascoe, l. c. pp. 182 & 182, tabulates the known Australian genera, following Lacordaire, but considers that the *Cryptoplides* and *Storeides* of that author should be united with his true *Eirrhinides*. The New Zealand genera *Hoplocneme* and *Stephanorhynchus* are widely separated from all Australian forms. *Bagous* occurs in Australia.

Auchmeresthes, Ktz., does not belong to the *Brachyderides*, but to this group, near *Eugnomus*. *Metacinops*, Ktz., does not belong to the *Otiorynchides*, but should also be placed near the *Eugnomides*, to which *Eutecheus*, Sch., and *Macropoda*, Montr., are also to be referred. H. Jekel, Bull. Soc. Ent. Fr. (5) iii. p. cxxxviii.

Bagous brevis, Sch., from England; E. C. Rye, Ent. M. M. ix. p. 242.

Sharpia, g. n., Tournier, CR. Ent. Belg. xvi. p. cxxxvii. Represents

Spermologus, but with the facies of *Dorytomus*; scrobes confluent beneath, eyes meeting beneath, tarsi moderately dilated. *S. heydeni*, Syria, and *grandis*, Persia, indicated as new, but not described, and *Erirhinus rubidus*, Rosenh.

Endaliscus, Kirsch, B. E. Z. xvii. p. 419. *Cryptoplides*: near the N. American *Endalus*, Cast., on account of its 6-jointed funiculus, and to be placed next *Tanysphyrus* in European lists. *E. skalitzkii*, sp. n., *id. l. c.* p. 421, Bohemia.

Pascoe, *l. c.*, describes the following new genera and species:—

Agestra, p. 183. More allied to *Dorytomus* than to any other genus. Femora toothed beneath; 2 basal abdominal segments very short and indistinctly limited. *A. suturalis*, p. 184, Fremantle.

Eniopea, p. 184. Placed provisionally near *Erirhinus*. Antennal club large, loose jointed; 2 basal abdominal segments short, the last one large, forming a pygidium. *E. amœna*, *ibid.*, Fremantle.

Diethusa, p. 185. Rostrum short, suddenly narrowed towards the apex; breast channelled, abdominal segments normal. *D. fervida*, *ibid.*, S. Australia.

Lybæba, p. 186. Rostrum cylindrical, sutures of abdominal segments slightly curved. *L. subfasciata*, *ibid.*, *repanda*, p. 187, Swan River.

Enide, p. 187. Differs from *Lybæba* in its rostrum being bent and narrowed towards the apex. *E. porphyrea*, *ibid.*, W. Australia, *astuans*, Swan River, *saniosa*, Fremantle, p. 188.

Hedyopsis, p. 188. Allied to *Erytenna*, but with no ocular lobes, and the anterior and intermediate tibiæ with two apical spurs. *H. selligera*, p. 189, Champion Bay.

Gerynassa, p. 189. Also allied to *Erytenna*, but with coarsely faceted eyes and subtruncated base to the prothorax. *G. nodulosa*, *ibid.*, W. & S. Australia, *basalis*, p. 190, Gawler.

Dicomada, p. 190. Allied to *Cydmæa*, but with rostrum broader at apex. *D. litigiosa*, *ibid.*, Fremantle, *ovalis*, Swan River, *terrea*, Champion Bay, p. 191.

Paryzeta, p. 191. Differs from *Xeda* in its rostrum being slender and broader at apex, and its elytra narrower. *P. musiva*, p. 192, Champion Bay.

Xeda, p. 192. Differs from *Cydmæa* in its scape impinging on the eye, in the absence of ocular lobes, and in the approximation of the intermediate coxæ. *X. amplipennis*, Swan River, *bilineata*, Champion Bay, *ibid.*

Olanæa, p. 193. Of doubtful affinities. Antennal scrobes præmedian, oblique, abruptly running beneath rostrum; no scales, except beneath. *O. nigricollis*, *ibid.*, Swan River.

Antyllis, *ibid.* General appearance of *Xeda*, but with a 6-jointed funiculus. *A. setosa*, *ibid.*, S. Australia, *griseola*, Swan River, *aurulenta*, Champion Bay, p. 194.

Cyttalia, p. 194. Agrees with *Phrenozemia* in its narrow head gradually passing into the rostrum, but pubescent or pilose, not scaly, and only the hind femora toothed. *C. griseipila*, p. 195, Sydney.

Emplesis filirostris, p. 185, Champion Bay, *storeoides*, p. 186, Queensland.

Phrenozemia lunata, p. 195, W. Australia.

Meriphus coronatus, *ibid.*, W. Australia.

Mecinus leviceps, Sarepta, *reichii*, Algeria, *nasutus*, Calabria, p. lxxxv..
humeralis, Sicily, *fairmairii*, Tangiers, p. lxxxvi. spp. nn., Tournier,
CR. Ent. Belg. xvi.

Bagous curtirostris, sp. n., Fairmaire, B. Z. (3) i. p. 349, Tangiers.

Amalactides.

Brexius lineatus, sp. n., Pascoe, *l. c.* p. 196, Melbourne.

Belides.

Belus cinereus, Blanch., is a *Pachyura*; *P. papulosa*, Pasc., is an
Isacantha, and all 3 genera are distinct: F. P. Pascoe, *op. cit.* xii. p. 280.

Pachyura vestita, sp. n., *id. l. c.* p. 279, N. S. Wales.

Belus ganglionicus, sp. n., *id. l. c.* p. 280, Sydney.

Isacantha exigua, sp. n., *id. ibid.*, Queensland.

Eurhynchides.

Eurhynchus maculatus, sp. n., Pascoe, *l. c.* p. 281, Swan River.

Apionides.

Apion. Diagnostic characters in the underside of the rostrum and the
scutellum are pointed out by Desbrochers, Bull. Soc. Ent. Fr. (5) iii.
pp. cxxxv. & cxxxvi.

Apion pavidum and *flavifemoratum*, ♂, have a sharp tubercle between
the posterior coxæ: C. Brisout, *op. cit.* p. clxxxix.

Apion gautardi, Tourn., is quite distinct specifically from *A. tamarisci*:
H. Tournier, MT. schw. ent. Ges. iv. p. 134.

Apion fagi. A loss of £180 in value of clover seed caused in one year
by this beetle, in a field of 14½ acres: W. H. Herbert, Ent. vi. p. 388.

Otidocephalides.

Otidocephalus americanus, Chevrr., = *myrmecodes*, Say, = *myrmex*, Hbst.;
O. myrmecodes, Chevrr., *nec* Say, is re-named *chevrolati*: G. H. Horn.,
P. Am. Phil. Soc. xiii. p. 450.

Otidocephalus vittatus, p. 448, *ulki*, p. 449, California, *levicollis*, Georgia,
perforatus, Maryland, p. 451; *id. l. c.* spp. nn.

Magdalinides.

Magdalis. The species are all more or less pubescent when recently
captured: *id. l. c.* p. 457.

Magdalis perforata, Georgia, *cuneiformis*, Nebraska, p. 453, *lecontii*,
p. 454, Kansas, California, *salicis*, p. 455, Middle States, *inconspicua*, p. 456,
Pennsylvania; *id. l. c.* spp. nn.

Balaninides.

Say's species can only be determined from Gyllenhal's descriptions of
types sent by him; *Balaninus sayi* and *rectirostris*, Gyll., = *rectus*, Say;
B. nasutus, Say, *rostratus* and *sparsus*, Gyll., = *nasicus*, Say; *B. porrectus*.
Boh., is queried as a *Balaninus*: *id. l. c.* p. 459 *et seq.*

Balaninus brassicæ: parasitic habits in connection with galls of *Nematus gallicola* described by P. Cameron, Scot. Nat. ii. p. 117. The larva spins a thread to assist itself in dropping to the ground: A. Müller, Ent. M. M. ix. p. 192.

Balaninus sericus, Desbr., ? = *pellitus*, Boh., var., and occurs in Switzerland, on oak; Tournier, MT. schw. ent. Ges. iv. p. 178.

Balaninus quercus, p. 458, Texas, N. York, *caryæ*, p. 460, Brooklyn, Horn, l. c.; *B. deyrollii*, Tournier, MT. schw. ent. Ges. iv. p. 177, Imerithia: spp. nn.

Anthonomides.

Orchestes 5-maculatus, Chevr., = *semirufus*, Gyll., var.; Des Loges, Bull. Soc. Ent. Fr. (5) iii. p. cxxi.: De Marseul, *ibid.*, affirms its distinctness: H. Brisout, l. c. p. cxxvii., supports Des Loges's view. *O. 5-maculatus*, Chevr., is a var. of *pubescens*, Stev., with which possibly *O. semirufus*, Gyll., is identical: H. Tournier, MT. schw. ent. Ges. iv. p. 181. *Orchestes 5-maculatus*, Chevr., = *enipontanus*, Gredler, = *semirufus*, Gyll., var.; Kirsch, B. E. Z. xvii. p. 216. *O. semirufus*, Gyll., = *scutellaris*, var., from England; *O. melanocephalus*, Ol., = *alni*, L., var.; E. C. Rye, Ent. M. M. x. p. 18.

Anthonomus discoidalis, sp. n., Tournier, l. c. p. 179, Upper Egypt.

Aubæus strangulatus, sp. n., *id. l. c.* p. 180, Upper Egypt.

Bradybatus sharpi, sp. n., *id. ibid.* E. Siberia.

Orchestes niger, Nova Scotia, Illinois, *subhirtus*, Illinois, p. 462, Horn, l. c.; *O. sericeus*, Taurus, *astracanicus*, Astracan, Tournier, l. c. p. 183: spp. nn.

Coryssomerides.

Zygopsides berytensis, Mars., should probably be referred to *Euryomatus*; Kirsch, B. E. Z. xvii. p. 217.

Tychiides.

J. DESBROCHERS DES LOGES, C. R. Ent. Belg. xvi. pp. v.-ix., publishes short diagnoses of 25 new species, subsequently fully described by him (Ann. Ent. Belg. vi. pp. 97-126), with various synonymical remarks, &c. The group is nearer *Balaninus* than *Orchestes*; *Sibynes* and *Miccotrogus* are treated as subgenera of *Tychius*; *T. decoratus*, Ros., = *fuscilineatus*, Luc., which should follow *striatulus*; *Sibynes schaumii*, Stierl., = *Tychius (Micotrogus) nigricollis*, Chevr.; *T. dohrni*, Stierl., = *zebrasch*, Strl.; *T. obesus*, Sch., = *sparsutus*, Ol., var.*; *T. pernix*, Gyll., ? = *hematocephalus*, Gyll.; *T. genista*, Boh., and *genisticola*, Chevr., = *venustus*, F., var.; *T. flavicollis*, Bris., = *squamulatus*, Sch.*; *T. curtus*, Bris., = *flavicollis*, Gyll.; *T. schneidleri* [sic], Bris., = *lineatulus*, Sch.*; *T. lineatulus*, Bris., = *schneidleri* [sic], Sch.*; *T. elephas*, Ktz., = *strumaricus*, Gyll.*; *T. curvirostris*, Bris., and *pygmaeus*, Wat., are not to be referred to *Barytychius*; *Miccotrogus monachus*, Chevr., *ex. typ.*, = *capucinus*, Sch.; *T. sublineatus*, Chevr., *nec* Schön., is re-described as a new species (pp. viii. & 111) under the name *niveivittis*, Mars., ined. [so named by De Marseul, Cat. 1863]; *T. glycyrrhizæ*, Beck., is re-described; *T. staticis*, Beck., is a *Sibynes*, and, as it confused two species, is proposed to

be dropped. In the synonymic remarks marked *, the author is followed by Tournier (*infra*).

H. TOURNIER, Ann. Soc. Ent. Fr. (5) iii. [not published until April 22, 1874], pp. 450-522, in 'Observations sur les espèces européennes et circumeuropéennes de la Tribu des Tychiides,' is of opinion that this group will eventually have to be united to the *Eriirhinides*, and that the material acquired since Lacordaire's establishment of it is already sufficient to disintegrate it. *Pachytychius* and *Barytychius*, Jekel, have their abdominal segments almost as in *Eriirhinus*, and a new form approaches the *Molytides*. *Aubœonymus picteti*, Tourn., is a *Pachytychius*. *Tychius elongatus*, Gyll., does not occur in Europe. A var. of *Styphlotychius scabricollis*, Ros., from Algeria, is described as *S. fairmairii* (p. 458); and *Tychius ancora*, *auricollis*, and *pernix*, Gyll., *pachyderus*, Fairm., and *rubriceps* and *3-maculatus*, Ros., are provisionally referred to that subgenus. *T. 3-virgatus*, Desbr., = *astragali*, Becker; *T. mitratus*, Costa, *schaumi* and *bicolor*, Stierl., *ex. typ.*, = *nigricollis*, Chev.; *T. suavis*, Bris., = *laticollis*, Perris; *T. obductus*, Hoch., has 7-jointed funiculus; *T. "kyrbyi,"* Wat., = *squamulatus*, Gyl.; *T. cretaceus*, Kies., is distinct from *cinnamomeus*, Kies.; *T. confusus*, Desbr., = *morawitzi*, Becker; *T. bellus*, Kirsch, *ex. typ.*, = *fusclineatus*, Luc.; *T. glycyrrhizæ*, Beck., = *rufirostris*, Sch.; *T. albivittatus*, Bris., *albivittis*, Gemm., = *aureolus*, Kies.; *T. hæmatopus*, Gyll., = *junceus*, Rch.; a var. from S. Europe of *T. meliloti*, Steph., is named *litigiosus* (p. 492); *T. junceus* and *meliloti*, when found on *Melilotus officinalis*, which has a yellow flower, are almost always dark, but light when found on *M. alba*; *T. brevicornis*, Wat., = *pygmæus*, Bris., = *pusillus*, Germ. *Miccotrogus signaticollis*, Chev., = *capucinus*, Boh., var.; *M. suturellus*, Mots., *nec* Gyll., is re-named *motschulskii* (p. 509); *Sibynes parallelus*, Kies., seems to be a *Miccotrogus*, possibly *cuprifer*, Pz., var.; *S. staticis*, Beck., preoccupied, is re-named *tournieri* (Becker, *in litt.*: p. 512); *S. arenariæ*, Steph., *phaleratus*, Stev., *seriatus*, *bohemani*, and *algiricus*, Desbr., = *primitus*, Hbst.; *S. gallicola*, Giraud, *ex. typ.*, and ? *S. formosus*, Aubé, = *femoralis*, Germ.; *Tychius dohrni*, Beck., *zebra*, Gyl., = *S. vittatus*, Germ.; *S. valofsi*, Desbr., = *canus*, Hbst., var.

Tychius hamatocephalus apparently lives on *Lotus corniculatus* in England: H. Moncreaff, Ent. M. M. x. p. 157.

Miccotrogus monachus, Chev., = *capucinus*, Boh.; É. Perris, Nouv. et faits (2) p. 6.

New genera and species :—

Apeltarius, Desbrochers, *l. c.* p. 125. Facies of *Sibynes canus*, but with 7-jointed funiculus, and no scutellum. *A. multilineatus*, sp. n., *id. l. c.* p. 126, Oran.

Jekelia, Tournier, *l. c.* p. 459. Facies of *Pachytychius*, which it resembles in the abdominal segments; tibiæ unguiculate, with a distinct dentate mucronal plate; tarsi not spongy beneath, with simple claws. *Tychius ephippiatus*, Fairm., and *J. depressipennis*, *ibid.*, Hungary, Algeria.

Ectatotychius, subg. of *Tychius*, *id. l. c.* p. 461. Of short form, with

strictly filiform rostrum. *T. amplicollis*, Aubé, and *E. similis*, id. *ibid.* Sicily, Algeria.

Pachytychius sobrinus, p. 454, Syria, *indicus*, *ibid.* note, Bombay, *trapezicollis*, p. 455, Algeria, Morocco; *id. l. c.*

Styphlotychius lacordairii, p. 456, *hypocrita*, p. 457, *kirschi*, p. 458, Algeria; *id. l. c.*

Barytychius globipennis, sp. n., *id. l. c.* p. 460, Caucasus.

Tychius 3-virgatus, Sarepta, *globithorax*, France, pp. v. & 99, *lineolatus*, pp. v. & 100, Pyrenees, France, *grandicollis*, pp. v. & 101, Algeria, *sericeus*, pp. vi. & 102, Bone, *longulus* and *confusus*, pp. vi. & 103, Sarepta, *longitubus*, pp. vi. & 104, *parallelipennis*, pp. vi. & 105, *breviusculus* and *dimidiatipennis* (? = *fuscipes*, Chev., var.; p. 98), pp. vi. & 106, *depressus*, pp. vii. & 108, Algeria, *curtirostris*, pp. vii. & 107, Corsica, *deplanatus*, pp. vii. & 109, Spain, *discithorax*, Algeria, *undulatus*, locality not given, p. 119, *mixtus*, p. 120, Morocco, DESBROCHERS, *l. c.*; *T. modestus*, p. 462, Greece, *tessellatus*, p. 464, Andalusia, *arietatus*, Geneva, *aureimicans*, Malaga, p. 465, *tenuirostris*, p. 466, Jerusalem, *seriepilosus*, Egypt, *depressicollis*, Algeria, p. 468, *hypætrus*, Sicily, Sardinia, Algeria, *raffrayi*, Algeria (? = *longitulus*, Desbr.). p. 469, *pauperculus*, Algeria, *subsulcatus*, Hungary, p. 470, *brisouti*, p. 471, Jura, *hueti*, p. 472, *terebrosus*, p. 475, Calabria, *longiusculus*, p. 474, *acosmus*, p. 486, *beckeri*, p. 487, Sarepta, *heydeni*, p. 476, Upper Egypt, *carinicollis*, Astracan, *italicus*, Tuscany, p. 479, *olcesii*, p. 483, Portugal, N. Africa, *chevolati*, p. 484, Portugal, *kiesenwetteri*, p. 485, Servia, *sericatus*, p. 488, *sharpi*, p. 506, Geneva, *difficilis*, p. 490, Carinthia, *dentipes*, p. 493, *decretus*, p. 496, *sericatus*, p. 498, *rufipes*, p. 508, *similaris*, p. 504, Algeria, *obscurus*, p. 494, *reduncus*, p. 499, Tangiers, *armatus*, p. 495, *comptus*, p. 497, Italy, N. Africa, *hirtellus*, Crete, *ruficornis*, Syria, p. 500, *neapolitanus*, p. 502, Naples, *perpendus*, p. 504, Lebanon, *ochraceus*, p. 505, Syria: TOURNIER, *l. c.*

Sibynes heydeni, p. 511, Greece, Algeria, Syria, S. Spain, *minutissimus*, Astracan, *fuscus*, Egypt, p. 513, *reichii*, Calabria, *hopffgarteni*, Hungary, p. 514, *grisescens*, p. 515, Swiss Alps, *abdominalis*, Hungary, *rudipilosus*, p. 520, Turkey, *beckeri*, Sarepta, *curtirostris*, Switzerland, France, p. 521, *perrisi*, p. 522, Aix, Tuscany, TOURNIER, *l. c.*; *S. nigrivittatus*, *inclusus*, pp. 7 & 110, *amplithorax*, pp. viii. & 112, *auricollis*, pp. viii. & 113, *algericus*, pp. viii. & 116, Algeria, *velutifer*, pp. viii. & 114, France, *seriatus*, pp. viii. & 115, Corsica, *bohemani*, pp. viii. & 115, France, Pyrenees, *rælofsi*, pp. viii. & 116, Portugal, *beckeri* and *zuberi*, p. 123, *planiusculus*, p. 124, no localities given, *subellipticus*, p. 124, Marseilles, and ? Alsace, DESBROCHERS, *l. c.*

Miccotrogus discoideus, sp. n., Desbrochers, *l. c.* pp. ix. & 117, Algeria (= *signaticollis*, Chev., of which *molitor*, Chev., is also a var., p. 98).

Cionides.

Cionus olens: larva mines leaves of *Verbascum pulverulentum*, É. Perris, Ann. Soc. Ent. Fr. (5) iii. p. 87.

Nanophyes duriei, Luc., makes galls on *Umbilicus pendulinus* in Algeria; H. Lucas, Bull. Soc. Ent. Fr. (5) iii. p. cvi.

Nanophyes dorie, sp. n., H. Brisout, Bull. Soc. Ent. Fr. (5) iii. p. lxxxv. Genoa.

Gymnetrides.

Gymnetron [-netrum] *mixtum*, Mulsant & Godart, Ann. Soc. L. Lyon, (n. s.) xx. p. 49, Narbonne; *G. schwarzi*, V. Rottenberg, B. E. Z. xvii. p. 204, Silesia: spp. nn.

Læmosaccides.

Læmosaccus ocularis, p. 281, *semiustus*, *gibbosus*, p. 282, *tarsalis*, *magdaloides*, p. 283, *fulvirostris*, p. 284, Champion Bay, *longiceps*, p. 281, *funereus*, p. 282, Queensland, *querulus*, p. 283, W. Australia and Victoria, Pascoe, Ann. N. H. (4) xii. spp. nn.

Cryptorhynchides.

Alcides (*Cionus*, Fischer) *trinotatus*, Mots., = *Ocladius salicornice*, Ol.; J. Faust, Hor. Ent. Ross. ix. p. 313.

Cryptorhynchus lapathi, L.: destruction caused by its larvæ to *Populus alba* noted by Boisduval; Bull. Soc. Ent. Fr. (5) iii. p. cxxxvii. J. Grouvelle has found the insect in the Isère Mountains, at 1500–1800 metres: l. c. p. cxlix. Larva described: J. Erné, MT. schw. ent. Ges. iv. p. 138.

Crypharis robusta and *tingitana*, Dieck, re-described; Fairmaire, R. Z. (3) i. pp. 345 & 348. *C. rosalia*, Rott., very probably = *Typhloporus deplanatus*, Hampe (the two genera are certainly identical); G. Dieck, B. E. Z. xvii. p. 422: = *C. planidorsis*, Fairm., ex. typ.; Desbrochers, MT. schw. ent. Ges. iv. p. 196.

Pterygomus, g. n., H. Jekel, Ann. Soc. Ent. Fr. (5) iii. p. 267. *Sophrorhinides*, Lac.: eyes finely reticulated, claws bifid; somewhat of the facies of *Cyodianerus*. Connected with *Panolcus*, Gerst., by *Metrania palliata*, Pasc. *P. sellatus*, sp. n., id. l. c. p. 269, Cayenne.

Graphicotera, g. n., H. Tournier, MT. schw. ent. Ges. iv. p. 183. *Sophrorhinides*: near *Corynephorus*, and next before *Camptorhinus* in European lists. *G. excelsa*, sp. n., id. l. c. p. 184, Caucasus.

Tentegia, g. n., F. P. Pascoe, Ann. N. H. (4) xii. p. 284. Like *Acalles*, but with linear tarsi and a broad truncated intercoxal process. Differs from *Myrtesis* in its pectoral channel not extending to the middle coxæ. *T. favosa*, sp. n., id. *ibid.* W. Australia.

Azides, g. n., id. l. c. p. 285. Has many characters of *Chimades*; allied to *Chatectetorus*. *A. dorsalis*, sp. n., id. l. c. p. 286, Sydney, N. Australia.

Rhyssematus equalis, p. 464, Pennsylvania, Kansas, *pubescens*, p. 465, California; Horn, P. Am. Phil. Soc. viii. spp. nn.

Chalcodermus inaequicollis, p. 466, Georgia, *collaris*, p. 467, Texas, id. l. c. spp. nn.

Psepholax mastersi and *egerius*, p. 196, Queensland, (*P.?*) *latirostris*, p. 197, Illawarra, Pascoe, op. cit. xi. spp. nn.

Poropterus satyrus, Tasmania, *innominatus*, Queensland, p. 197, *varicosus*, Illawarra, *oniscus*, Queensland, *tumulosus*, S. Australia, Tasmania, p. 198, id. l. c.; *P. prodigus*, id. op. cit. xii. p. 285, Eclipse Island: spp. nn.

Tychreus sellatus, sp. n., id. op. cit. xii. p. 286, N. S. Wales.

Camptorhinus fasciatus, sp. n., Schaufuss, Nunq. Ot. ii. (1872) p. 275, Greece.

Analcis variegatus, sp. n., Horn, l. c. p. 468, Illinois to Gulf States.

Acalles carinicollis, p. 185, Egypt, *olcesii*, p. 186, *brevis*, p. 187, Tangiers, Tournier, l. c.; *A. graellsii*, Martinez y Saez, An. Soc. Esp. ii. p. 416, pl. xiii. fig. 6, Puerto del Pico; *A. giraudi*, Mulsant & Godart, Ann. Soc. L. Lyon (n. s.) xx. p. 265, France (under bark of *Eucalyptus globulus*); *A. sophieæ*, H. Tschapeck, S. E. Z. xxxiv. p. 245, Styria: spp. nn.

Crypharis strigirostris, p. 346, Tangiers, *convexiuscula*, Dely-Ibrahim, *subterranea*, Boghari, p. 347, Fairmaire, R. Z. (3) i., spp. nn.

Ramphides.

Ramphus kiesenwetteri, sp. n., Tournier, MT. schw. ent. Ges. iv. p. 188, Sicily.

Ceuthorhynchides.

Ceuthorhynchideus chevrolati, Bris. (? M. S.), = *troglydites*, var. *d.* Gyll.; *Ceuthorhynchus crassidentatus*, Marshall, is non-existent, and not described: E. C. Rye, Ent. M. M. x. p. 18.

Ceuthorhynchus maschelli, sp. n., (Hochhuth) Solsky, Bull. Mosc. xlvi. p. 162, Kiew.

Poophagus hopffgarteni, sp. n., Tournier, l. c. p. 189, Hungary.

Rhinoncus nigriventris, sp. n., Pascoe, Ann. N. H. (4) xi. p. 199, Queensland.

Baridiides.

Baridius speciosus, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. xi. fig. 13; *B. analis*, var. from Prague, Kirsch, B. E. Z. xvii. p. 211.

Baridius granulipennis, Egypt, *stierlini*, Sicily, spp. nn., Tournier, l. c. p. 190.

Centrinus vergarae, sp. n., Reed, An. Univ. Chil. xli. p. 354, Llanquihue, Chili.

Calandrines.

Rhynchophorus zimmermanni, Fahrs. (chief stages described; the larva bores roots and stocks of palmetto: S. V. Summers, Canad. Ent. v. p. 123), = *cruentatus*, F., var.; *Scyphophorus asperulus*, Lec., = *acupunctatus*, Gyll.; a var. *baridioides* of *Sphenophorus vomerinus*, Lec., is described (p. 413); *S. procerus*, Lec., = *validus*, Lec.; *S. ochreus*, Lec., ? = *æqualis*, Gyll.; *S. compressirostris*, Germ., nec Say, is renamed *germari*: Horn, P. Am. Phil. Soc. xiii. p. 408 *et seq.*

Metanasius, g. n., Horn, l. c. p. 410. Differs from *Sphenophorus* in its very widely separated anterior coxæ. *S. sericeus*, Humb. & B., *S. carbonarius*, Chev., &c.

Scyphophorus robustior, p. 409, no locality given, *yuccæ*, p. 410, California, Horn, l. c. spp. nn.

Sphenophorus ulkii, p. 413, Nebraska, Colorado, &c., *robustus*, p. 419, North America, *costipennis*, p. 420, Georgia, Illinois, &c., *latinus*, p. 421, Georgia, *scoparius*, p. 424, Wisconsin, Kansas, *arizonensis*, p. 428, Arizona, *cultellatus*, p. 429, Kansas, Texas, *id.* l. c. spp. nn.

Cossonides.

T. V. WOLLASTON, 'On the Cossonidæ of Japan' (Tr. E. Soc. 1873, pp. 5-43), describes 18 species (embodied in 15 genera, and all new) taken by G. Lewis, in Kiushiu and the southern division of Nipon. The ordinary European types do not prevail, and there is no dominant type. The following new genera and species are described:—

Tetratemnus, p. 9. Closely allied to *Dryophthorus*, but with shorter rostrum and legs, the anterior coxæ comparatively wide apart, the posterior coxæ more approximated, &c. Also allied to *Charorhinus*, Fairm., but with transverse depressed eyes, and distinctly pentamerous tarsi. *T. sculpturatus*, p. 11 (also found dead in tea, Jersey).

Pentacoptus, p. 12. Facies of *Gronops*: allied to *Pentarthrum*. *P. gronopiformis*, p. 13.

Tychiodes, pp. 16, 449, & 518. Somewhat of the facies of one of the *Erihynidae*, with an elongate linear slender rostrum, short transverse thorax, flattish wide oblong-elliptic body, small head, &c.: allied to *Microxylobius*. *T. adamsi*, p. 17, I. Awasima, near Nipon.

Pholidoforus, pp. 18, 465, & 546. With densely scaled surface. *P. squamosus*, p. 19.

Coprodema, pp. 20, 465, & 546. Facies of *Calandra*, but a true Cossonid, allied to the preceding genus. *C. calandriforme*, p. 21.

Exodema, pp. 22, 466, & 547. Closely allied to *Coprodema*, but with longer tarsi, of which the 3rd joint is widened and bilobed. *E. subulotum*, p. 23.

Phlæophagosoma, pp. 23, 465, 545, & 609-614. Allied to *Phlæophagus* and *Rhyncolus*, but narrower, more fusiform, and less convex, with more elongate prothorax and rostrum and shorter tarsi, the 1st joint of which is sub-equal with 2nd and 3rd. Type, *P. minutum*, p. 25; also *P. (?) curvirostre*, p. 26 (see also other spp. and sub-g. n. *Amorphorhynchus* *infra*).

Pseudocossonus, pp. 27, 478, 562, & 621. Facies of *Cossonus*, but with extremely robust legs, and abnormally short and incrassated tarsi, the apical joint of which is conical. *P. brevitarsis*, p. 28, *brachypus*, p. 29 (see also *infra*).

Heterarthrus, p. 29. Of narrow elongate-fusiform outline, with rather short and thick rostrum, somewhat slender and elongate legs and elongate tarsi, the apical joint whereof is ordinary and clavate in the ♂, and fusiform-conical in the ♀. *H. levisi*, p. 31, *pallidipennis*, p. 32 (and see *infra*).

Macrorhyncolus, pp. 33, 489, 576, & 635. Allied to *Rhyncolus*, but larger, more parallel, with the rostrum short and incrassate, but conspicuously parallel throughout, and the scrobes short, deep, wide, and suddenly narrowed, and angularly deflexed beneath the eyes. *M. crassiusculus* p. 34 (and see *infra*).

Xenomimetes, p. 35. Facies of *Hylurgus*: allied to *Syntomocerus* (*Eremotes*) and *Stenoscelis*, but with a conspicuously longer, less incrassate, and linear rostrum, less thickened antennæ, and the elytra sub-divaricate at the apex. *X. destructor*, p. 36.

Sphærocorynes, pp. 38, 495, & 582, somewhat the facies of *Hylastes*: with

very short and thick parallel rostrum, stout antennæ (of which the funiculus is short, and the club extremely large rounded and abrupt), and legs sub-equally distant at the base. *S. lewisianus*, p. 39.

Pentarthrum (re-characterized) *angustissimum*, p. 14.

Hexarthrum (re-characterized) *brevicorne*, p. 38.

Stenoscelis (re-characterized) *gracilitarsis*, p. 42.

T. V. WOLLASTON. 'On the genera of the Cossonidæ.' *Tom. cit.* pp. 427-657.

An exhaustive analysis of the genera now known (122 in number, 75 of which are new), comprising 253 species (139 described as new), and arranged as follows:—1, a tabulated list of the groups; 2, full generic diagnoses; 3, observations (diagnostic and geographical) on each genus; 4, descriptions of the new species; 5, a list of all the species examined. Five sub-families are adopted:—*Notiomimetides*, *Dryophthorides*, *Pentarthrides*, *Onycholipides*, and *Cossonides*; Lacordaire's *Lymantides* being rejected, on account of the instability of its supposed distinguishing feature of shortness in the metasternum, and *Phænomerus* considered as not related to the *Cossonide* but to the *Sphadasmides* and *Mecopus*. *Cherorhinus*, Fairm., having 5 joints (not 4) to the funiculus, is not a *Dryophthorid*, but a *Pentarthrid*. *Rhyncolus* [!] *hervei*, Allard, = *Pentarthrum huttoni*, Woll. The species are principally of insular habits, and peculiar for the instability in the number of the joints of the funiculus, and the occasionally whole or partial obliteration of the eyes. *Mesoæneus*, Woll., = *Amaurorhinus*, Fairm. (imperfectly diagnosed). *Georhynchus*, Roelofs, is placed (with some reservation) near *Onycholips*, the type of a new sub-family, as there are other undoubted Cossonids in which the 1st and 2nd segments of the abdomen are not absolutely confluent, and others in which the intermediate coxæ are almost completely in contact: Lacordaire is wrong in assigning a 7-jointed funiculus to the latter genus. *Raymondia*, Aubé, nec Frauenfeld (*Dipt.*), is re-named *Raymondionymus* (p. 531). *R. delarouzii*, Bris., is an *Alaocyba*. *Caulotrupsis*, Woll., is generically distinct from *Phlebotomus*; *Mesites* is restricted to *pallidipennis* and *cunipes*, Boh., and *aquitanus*, Fairm.—convex, cylindrical, shining species. *Rhyncolus ater*, Mots., nec Linn., is removed to *Macrorhyncolus*, Woll., and re-named *crassitarsis* [apparently unnecessarily]. The name *Syntomocerus*, proposed by the author for his *Eremotes*, on account of *Eretmotes*, Mars., is withdrawn; it is characterized by the 2nd funicular joint being almost hidden in the apex of the enlarged basal joint, and *R. strangulatus*, Perris, is referred to it. *Hexarthrum capitulum*, Woll., = *Rhyncolus culinaris*, Germ.; *R. submuricatus*, Boh., is to be referred to this genus.

The following new genera and species are characterized:—

Notiomimetides (subf. n.).

Notiomimetes, pp. 440 & 504. Agrees with *Dryophthorus* in having a 4-jointed funiculus, fusiform outline, and obsolete scutellum; but with no terminal hook to the tibiæ, widely separated coxæ (more so than any other Cossonid), pseudo-tetramerous tarsi, an immersed head, obsolete eyes, and bald surface. *N. pascoii*, p. 594, S. Australia.

Dryophthorides.

Psilodryophthorus, pp. 441 & 505. Surface slightly shining, almost bald; prothorax nearly even, elytra with porrect shoulders, not cariniform at apex, rostrum not roughened. *P. costatus*, p. 595, New Guinea.

Stenommatius, pp. 441 & 506. Differs from *Dryophthorus* in its longer, more slender and arched rostrum, nearly confluent eyes, and more widely separated coxæ. *S. fryi*, p. 595, Mexico.

Pentarthrides.

Synommatius, pp. 443 & 508. Eyes entirely confluent beneath. *S. confluens*, p. 596, Sarawak.

Lyprodes, pp. 444 & 511. Of narrow cylindrical shape, with opaque surface, thick abbreviated feet, long slender rostrum, 2nd funicular joint longer than following joints, &c. *L. cylindricus*, p. 596, Sula.

Phleophagomorphus, pp. 445 & 511. Of somewhat convex build, with rostrum pinched in at base, depressed eyes, and 4 anterior legs approximated at base. *P. angusticollis*, p. 596, New Granada.

Pseudopentarthrum, pp. 445 & 512. Intermediate between the preceding and *Pentarthrum*. *P. phleophagoides*, p. 597, Mexico.

Xenosomatium, pp. 446 & 513. Tibiæ short, broad, triangular; terminal hook to 4 posterior legs spiniform, short; obsolete in front pair, replaced by an outwardly curved pubescent spine arising from inner angle. *X. tibiale*, p. 597, Malay Islands.

Sericotrogus, pp. 446 & 515. Allied to *Pentarthrum* in its scutellum and eyes, but smaller, more slender, fusiform, brassy, with widely bilobed 3rd tarsal joint. *S. subanescens*, p. 602, Auckland.

Stenotrupis, pp. 447 & 515. Allied to *Pentarthrum*, but narrower, more depressed, with completely sunken eyes, shorter legs, equally separated coxæ, &c. *S. crassifrons*, p. 602, Makian, *acicula*, p. 603, Cuba.

Microcossonus, pp. 447 & 517. Allied to *Stenotrupis*, but with shorter and wider rostrum, more developed and less flattened eyes, coxæ more remote, &c. *M. wallacii*, p. 603, Saylee.

Cossonideus, pp. 448 & 517. Pale, depressed, deeply sculptured, parallel-fusiform, with very large and prominent eyes, elongate tarsi, &c. *C. pascoii*, p. 603, W. Australia.

Tychiosoma, pp. 449 & 604. Larger and flatter than *Tychiodes*, with more triangular thorax, more medially inserted antennæ, &c. *T. gracilirostre*, p. 604, Philippine Islands.

Leptomimus, pp. 449 & 519. Very narrow, parallel, opaque, and closely sculptured, with very long, slender rostrum: differs from *Stenotrupis* in the head not being exserted, and the eyes not depressed. *L. fragilis* and *delicatulus*, p. 604, Gilolo.

Lamprochrus, pp. 450 & 520. Rostrum very elongate and slender (in ♂ slightly dilated as in *Mesites*), antennæ, legs, and tarsi very long. Type, *Microxylobius cossonoides*, Woll.

Microtribus, pp. 451 & 522. Allied to *Microxylobius*, but with rather narrow, elongate, parallel rostrum, small, prominent, and less separated eyes, largely developed thorax, lengthened funicular joint, widened and deeply bilobed 3rd tarsal joint. *M. huttoni*, p. 605, New Zealand.

Mesoxenomorphus, pp. 451 & 522. Allied to *Mesoxenus*, but with eyes. *M. africanus*, p. 605, Caffraria.

Heteropsis, pp. 452 & 523. Near *Amaurorhinus*, but with a developed scutellum. *H. lawsoni*, p. 606, New Zealand.

Pseudomesoxenus, pp. 453 & 525. Differs from *Amaurorhinus* in its more elongate metasternum, thicker and subtriangular rostrum, shorter and more slender limbs, simple 3rd tarsal joint, convex underside, &c. Type, *Pentarthrum subcæcum*, Woll.

Halorhynchus, pp. 454 & 526. Entirely eyeless, tibiæ with a distinct spinule inside, apical hook of 2 hinder legs almost spiniform, 4 anterior tarsi narrow, hinder pair more robust, ungues rudimentary. *H. cæcus*, p. 606, W. Australia.

Pentarthrum zealandicum, New Zealand, *nitidum*. Chili, p. 598, *affine*, Chili, *longirostre*, New Zealand, p. 599, *subsericatum*, New Zealand, *rugosum*, Saylee, *sublevigatum*, Sula, p. 600, *grayi*, Brazil, *nigrum*, Tasmania, p. 601.

Onycholipides (subf. n., p. 435; funiculus 6-jointed, tibiæ fossorial, not hooked at apex, tarsi tetramerous). Includes *Georhynchus*, *Onycholips*, *Raymondionymus*, and *Alaocyba*.

Cossonides.

Styphloderes, pp. 457 & 535. Differs from *Cotaster*, Mots., in its more flattened, nude body, longer and more slender rostrum, antennæ, and legs, smaller eyes, uneven thorax, longer 2nd joint of the looser funiculus, smaller apical hook, wider and more distinctly bilobed 3rd tarsal joint, and much larger claws. Type, *C. littoralis*, Mots., = *exsculptus*, Boh.

Pseudophlecephagus, pp. 460 & 540. Combines the parallel, less inflated shape and conspicuous scutellum of *Rhyncolus* with the abbreviated metasternum and slender antennæ and tarsi of *Phlecephagus*. *Phl. tenax*, Woll. (*Phl. æneopiceus*, Boh., also seems possibly a member of this genus).

Thaumastophasis, pp. 460 & 541. Tibial hook obsolete, front coxæ contiguous, intermediate pair barely separated, eyes enormous, club of antennæ slender and acuminate, thorax narrow, small, and uneven: allied to preceding. *T. oculatus*, p. 606, S. Australia.

Himatium, pp. 461 & 542. Narrow, parallel, cylindric, not very convex, sparingly set with elongate, partially erect, fulvescent hairs. *H. pubescens*, p. 607, Malabar.

Pholidonotus, pp. 461 & 542. Surface scaled: allied to *Himatium*, but with antennæ more medially inserted, setose and thicker legs, &c. *P. squamosus*, p. 607, Sarawak.

Coptorhamphus, pp. 462 & 543. Funiculus gradually enlarged, front coxæ nearly contiguous, femora toothed, tibiæ tufted at outer apex, thorax foveated. *C. subfasciatus*, Java, *strangulatus*, Sarawak, p. 608.

Aphanommata, pp. 463 & 544. Black, shining, bald, with a somewhat elongate-triangular rostrum, transverse scutellum, small and simple 3rd tarsal joint. Combines some characters of *Phlecephagus* and *Rhyncolus*. *R. euphorbiarum*, Woll.

Brachyscapus, pp. 463 & 544. With an enlarged scutellum, ample wings, short triangular rostrum, sub-approximate eyes, and a very short scape. *B. crassirostris*, p. 609, Natal.

Amorphorhynchus, pp. 464 & 546, note. A subgenus of *Phlecepha-*

gosoma (cf. *tom. cit.* p. 23), differing in the rostrum being slightly thickened behind the middle or at the base. *P. (A.) sinuaticolle*, p. 609, Malay Archipelago, *glaberrimum*, Java, *rotundicolle*, Amboina, *fusirostre*, Saylee, p. 610, *vicinum*, Sarawak, *angustulum*, Batchian, p. 611, *opaculum*, Batchian, p. 612.

Melarhinus, pp. 466 & 547. Rostrum broad, depressed, medially channeled, eyes very prominent, thorax constricted before apex, funiculus compact, club narrow, not abrupt. *M. nigritus*, p. 614, Madagascar.

Psilosomus, pp. 466 & 548. Somewhat Calandriform, opaque, bald, densely punctured, segments 1 and 2 of abdomen abnormally divided, rostrum thick, sub-cylindrical, thorax large and elongate, elytra coarsely sulcate. *P. opacus*, p. 614, Ceylon and Malayan peninsula (? = *Cossonus*? *hebes*, Walker).

Lipancytus, pp. 468 & 550. Tibial hook obsolete, rostrum very long, slender and cylindrical, body narrow and parallel, thorax unconstricted, feet wide, much developed, claws minute, legs long and thickened, and approximated at base. Differs from *Aorus*, Sch., in segments 1 and 2 of abdomen being less elongate, 3 and 4 being considerably more so. *L. inarmatus*, p. 615, Amazons.

Homaloxenus, pp. 469 & 552. Suggestive of the *Erirehinides*; club annulated, rostrum long, straight, strigose, antennæ apically inserted, femora uni-dentate, body very flat. *H. dentipes*, p. 615, S. Domingo.

Eucoptus, pp. 470 & 553. Size and facies of *Pentarthrum* and *Stenotrupis*, but funiculus 7-jointed; real affinities with *Stenotis*; segments 1 & 2 of abdomen separated by a bi-arcuated line. *E. depressus*, p. 616, Amazons, Brazil.

Rhopalomesites, pp. 472 & 555. Differs from *Mesites* proper in the male rostrum being longer and more slender, more widened at insertion (at or before the middle) of the thinner and longer antennæ, of which the club is longer and more abrupt; in the less incassate head and more approximated eyes; in the 3rd tarsal joint being appreciably bilobed, &c. *M. tardii*, Curt., *complanatus*, *maderensis*, *persimilis*, *euphorbiæ*, and *proximus*, Woll.

Odontomesites, pp. 472 & 555. In male, femora sub-dentate beneath, and rostrum fringed with hairs at apex. More fusiform and depressed than *Mesites*. *M. fusiformis*, *pubipennis*, and *hesperus*, Woll.

Megalocorynus, pp. 473 & 557. Club of antennæ enormously developed, and clothed with short pubescence, scape twisted and sub-compressed; rostrum flattened and gradually contracted towards the base in the female, long and dilated in front in the male. *Cossonus depressus* and *conicirostris*, Boh.

Stenotribus, pp. 474 & 558. Differs from *Catolethrus* in its medially inserted antennæ, more parallel and cylindric rostrum, which is more divided from the forehead, very sunken eyes, very long and even thorax, simple 3rd tarsal joint, sub-equally separated coxæ, &c. *S. longicollis*, p. 619, Bahia.

Phacegaster, pp. 475 & 559. Differs from *Catolethrus* in its larger size, very much broader rostrum, which is gradually widened from base to apex, with the antennæ inserted nearer the middle, its hinder femora and

tibiæ fringed beneath, and segments 1 & 2 of its abdomen having each 2 granulated ocellate spaces. Type, *Catolethrus nasalis*, Boh.

Gleodema, pp. 476 & 560. Variegated with red and black; large, fusiform, highly polished, almost unsculptured. thorax even, more or less concave beneath, &c. *G. spatula*, p. 619, Dorey, *ruficollis*, p. 620, Saylee.

Gleoxenus, pp. 477 & 561. Facies of a gigantic *Rhyncolus*, but allied to the preceding; 3rd tarsal joint greatly thickened but simple; spine at inner apex of front tibiæ enormously lengthened and developed. *G. armatus*, p. 620, Madagascar.

Exonotus, pp. 477 and 561. Elongate, narrow, parallel, rather large, shining, convex, legs very robust, front tibiæ biflexuous, with very large and open apical cavities. *E. basalis*, p. 620, Tondano, Celebes.

Catolethromorphus, pp. 479 & 563. Asiatic representative of the *Catolethrus* group, with thicker and more parallel rostrum, which is undivided from the largely developed head, and rounded, rather prominent, and more separated eyes. *C. nigripes*, p. 621, East Indies.

Brachycheenus, pp. 479 & 563. Allied to preceding, but much smaller, with rostrum not so elongate, antennæ inserted behind the middle, 2nd joint of funiculus almost hidden, and 3rd joint of tarsi simple. *B. pallidulus*, p. 622, Sarawak.

Stenomimus, pp. 480 & 564. Allied to the following, but with medial antennæ, longer, more slender, and parallel rostrum, very prominent eyes, narrower outline, &c. *S. fryi*, p. 622, Brazil.

Micromimus, pp. 480 & 564. Pale, shining, deeply sculptured, depressed; with very large transverse sunken eyes, very short and suddenly clavate scape, widely separated coxæ, and simple 3rd tarsal joint. *M. batesi*, p. 622, Amazons, *pumilio*, Trinidad, *nigrescens*, Mexico, p. 623.

Glaotrogus, pp. 481 & 565. Highly polished, almost unsculptured, extremely flat, with a greatly exerted elongate-quadrate head, large, sunken eyes, approximate beneath, short broad almost parallel rostrum, very large club, even thorax, which is a little scooped-out behind, &c. *G. politissimus*, p. 623, Morty and Gilolo.

Homalotrogus, pp. 482 & 565. Close to the preceding, but with an oval head, eyes more approximate above, much longer, less slender, and not parallel rostrum, &c. *H. angustifrons*, p. 624, Ceram and Batchian.

Isotrogus, pp. 483 & 566. Allied to the two preceding, but approaching *Cossonus*: 2nd joint of funiculus not longer than the following joints. *I. tabellatus*, p. 624, *maurus*, p. 625, Batchian.

Heterophasis, pp. 483 & 567. More elegantly coloured than *Cossonus*, of more fusiform shape, very depressed, with the thorax almost unsculptured, and segments 1 & 2 of abdomen more completely fused. *H. ruficollis*, p. 625, *concolor*, p. 626, Dorey.

Hyponotus, pp. 484 & 568. Facies of *Tenebrio*: opaque, set with short setæ, with uniformly punctured but unimpressed thorax; differs from *Cossonus* in its broader head, more separated eyes, wider, shorter, and more parallel rostrum, larger legs, &c. *H. subpubescens*, p. 626, Singapore.

Borophleus, pp. 484 & 569. Allied to *Cossonus*, with shorter, broader, and nearly parallel rostrum, larger, rounder, and more prominent eyes,

which are more widely separated, more equally and closely punctured thorax, longer metasternum, more approximate coxæ, and 3rd joint of tarsi sub-bilobed. *B. puncticollis*, Mexico, *minor*, N. America, p. 627.

Pachytrogus, pp. 484 & 569. Suggestive of *Stereoborus* and *Stereotribus*, but with thicker and broader rostrum, depressed and less widely separated eyes, very coarsely and equally punctured thorax, &c. *P. crassirostris*, p. 627, Chili.

Stereoborus, pp. 485 & 570. With very robust thick legs, tibiæ very short and broad, with terminal hook powerfully developed, front pair with a lamelliform triangular plate on the inner edge, head wider than in *Cossonus*, with more prominent eyes, longer thorax and more approximate coxæ. *S. robustus*, New Guinea, *affinis*, *punctirostris* (& var. *obliteratus*, New Guinea), Malay Archipelago, p. 628.

Stereotribus, pp. 486 & 571. Head narrower than in the preceding, rostrum slit behind and bearded beneath, eyes more prominent, lamelliform process of tibiæ armed inside at the base with a robust spine. *S. scabrifrons* and *fissifrons*, Malay Archipelago, p. 629.

Stereotrogus, pp. 572 & 630: sub-g. n. of *Stereotribus*, with rather longer rostrum, which is perceptibly narrowed towards the base, and a larger and longer club to the antennæ. *S. incisus* and *tuberculifrons*, Ceylon, p. 630.

Stereomimetes, pp. 486 & 572. Approaching *Phæcogaster* in the spine of its posterior tibiæ, but more allied to *Stereotribus*, from which it differs in its basally unsinuated thorax, more parallel elytra, &c. *S. crassicornis*, p. 630, Champion Bay.

Stereoderus, pp. 486 & 573. Parallel, cylindric, shining, convex, black, rostrum tuberculated above, barbed beneath, or with 3 slits at apex, limbs very robust, eyes large, very wide apart, and somewhat anterior. *S. barbatus* and *simplex*, p. 631, Malay Archipelago, *pacificus*, p. 632, Fiji Islands.

Oxydema, pp. 487 & 574. Of elongate narrow fusiform outline, attenuate before and behind; with long slender rostrum, broadest in the anterior half, round prominent eyes, prothorax even, and constricted in front, anterior coxæ very remote, &c. *O. fusiforme*, Ceylon, *attenuatum*, Dorey, p. 632, *puncticolle*, p. 633, Batchian.

Notiosomus, pp. 488 & 574. Allied to the preceding, but less narrowed, especially behind, and with other small comparative differences. *N. major*, S. Australia, *australis*, Australia, p. 633, *congener*, p. 634, W. Australia.

Aphanocorynes, pp. 488 & 575. Flatter than *Oxydema*, with quite parallel rostrum, much less developed club, and 3rd tarsal joint more evidently bilobed. *A. depressus*, p. 634, King George's Sound.

Orthotemnus, pp. 489 & 575. Differs from the preceding in its elongate triangular thorax, which is very straightly truncated at the base, quite parallel elytra, which are separately recurved at the apex, posterior coxæ not so distant as the others, &c. *O. reflexus*, p. 634, Malay Archipelago.

Conarthrus, pp. 491 & 577. Last joint of tarsi conical, not abbreviated, club of antennæ short, unacuminate; of elongate linear outline, densely punctured in front, with sloping scutellum, very flexuous front

tibiæ and wide head and rostrum. *C. tarsalis*, p. 636, Makian, *cylindricus*, Batchian, *vicinus*, Cochin China, p. 637.

Eutornus, pp. 491 & 578. Differs from the preceding in its more fusiform outline, more lightly sculptured surface, rufo-ferruginous colour, linear rostrum, scutellum not tilted, &c. *E. jansoni*, p. 637, Ceylon, *ferrugineus*, Malay Archipelago, and (? *E. dubius*, New Zealand, p. 638.

Coptus, pp. 492 & 578. Eyes enormously developed and very prominent, antennæ basal, with very short 2nd funicular joint and abrupt club, rostrum almost as wide as head, straightly truncate in front, all coxæ widely separated. *C. oculatus* and *minor*, p. 639, Malay Archipelago.

Pachyops, pp. 492 & 579. Narrow, parallel, cylindric, closely sculptured; head broad, thick, greatly exerted, thorax long, sub-conical, scape elongate, club largely developed, coxæ not widely separated. *P. cylindricus*, p. 639, Sarawak.

Pentamimus, pp. 493 & 579. Resembles a large *Rhyncolus*, but with 5-jointed funiculus. *P. rhyncoliformis*, *suffusus*, Australia, *canaliculatus*, Tasmania, p. 640.

Tetracoptus, pp. 493 & 580. With 4-jointed funiculus. *T. reductus*, p. 641, New Guinea.

Xestoderma, pp. 694 & 580. Shining, deep black, cylindric, with short, broad, thick rostrum, excurved scape, abrupt compressed club, and segments 1 & 2 of abdomen divided by a conspicuous line. *X. wallacii*, *atra*, p. 641, Malay Archipelago.

Xestosoma, pp. 494 & 581. Differs from the preceding in its longer scape, larger club, very small transverse scutellum, and cordate 3rd tarsal joint. *X. grandicolle*, *subopacum*, p. 642, Malay Archipelago.

Xestomorphus, p. 642. Sub-g. n. of the preceding, having the thorax obsolete subsinuate at base and the scutellum larger and more rounded. *X. costipenne*, *ibid.*, Sula.

Lissopsis, pp. 495 & 581. Sub-Hylastideous, with very short rostrum, which is polished and unsculptured at base, very prominent eyes, elytra asperated behind, coxæ widely separated. *L. speculifrons*, p. 643, Saylee.

Xenotrupis, pp. 496 & 582. Fusiform, with longer and less thickened rostrum and less incrassated head than the preceding; eyes exceedingly large and prominent, thorax concave beneath. *X. fusiformis*, p. 643, Malay Archipelago.

Pachystylus, pp. 496 & 583. Scutellum nearly obsolete, limbs incrassate, first tarsal and 2nd funicular joints short, scape robust throughout, metasternum concave in both sexes and keeled in female. *P. dimidiatus*, p. 644, Chili.

Xenocnema, pp. 499 & 587. Very anomalous, being allied to the *Hylastidæ* in the absence of an apical external tibial hook, and in its deeply divided 1st and 2nd abdominal segments. Tibiæ spined externally before apex, and with an internal robust spur; rostrum divided from head, antennæ medial, interstices of elytra costiform. *X. spinipes*, p. 648, New Zealand.

Stereocorynes, pp. 500 & 588. Rostrum short and sub-parallel in the male, shorter and sub-triangular in the female, antennæ post-median,

short, glabrous, with solid compressed club, very sunken eyes, and 4 anterior coxæ very close. Type, *Rhyncolus truncorum*, Germ.

Tomolips, pp. 501 & 590. Funiculus 5-jointed, but osculant between *Hexarthrum* and the strictly sub-Hylastideous genera. *T. bicalcaratus*, p. 648, *asperatus*, p. 649, Mexico.

Dendroctonomorphus, pp. 501 & 591. With conspicuous scutellum, quite simple 3rd tarsal joint, asperate elytra, very elongate feet, sunken eyes, triangular rostrum, &c. *D. muricatus*, Ceylon, *parallelus*, Mexico, p. 649.

Brachytemnus, pp. 502 & 591. Differs from *Rhyncolus* in its much shorter and more triangular rostrum, larger and more sunken eyes, which are less lateral, more cylindrical and developed thorax, very much shorter antennæ with abrupt club, more slender legs, more approximated coxæ. *Rhyncolus porcatus*, Müll., and *R. pinipotens* (*crassirostris* olim), Woll.

Calyciforus, pp. 502 & 592. Antennæ very short, with cup-shaped club; scutellum greatly developed, thorax excavated behind, elytra very coarsely sulcate and costate, 3rd tarsal joint quite simple. *C. excavatus* and *erosus*, p. 650, Brazil.

Eurycorynes, pp. 503 & 593. Antennæ greatly abbreviated, with joints of funiculus gradually more transverse and lamelliform, and club enormously enlarged; scutellum almost obsolete. *E. jansonianus*, p. 651, Rio Janeiro, Minas Geraes.

Phlecephagosoma morio (? = *Phlecephagus cossonoides*, Mots.), *atratum* (? = *P. linearis*, Mots.), Ceylon, p. 612, *corvinum*, New Zealand, *puncticolle*, Malacca, p. 613, *proximum*, p. 614, Makian.

Catolethrus leviusculus, *grayi*, p. 617, *productus*, *parvus*, *basalis*, p. 618, Brazil.

Pseudocossonus dimidiatus, p. 621, Dorey.

Heterarthrus pictus, p. 636, Japan.

Eremotes gravidicornis, p. 644, ? Pyrenees.

Rhyncolus cylindricollis, *californicus*, p. 645, *protensus*, p. 647, California, *punctatus*, *similis*, *leviusculus*, p. 646, *fusiformis*, p. 667, Brazil.

Stenoscelis crassifrons, p. 651, Cape of Good Hope.

This tribe, as restricted by Lacordaire, appears to be entitled to higher rank. *Cossonus platalæa*, Boh., nec Say, is re-named *bohemani* (p. 438); *C. scrobiculatus*, Lec., & ? *californicus*, Mots., = *piniphilus*, Boh.; *C. concinnus*, Boh., ? = *corticicola*, Say; *Rhyncolus brevis*, Boh., is ? a *Stenoscelis*: G. H. Horn, P. Am. Phil. Soc. xiii. p. 431 et seq.

Dryotribus, g. n., *id. l. c.* p. 432. *Pentarthrides*: eyes small, rounded, very coarsely granulated, situated on the rostrum, elytra oval: facies of *Dryophthorus*. *Dryotr. mimeticus*, sp. n., *id. l. c.* p. 433, Florida (*cf.* p. 435 on possible relations with *Lymantes*, Sch.).

Wollastonia, g. n., *id. l. c.* p. 433. Closely allied to *Pentarthrum*, but with more narrowly separated anterior and middle coxæ, and with the antennal scrobes passing entirely beneath the eyes, and distant from their lower edge. *W. quercicola* (? *Rhyncolus quercicolus*, Boh.).

Ellasoptes, g. n., *id. l. c.* p. 436. Closely allied to *Lipommata*, Woll.,

but has eyes, and more slender antennæ and tarsi. Facies of *Mesoxenus*.
E. marinus, sp. n., *id. ibid.*, S. Francisco.

Amaurorhinus ? nitens, sp. n., *id. l. c.* p. 435, Florida.

Cossonus crenatus, p. 400, N. Oregon and California, *C. ? subcylindricus*, p. 441, Delaware, *pinguis*, Georgia, Florida, *dubius*, Illinois or Missouri, *id. l. c.* spp. nn.

Phleopagus apionoides and *minor*, spp. nn., Pennsylvania, *id. l. c.* p. 443.

Rhyncolus protractus, p. 444, California, *oregonensis*, p. 445, Oregon, *id. l. c.* spp. nn.

Hexarthrum ulkii, sp. n., *id. l. c.* p. 446, Columbia.

Phænomerus leucogrammus, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. xi. fig. 12.

Cossonus ferrugineus, Clairv., occurs in England; *C. linearis* does not. T. V. Wollaston, Ent. M. M. ix. p. 243.

SCOLYTIDÆ.

F. Chapuis's 'Synopsis des Scolytides,' Mém. Liège (2) iii. (1873), pp. 213-269, consists of very concise Latin diagnoses, with no differential characters, of all of the family but the *Tomicides* which are left to Eichhoff. This treatise was published separately in 1869, and is exhaustively discussed in Zool. Rec. vi. pp. 282-285.

Apate (Lepisomus) rufipennis and *nigriceps*, Kirby, are to be referred to *Polygraphus*: J. L. Leconte, P. Ac. Philad. 1873, p. 336.

Scotylus ratzeburgi, Jans., destroying birch: T. Kirsch, SB. Ges. Isis, 1871-2, p. 169.

Scolytus caryæ, Riley. Habits and ♂ described, and chief stages figured; C. V. Riley, Rep. Ins. Mo. v. pp. 103-108, fig. 38.

Tomicus cembrae. Economy in the Grisons described and figured, with comparison of its mines with those of *T. chalcographus*, *typographus*, and *laricis*. Bischoff-Ehinger, MT. schw. ent. Ges. iv. pp. 160-162, 2 pls.

BRENTHIDÆ.

Brenthus peninsularis, p. 128, *lucanus*, p. 129, Lower California, Horn, Tr. Am. Ent. Soc. iv. spp. nn.

ANTHRIBIDÆ.

Phlæobius pustulosus, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. xii. fig. 1.

Straboscopus planipennis, Jekel, re-described from Peru; Kirsch, B. E. Z. xvii. p. 417.

Arcocerus coffeæ acclimatized at Basle: A. Müller, P. E. Soc. 1873, p. ix.

Lawsonia, g. n., D. Sharp, Ent. M. M. x. p. 30. *Proscoporhinides*: differing from the typical genus in its head being simple in both sexes, and its very short rostrum. *L. longicornis*, *ibid.*, *variabilis*, p. 31, spp. nn., New Zealand.

Etnalis, g. n., *id. l. c.* p. 32. *Eugonides*: with transverse line of thorax projecting outwardly as a strong spine. *E. spinicollis*, sp. n., *ibid.*, New Zealand.

Stenocerus (?) *vidali*, sp. n., E. Reed, An. Univ. Chil. xli. p. 354, and Ent. M. M. ix. p. 209, Llanquihue, Chili.

BRUCHIDÆ.

V. Motschoulsky, in the (posthumous) Article 13 of his 'Énumération des nouvelles espèces, &c.,' contained in Bull. Mosc. xlvii. pp. 203-252, describes a genus expressly stated to be new, and many species not so specified, but which in the majority of cases are apparently meant to be considered new. A table of species of *Bruchus*, with localities, characters, and various authors names, is given at pp. 211-244, and the species therein attributed to the author with no references to prior descriptions are:—*B. delicatulus*, Tiflis, *lanceolatus*, Egypt, p. 211, *myobromæ*, Tauria, *maculosus*, Georgia, p. 212, *diversicornis* and *ruficornis*, Caucasus, *nigri-lineatus*, Tauris, p. 213, *tesserulus*, Sarepta, *vitticollis*, Russian Georgia, *æstuosus*, S. W. Russia, *basifasciatus*, Egypt, p. 214, *albiguttis*, Mobile, *nugarius*, Tauria, *fulvicornis* (apparently *flavicornis*, Dahl., re-named), Italy, p. 215, *implicitus*, Styria, *planeticus*, Tauris, *incanescens*, Crete, p. 216, *ovalis*, Smyrna, *niveus*, Cape of Good Hope, *forticornis*, S. W. Russia, *rubrimanus*, Georgia, p. 217, *sardous* and *angustulus*, Sardinia, *atratus*, Siberia, *pulverulentus*, Austria, p. 218, *conicus*, S. Russia, *tardus*, S. Georgia, *griseus*, Transcaucasia, p. 219, *glaucus*, E. Siberia, *simplex*, California, *præcanus*, Chili, p. 220, *inops*, Egypt, *subalbivittis*, Derbent, p. 221, *rufimaculatus*, Panama, *ruficollis*, Chili, *rufescens*, Columbia, p. 222, *rufisignatus*, Para, *rufus*, California, *transversiguttatus* (no locality), p. 223, *cinereivarius*, E. India, *conspersus*, N. America, *kamtschaticus*, Kamtschatka, p. 224, *lineolatus*, E. India, *subrufus*, Columbia, *fuscisparsus*, Brazil, p. 225, *silacialis*, Caucasus, *nugax*, Smyrna, *autumnalis*, Transcaucasia, p. 226, *virgilie* and *subroseus*, Brazil, *punctatistriatus*, Panama, p. 227, *scutulatus*, Brazil, *adustus*, Japan, p. 228, *paracentesis*, p. 229, Sardinia, *niveiguttatus*, Cape of Good Hope, *7-guttatus*, Kurdistan, *5-punctatus*, Crete, p. 230, *9-guttatus*, Syria, *canescens*, Mesopotamia, p. 231, *rostratus*, Turkey, *antennarius*, Austria, *abutilionis* and *corallipes*, N. America, p. 232, *maurus*, Algeria, *pulicarius*, California, *suratus*, Turkey, p. 233, *infectus*, Crete, *senex*, Brazil, p. 234, *lapsanæ*, Panama, *probator*, E. Indies, p. 235, *commodus*, *cribricollis*, Algeria, *aculeatus*, Valparaiso, p. 236, *nubigena*, Brazil, *divisus*, Algeria, p. 237, *gilvipes*, S. Spain, *rugicollis*, Persia, p. 238, *cavicollis*, Egypt, *varicornis*, N. America, *clavatus*, Algeria, p. 239, *varipictus*, Algeria, *pinetorum*, Siberia, *septentrionalis*, St. Petersburg, p. 240, *nictitans*, N. America, *insitivus*, Daghestan, p. 241, *latiusculus*, Kirghese Steppes, *calamitosus*, E. Siberia, *pachycerus*, Transcaucasia, *campanulatus*, Caucasus, p. 242, *venustulus*, Russian Georgia, *elegans*, Baschkiria, *incurvatus*, Caucasus, *rufipygalis*, Mongolia, *obscuritarsis*, S. Russia, *intermedius*, Georgia, p. 244. In all these cases, the descriptions are very curt and superficial.

G. H. Horn, Tr. Am. Ent. Soc. iv. pp. 311-342, revises the species

found in the United States, considering that they should be placed immediately after the *Chrysomelidæ*, if really entitled to rank as a distinct family from the latter. They certainly are not *Rhynchophora*. The species of *Bruchus* are grouped upon the basis of the denticulation of thorax and femur. *Bruchus fabæ*, Riley, = *obtectus*, Say, = *obsoletus*, Say.

G. R. Crotch, Check List N. A. Col. p. 93, sinks *Bruchus*, L., for *Mylabris*, Geoffr., and adopts the above position for the group, under the name *Spermophugide*.

Bruchus. The superficial sexual characters of the 9 British species noticed: H. S. Gorham, Ent. M. M. ix. p. 191.

Bruchus rufimanus swarming near a wrecked ship: R. Lawson, Ent. M. M. ix. p. 217.

Urodoplatus [-*tys*, vel *Platyurodon*], g. n., Motschoulsky, *l. c.* p. 203, closely allied to *Urodon*. *U. ventric[u]losus*, sp. n., *id. l. c.* p. 204, Cape of Good Hope.

Kytorhinus [*Cy-*] (Fischer de Waldheim, Mém. Nat. Mosc. ii. 1809) *semi-griseus*, E. Indies, *ipomeæ*, Brazil, p. 204, *quadratus*, Brazil, *rubiginosus*, Mexico, p. 205, *nigrirufus*, Trieste, *bifloccosus*, Venezuela, *cubicus*, Brazil, Mexico, p. 206, *pygidialis*, Brazil, *umbraculatus*, Panama, p. 207, *thermopsis*, Daouria, *aridus*, Kirghese Steppes, *immixtus*, Caucasus, p. 208, *K. (?) cassivorus*, p. 207, Chili, Motschoulsky, *l. c.* spp. nn.

Bruchus halimodendri, Gouriev, *croceipennis* and *dilutus*, Egypt, p. 209, *ochreateus*, E. India, *pallidipennis*, California, p. 210, *lanceolatus*, p. 211, Egypt, Motschoulsky, *l. c.*; *B. sordidus*, p. 319, Lower California, *impiger*, p. 323, Owen's Valley, *ulkii*, p. 324, Arizona, *bivulneratus*, Southern and Western States, *cruentatus*, Georgia to Dacota, p. 325, *limbatus*, Lower California and Arizona, *discolor*, Texas, p. 326, *nigrinus*, Middle States, *pruininus*, Arizona, p. 327, *aureolus*, p. 329, California, *floridae*, Florida, *protractus*, Lower California, p. 332, *inornatus*, Middle States, *pectoralis*, Texas, p. 333, *bisignatus*, Kansas, *albiscutellatus*, Georgia, p. 334, *perforatus*, p. 335, Arizona, *distinguendus*, Georgia, *calvus*, Massachusetts and Tennessee, *fraterculus*, Kansas, Colorado, p. 336, *amicus*, Texas, Arizona, p. 337, *longistilus*, Columbia, *schrancikæ*, Missouri, p. 339, *mixtus*, p. 340, Utah, *placidus*, Arizona, Texas, *exiguus*, Kansas, p. 341, *seminulum*, Pennsylvania to California, *macrocerus*, Columbia, Tennessee, p. 342, Horn, *l. c.*: spp. nn.

Pachymerus fuscicrus and *tuberculatus*, Panama, p. 244, *triquetrus*, Brazil, *helvinus*, Venezuela, p. 245, *P. (?) clandestinus*, p. 246, Aspinwall, Motschoulsky, *l. c.* spp. nn.

Caryoborus testaceus, p. 246, Nicaragua, *amplicollis*, Birma, *lagonychii*, Caspian Sea, p. 247, *capicola*, p. 248, Cape of Good Hope, *id. l. c.*; *C. veseyi*, Horn, *l. c.* p. 313, Lower California: spp. nn.

Spermophagus affinis, Antilles, *lineolatus*, Nicaragua, p. 248, *nigrimarginatus*, tropical America, Surinam, *dilatatus*, Syria, p. 249, *albipunctatus*, Cape of Good Hope, *bifasciolatus*, Agra, p. 250, *capensis*, Cape of Good Hope, *subdenudatus*, Songaria, p. 251, Motschoulsky, *l. c.* spp. nn.

Xenorchestes americanus, sp. n., *id. l. c.* p. 251, Mobile.

CERAMBYCIDÆ.

J. L. LECONTE, Sm. misc. Coll. No. 265, pp. 279-348 (May & June, 1873), in the 2nd part of his 'Classification of the Coleoptera of North America' (of which Part i. formed No. 136 of Sm. misc. Coll., and was published in 1862), discusses the characters and affinities of the following families:—SPONDYLIDÆ, with sub-families Parandridæ and Spondylidæ: CERAMBYCIDÆ, subf. 1, Prionidæ, tribes *Ergatini*, *Mallodontini*, *Derobrachini*, *Prionini*, *Tragosomini*, *Solenopterini* (also called *Pæcilosomini*); 2, Cerambycidæ (genuinæ), containing—a, *Callidioides*, tribes *Asemini* (groups *Asemi*, *Opsimi*, *Smodici*), *Callidiini*; b, *Cerambycoides*, tribes *Cerambycini* (groups *Æmes*, with sub-groups *Æmes*, *Achrysones*, and *Graciliæ*, *Cerambyci*, *Ibidiones*, *Curii*), *Obrini* (groups *Obria* and *Stenopteri*), *Rhopalophorini*, *Ancylocerini*, *Paristemiini*, *Rosalini* (treated as a group; accidentally, it is presumed), *Callichromini*, *Trachyderini* (groups *Megaderi*, *Trachyderes*, *Stenaspes*, *Tyloses*), *Stenosphenini*, *Clytini* (groups *Cyllenes*, *Clyti*, *Anaglypti*), *Agallissini*; c, *Atimiodes*, tribe *Atimini*; d, *Lepturoides*, tribes *Disteniini*, *Desmocerini*, *Necydalini*, *Encylopinini*, *Lepturini*; 3, Lamiidæ, containing—a, *Dorcadioides*, tribes *Dorcadiini*, *Monilemini*, *Michthysomini*; b, *Cyrtinoides*, tribes *Cyrtinini*, *Psenocerini*; c, *Lamioides*, tribe *Monohammini* (groups *Monohammi*, *Ptychodes*, *Goes*); d, *Mesosoides*, tribe *Mesosini*; e, *Acanthoderoides*, tribe *Acanthoderini*, sub-tribes *Acanthoderini* and *Acanthocini* (groups *Lagochiri*, *Liopi*, *Acanthocini*, *Dectes*); f, *Pogonocheroides*, tribes *Pogonocherini* (groups *Estolæ*, *Pognocheri*, *Eupogonii*), *Desmiphorini*; g, *Oncideroides*, tribes *Onciderini*, *Antaxiini*, *Hippopsini*; h, *Saperdoides*, tribes *Saperdini*, *Phytceiini*; i, *Methioides*, tribe *Methiini*. Mention is made of various new genera and species, simultaneously described in Sm. misc. Coll. No. 264 (Part ii.; part i. being No. 167, *op. cit.*, 1866), and which will be hereunder recorded under the usual headings. It will be observed that the author departs considerably in some instances from Lacordaire's arrangement; and his union of such widely different groups as the *Parandridæ* and *Spondylidæ*, and his attributing to them when so united a rank equivalent to the whole of the other *Longicornia*, will probably receive but little support.

H. W. Bates, Ann. N. H. (4) xii. pp. 148-156, 193-201, 308-318, 380-390, describes the Longicorn Coleoptera of Japan collected by George Lewis (62 new), whose captures have raised the number to 107 species. The nature and relations of these confirm the author's opinion that the Japanese fauna forms no part of the Palæarctic province.

The pagination of the paper by Blessig & Solsky on the *Longicornia* of S. E. Siberia and the Amur district in Hor. Ent. Ross. ix. is erroneously given in Zool. Rec. x. p. 300; and should be referred to pp. 161-260 of the former work. Owing also to a confusion between the expressed dates and actual periods of publication, a portion of vol. ix. of the Hor. Ent. Ross. was included in Zool. Rec. x.

Prionides.

Prionus tetanicus, Pasc., and ? *fossatus*, Pasc., = *insularis*, Mots.; *Ægosoma sinicum*, White, ♂ described. H. W. Bates, *l. c.* p. 151.

Cantharoctenus insignis, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. xii. fig. 2.

Homæsthesis, g. n., Leconte, *op. cit.* (265), p. 288. Differs from *Prionus* in having the sensitive surface of the antennæ uniform in the ♂, and the sides of the thorax unidentate. *P. integer*, Lec., and *emarginatus*, Say (of which *innocuus*, Lec., is probably the ♀).

Cerambycides.

H. W. BATES, Ann. N. H. (4) xi. pp. 21-45, 117-132, recapitulates the characteristics of the *Rhinotragides*, describing the genera and species of that group occurring in tropical America. He considers the triangular shape of the metasternal episterna to be essential. *Rhinotragus marginatus*, Perty, = *dorsiger*, Germ., var. *Æchmutes*, Bates, = *Ornithomus*, Thoms., which, though three years prior, is not accepted, as its name may, when the faulty grammatical construction is corrected, prove to be already employed in Zoology (Von Harold, C. H. xi. p. 122, rightly observes that Thomson's genus must stand, whether corrected or not. The obvious alteration to *Ornithostomus* he thinks could stand, not being used in *Coleoptera*; if it had been, *Orneostomus* could have been employed [there is no *Ornithostomus* in any branch of Zoology]). *Agæone*, Pasc., is considered untenable, or at most applicable to its type species, *A. notabilis*. *Acyphoderes brachialis*, Pasc., = *femoratus*, Klug.; *A. sericinus*, White, = *aurulentus*, Kby. *Phygopoda fugax*, Thoms., ? = *albitarsis*, Klug. *Pandrosos*, Bates, must be removed from the *Rhinotragides*; its proper place seems near *Coremia*. *Isthmiade hephæstionides*, Thoms., = *braconides*, Pty.; *Epimelitta*, Bates, = *Charis*, Newm., and *C. acæde*, Newm., = *barbierus*, Kby.; *Molorchus laticornis*, Klug., is a *Tomopterus*; *Sphecogaster biplagiatus*, Lac., = *Sphecomorpha chalybea*, Newm., and *Stenopterus murinus*, Klug., is also a *Sphecomorpha*, which does not belong to the *Necydalides*.

Criocephalus rusticus, L., and *Gracilia pygmæa*, F., occur in Japan; *Stenocorus vittatus*, F., = *Xystrocera globosa*. Ol.; *Leptura aterrima*, Mots., = *atra*, Laich., common in E. Siberia; *L. ochraceifasciata*, Mots., ♂ characterized, and var. n. *ochrotela*, from Nagasaki, described (p. 196); *Anthoboscus alphabeticus*, Chev., = *Clytanthus notabilis*, Pasc.; *C. japonicus*, Chev., ? = *oppositus*, Chev.; *Purpuricenus japonus* (and ? *P. spectabilis*), Mots., *sinensis*, White, = *temmincki*, Guér., for which *Sternoplistes*, Guér., need not be retained. *Id. op. cit.* xii. pp. 151-201.

Arhopalus eurystethus, Lec., = *Clytus antennatus*, White; *Stenaspis unicolor*, Dup., = *solitarius*, Say; *Elaphidion pruinosum*, Dej., Guér., = *villosum*, F. [*cf.* also Zool. Rec. viii. p. 319]: J. L. Leconte, P. Ac. Philad. 1873, p. 336. *Elaphidion operarium*, White, = *procerum* or *simplicolle*, Hald.; *Thersalus bispinus*, Pasc., ? = *E. atomarium*, Dru., and *Phacodes* is a geographical var. of *Elaphidion*: *id.*, Sm. misc. Coll. 264, p. 183.

Neomarius gandolphii, Fairmaire, re-described as g. & sp. nn. by the author. R. Z. (3) i. pp. 350 & 351 [*cf.* Zool. Rec. ix. p. 301].

Cerambyx heros: on its claims to be considered British, *cf.* F. Smith, Ent. M. M. x. p. iii.

Cerambyx velutinus, Brullé, with truncate elytra, from Valencia : Perez Arcas, Act. Soc. Esp. ii. p. 7.

Stromatium unicolor : larva described by Mulsant & Mayet, Mém. Ac-Lyon, xix. pp. 344-346.

Phoracantha recurva at Canterbury, New Zealand : C. M. Wakefield, Tr. N. Z. Inst. vi. p. 154.

Compsomera fenestrata, Gerst., fig. 3, *Rhopalizus sansibaricus*, fig. 4 ; V. d. Decken's Reisen, iii. pt. 2, pl. xii.

Aromia moschata. Figured, and general description of habits, by E. Lefroy, Sci. Goss. 1873, p. 266, figs. 170 & 171. It apparently feeds on sycamore in the Vosges and near the Grande-Chartreuse : *Callidium hungaricum* occurs with it. V. Mayet, Bull. Soc. Ent. Fr. (5) iii. p. cxcix. Thévenet, *ibid.*, states that willows are to be found in the latter locality.

Toxotus, *Anthophylax*, *Pachyta*, and *Acmæops* generically differentiated, with observations on the value attributed to them by different authors. *P. bicuneata*, Mots., = *An. 4-maculatus*, L., var. ; varieties are described of *P. variabilis*, Gebl., and *interrogationis*, L. ; *P. ustulata*, Mots., = *Ac. strigilatus*, F. ; *Stenura sedakovii*, Mann., ? = *Strangalia bifasciata*, Schr., ♀ var. ; Blessig, Hor. Ent. Ross. ix. p. 229 *et seq.*

Acmæops nigripennis, *varians*, and *fusciceps*, Lec., = *bivittata*, Say ; *A. lugens*, *mollipilosa*, *fusca*, *californica*, and *subcyanea*, Lec., = *tumida*, Lec., *A. dorsalis* and *lupina*, Lec., = *subpilosa*, Lec. ; *A. marginalis*, Lec., = *longicornis*, Kby. ; *A. gibbula*, Lec., = *proteus*, Kby. ; *A. fulvipennis*, Mann., *longiceps*, Kby., *strigilata*, F., = *pratensis*, Laich. ; Leconte, *l. c.* (264) pp. 209 & 210.

Callidium pilicolle, Thoms., ? = *macropus*, Kryn. ; *Clytus auboueri*, Desbr., = *sterni*, Ktz. : L. Bedel, Bull. Soc. Ent. Fr. (5) iii. pp. lxxxvii. & lxxxviii. Desbrochers, *l. c.* p. ccxvi., objects to the latter collocation, which, however, Bedel, p. ccxvii. corroborates. E. Olivier, *l. c.* p. ccxxvii. confirms Bedel, and states that *Clytus sterni*, Ktz., = *duponti*, Muls., = *cinereus*, Gory (found also in the United States, doubtless imported : Chevrolat, *ibid.*).

Clytus perspicillum, Fisch., = *comptus*, Mann., ♀ ; J. Faust, Hor. Ent. Ross. ix. p. 315.

Clytus erythrocephalus, F., taken in the middle of England. E. C. Rye, Ent. M. M. ix. p. 215. It has occurred at Epping, doubtless imported from N. America : H. Doubleday, *tom. cit.* p. 268.

Vesperus. Sanz's notes, in 'Resumen de los Trabajos del Ateneo propagador de las Ciencias naturales' for 1872-73, p. 8, have not been seen by the Recorder.

Vesperus vatarti. Transformations described from Aragonese individuals. The young larva is very agile, and has eyes and long hairs : the adult is blind, very slow, and almost glabrous (described, p. 119). J. Lichtenstein and V. Mayet, Ann. Soc. Ent. Fr. (5) iii. pp. 116-122, pl. v. No. ii. figs. 1-12. An instance of the larva, after making its cell, not changing to pupa, but coming out again to feed, is given by Lichtenstein, *l. c.* Bull. p. xxi. This species is injurious to vines in the Roussillon district : P. Pellet, Nouv. et faits, 1873, p. clxx.

New genera and species :—

H. W. BATES, Ann. N. H. (4) xii., characterizes—

Mallambyx, p. 152. Agrees with Australian *Pachydissus* in its unarmed antennæ and thorax, and finely pubescent surface, but differs in facies and in the very slight nodosity of 3rd and 4th antennal joints. Central groove of head extends behind to neck. *M. japonicus*, ibid., Japan, and ? *Pachydissus fulvidus*, Pasc.

Stenodryas, p. 153. Between the *Callidiopsides* and *Graciliides*. Resembles *Ceresium*, except in the long slender legs and abruptly clubbed femora. *S. clavigera*, p. 154, Hiogo.

Stenygrinum, p. 154. Facies of *Stenygra*, but closely allied to *Ceresium*, and more so to the Australian *Bethelium*, from which it differs in its cylindrical thorax and less hirsute antennæ. *S. quadrinotatum*, ibid., Ipongi.

The same author, *op. cit.* xi., characterizes—

Phænissa, sub-g. of *Ommata*: elytra entire or nearly so. *Oregostoma nigripes*, and (?) *discoideum*, Serv., *Rhinotragus puniceus*, Newm., and *O. (P.) bipartita*, Paraná, p. 26.

Chrysaethe, sub-g. of *Ommata*: elytra scarcely abbreviated, apex truncated. *O. atrata*, Bates, &c. p. 27.

Rhopalessa, sub-g. of *Ommata*: elytra opaque. *O. (R.) clavicornis*, New Friburg, p. 28, and *Rhinotragus tenuis*, Burm.

Eclipta, sub-g. of *Ommata*, p. 29: legs slender, middle femora abruptly but not very broadly clavate, elytra with sides sub-parallel, apex truncated. *Odontocera irene* and *eunomia*, Newm., *ægrotæ*, Bates, *Agaone monostigma*, *malthinoides*, and *ruficollis*, Bates, *Oregostoma fenestratum*, Luc., and *O. (E.) castanea*, p. 29, *brachialis* and *liturifera*, p. 31, *lanuginosa*, p. 32, Rio Janeiro, *thoracica* and *flavicollis*, p. 30, *prolixa*, p. 32, *cribripennis*, p. 33, *vitticollis*, p. 34, *aniguttata*, *xantho*, and *pæcila*, p. 35, Paraná, *erythrodera*, p. 33, New Friburg.

Acorethra, p. 126. Closely allied to *Charis* and *Phygopoda*, differing from the former in its elongate hind legs and abdomen, and from the latter in its simple hind tibiæ and obtuse cuneiform elytra. *A. chrysaëpis*, ibid., New Friburg.

Phespia, p. 127. Closely allied to *Tomopterus*: enlarged antennal joints forming a thick cylinder, elytra subuliform. Facies of *Cerceris* (*Hymenoptera*). *Odontocera cercerina*, Bates, *Charis corinna*, Pasc., and *P. simulans*, ibid., Rio Janeiro and Paraná.

Apostropha, p. 130. Allied to *Ommata*, but differing in the widely separated eyes from all the typical *Rhinotragides*. *A. curvipennis*, ibid., Paraná.

Stenopseustes, p. 131. Facies of *Ommata*. *S. æger*, ibid., Paraná.

Xenocrasis, ibid. Unites characters of true *Necydalides* and *Rhinotragides*, being most nearly allied to the latter, though with distant and not enlarged eyes and laterally carinated forehead. *X. badeni*, p. 132, New Friburg.

Leconte, Sm. misc. Coll. 264, characterizes—

Gonocallus, p. 171. Male antennæ 12-jointed; eyes more inclined to

embrace the base of the antennæ than in any other Callidoid genus. *Callidium collare*, Kby.

Ganimus, p. 173. Differs from *Æme* in its prothorax being lobed at the base: a well defined angle near the tip of mandibles. *G. vittatus*, p. 174, California.

Eucrossus, p. 174, differs from *Dryobius* in its uniformly pubescent body. *E. villicornis*, p. 175, Arizona, California.

Haplidus, p. 175. Differs from *Æme* and allies in its short, equal, slender palpi; front coxæ contiguous, hardly prominent, middle coxæ distant. *H. testaceus*, p. 176, California, Nevada, Utah.

Acestinus, p. 177. Differs from *Hammaticerus* in its 12-jointed, silky, serrate antennæ. *A. obscurus*, *ibid.*, Rio Grande Valley.

Osmidus, *ibid.* Differs from *Hesperophanes* in its more elongate form and the absence of a deep frontal suture. *O. guttatus*, p. 178, Cape St. Lucas.

Aneflus, p. 185. Allied to *Elaphidion*; antennæ with apical joints flattened and distinctly carinated, legs coarsely punctured and pubescent, &c. *E. protensum*, *lineare*, and *tenue*, Lec., and *A. volitans*, p. 186, *prolixus*, p. 203, note, Lower California.

Eustroma, p. 186. Antennæ shorter and stouter than in *Elaphidion*, joints excavated beneath. *Elaphidion validum*, Lec.

Zamodes, p. 187. Differs from *Tylonotus* in its non-sulcate antennæ, the want of callosities on the thorax, and its long erect hairs (? = *Zanium*, Pascoe). *Z. obscurus*, p. 188, Pennsylvania.

Plectomerus, p. 189. Differs from *Curius* in its cylindrical polished body, pedunculated and suddenly clavate femora, &c. *Callidium dentipes*, Ol.

Eumichthus, p. 190. Allied to preceding, but palpi slightly dilated, and tarsi tumid. *E. ædipus*, *ibid.*, Vancouver Island.

Hybodera, p. 191. Allied to *Cartallum*, thorax with 4 discoidal tubercles and a small median one. *H. tuberculata*, *ibid.*, Oregon, Vancouver I.

Pilema, *ibid.* Differs from *Cartallum* in its slender palpi, with cylindrical last joint, and in its wide truncate mesosternum. *P. ruficolle* and *cyanipenne*, p. 192, California.

Megobrium, p. 192. Intermediate between *Cartallum* and *Pilema*. *M. edwardsi*, p. 193, California.

Holopleura, p. 193. Allied to *Pteroplatys*; antennæ long, slender, with simple 11th joint. *H. marginata* and *helena*, p. 194, California.

Schizax, p. 195. Allied to *Tylosis*, but with divided eyes. *S. senex*, p. 196, Arizona.

Zagymnus, p. 203. Differs from *Agallissus*, Dalm., in its short, vertical front, parallel elytra with small sutural spine, &c. *Z. clerinus*, *ibid.*, Florida.

Leptalia, p. 204. Allied to *Encyclops*. *Anoplodera macilenta*, Mann. (with varr. *frankenheuseri*, Mann., and *Leptura fuscicollis*, Lec.).

The same author, *op. cit.* 265, characterizes—

Xylocrius, p. 296. Mesonotum punctured and pubescent at the sides, with a median stridulating surface. *Callidium agassizi*, Lec. (and *X. cribratus*, *op. cit.* 264, p. 172, Nevada).

Callimus, p. 305, allied to *Obrium*: palpi with last joint broadly triangular (*C. chalybæus*, op. cit. 264, p. 189, California).

Glycobius, p. 319. Allied to *Cyllene*; antennæ compressed, subserrate. *Cyllene speciosa*, Say.

Calloides, ibid. Antennæ filiform, mesosternum declivous; allied also to *Arhophalus*. *Cyllene nobilis*, Harris, and *lorquini*, Buq.

Microclytus, p. 320. Antennæ not spinose, 2nd and 4th joints equal; elytra without ivory spots; facies of *Anaglyptus*. *Clytus gazellula*, Hald.

Bellamira, p. 328. Allied to *Strangalia*; elytra strongly sinuate on the sides, antennæ without poriferous spaces. *Toxotus coarctatus*, Hald., = *Leptura scalaris*, Say.

Omphalodera, Blessig, Hor. Ent. Ross. ix. p. 244. Facies of a small *Acmeops*, but with 4 posterior tibiæ curved, head and antennæ differently formed, &c. *O. puziloi*, id. l. c. p. 245, pl. viii. fig. 5, Siberia.

Strangal[i]omorpha, id. l. c. p. 253. Like a very narrow *Strangalia* or *Leptura*; near the former and *Ædicnema*, but with shorter head, antennæ inserted between the eyes, very long and slender hind legs, &c. *S. tenuis*, id. l. c. p. 254, S. E. Siberia.

BATES, op. cit. xii., describes—

Neocerambyx [?] *chrysothrix*, p. 152, Nagasaki.

Ceresium holophæum, p. 153, Hiogo.

Obrium longicorne, p. 155, Japan.

Stenomalus cleroides, ibid. Ipongi.

Distenia japonica, ibid. Hiogo.

Toxotus ceruleipennis, p. 193, Japan or N. China.

Acmeops criocerinus, p. 194, Awomori, Nipon (? = *Pachyta minuta*, Gebl.).

Leptura scotodes, p. 194, Nagasaki, *dimorpha*, *xanthoma*, p. 195, *anaspidioides*, p. 196, Japan.

Thranium variegatus, p. 196, Nagasaki.

Callichroma (*Chloridolum*) *tenuatum*, p. 197, Kobe, Nipon.

Phymatodes albicinctus, p. 198, Omura.

Clytanthus muscosus, p. 198, Hiogo, *diminutus*, p. 199, Nagasaki.

Xylotrechus pyrrhoderus, p. 200, Nagasaki, Yokohama.

Clytus caproides, ibid. Ipongi.

The same author, op. cit. xi., describes—

Oxylymma gibbicollis, p. 23, Bahia.

Odontocera vittipennis, p. 37, Brazil, *clara*, p. 38, Chontales, *crocata* and *sanguinolenta*, p. 40, Rio Janeiro, *flavicauda*, p. 40, Paraná, *nigriclavus*, p. 41, Rio Janeiro and Paraná, *auricincta*, Mexico. *leucothea*, New Friburg, Minas, and Paraná, p. 42, *hilaris*, p. 43, Amazons, *petiolata*, p. 44, New Friburg, Rio Janeiro.

Acyphoderes mæstus, p. 117, Paraná, *carinicollis*, p. 119, Rio Janeiro.

Isthmiade rubra, p. 121, Rio Janeiro, *macilentata*, p. 122, S. Brazil.

Charis mimica, p. 123, New Friburg, *bicolor*, p. 124, no locality given.

Tomopterus quadratipennis, p. 128, Rio Janeiro.

LECONTE, *op. cit.* 264, describes—

- Asemum niidum*, p. 169, Oregon.
Criocephalus montanus, p. 170, Colorado.
Gracilia fasciata, p. 171, Lower California.
Callidium vile, California, *hirtellum*, Nevada, p. 172.
Eme costata, p. 174, California.
Achryson concolor, p. 176, Texas.
Eburia perforata, *ovicollis*, p. 180, *tumida*, p. 181, Texas.
Elaphidion aculeatum, p. 184, Texas, *punctatum*, p. 185, Lower California.
Compsa puncticollis, p. 188, *4-plagiata*, p. 189, Lower California.
Phyton discoideum, p. 190, Lower California.
Molorchus longicollis, p. 193, California.
Rhopalophorus laevicollis, *ibid.*, Texas, N. Mexico.
Callichroma cobaltinum, p. 195, Lower California.
Crossidius punctatus, p. 197, Oregon, California.
Cyllene brevipennis, p. 197, Utah.
Clytus lanifer, p. 198, California.
Xylotrechus convergens, p. 198, Ohio, *insignis*, California, *obliteratus*, Colorado, p. 199.
Neoclytus torquatus, p. 200, Texas, *balteatus*, Oregon, *interruptus*, California, p. 201.
Euderces reichii, Texas, *parallelus*, Lower California, p. 202.
Necydalis cavipennis, p. 204, S. Francisco.
Centrodera (not distinct from *Xylosteus*) *nevadica*, p. 205, Nevada.
Xylosteus ornatus, *ibid.*, Oregon.
Toxotus obtusus, p. 206, Yellowstone Basin.
Pachyta armata, Oregon, *rugipennis*, Canada, p. 207.
Anthophylax tenebrosus, p. 208, California.
Acmaeops pinguis, p. 210, California, *ligata*, Montana, *basalis*, California, p. 211.
Strangalia virilis, p. 212, Texas.
Typocerus brunnicornis, p. 214, Texas.
Leptura gigas, p. 223, Texas, *soror*, p. 223, *plagifera*, *rubida*, *tribalteata*, p. 224, *grossa*, p. 225, *coccinea*, p. 226, *crassicornis*, *behrensi*, p. 227, California, *quadrata*, p. 225, Saskatchewan, *brevicornis*, Nevada, *hirtella*, Labrador, p. 226, *gnathoides*, *spuria*, Oregon, *aspera*, Vancouver I., p. 228.

Cerambyx elegans, C. A. Dohrn, S. E. Z. xxxiv. p. 74, Astrabad (= *multiplicatus*, Motsch. : *id. op. cit.* p. 322).

Xylosteus gracilis, Kraatz, B. E. Z. xvii. p. 202, Illyria.

Leptura (*Anoplodera*) *gibbicollis*, Blessig, l. c. p. 258, Siberia.

Gaurotes ? (*Acmaeops*) *ussuriensis*, *id. l. c.* p. 247, Ussuri, Siberia.

Callidium (*Rhopalopus*) *caucasicum*, Des Loges, Bull. Soc. Ent. Fr. (5) ii. p. cxxxvii. Caucasus.

Clytus favieri, Fairmaire, R. Z. (3) i. p. 351, Morocco.

Lamiiides.

Dorcadion. A revision by Kraatz., Käf. Europa's, xxix. 33-101a. D.

pallasi, Gebl., nec Fisch., is re-named *gebleri*, and is probably only a var. of *glycyrrhizæ*, Pall., of which *olivieri*, Thoms. (*politum*, Fisch., nec Dalm.) is probably a local race; *D. abakumovii*, Thoms., = *politum*, Dalm., var.; *D. suturatum*, Ferrari, = *nitidum*, Mots.; a var. of *D. femoratum*, Brullé, from Salonica, is named *lineaticolle*; a var. of *D. molitor*, F., from Embrun, is named *brisouti*; varr. of *D. saulcivii*, Thoms., named *halepense* [*aleppense*], *atticum*, and *parnassi*.

Dorcadion uhagoni, Per., re-described and figured, from Cuenca; Martinez y Saez, An. Soc. Esp. ii. p. 69, pl. i. fig. 5. *D. annulicornia*, Chev., varies in colour, and ? = *handschuchi*, Küst.; Perez Arcas, Act. Soc. Esp. ii. p. 11.

Listroptera perforata, Burm., nec Klug, is re-named *parana* [? -næ]; *Tapina coronata*, Thoms., nec Serv., re-named *diadema*; *Phantasia crispa*, Gmel., nec F., re-named *gmelini*: Gemminger, C. H. xi. p. 146.

Monohammus dentator. Transformations and habits fully described: F. C. Bowditch, Am. Nat. vii. pp. 498-500.

Monohammus impluviatus, Mots., = *saltuarius*, Esch.; Blessig, Hor. Ent. Ross. ix. p. 198 (it is specifically distinct; Solsky, *ibid.*, note). *M. 4-maculatus*, Mots., = *sartor*, F.; *Agapanthia angusticollis* and *lineaticollis* are not distinct; *A. fasciculosa*, Mots., = *pilicornis*, F.; *Saperda rudolphi*, Cederh., *seydlii*, Fröh., = *perforata*, Pall.: *id. l. c.* pp. 200-219.

Mesosa nubila: larvæ in branches from lower parts of oaks. G. Tappes, Bull. Soc. Ent. Fr. (5) iii. p. cxciii.

Xylorhiza venosa, Latr., destructive to *Callicarpa macrophylla* in China, described and figured in its chief stages by H. Lucas, Ann. Soc. Ent. Fr. (5) iii. pp. 375-386, pl. xi.

Melanauster macularius, Thoms., = *punctator*, F., var., = *chinensis*, Forst.; *M. championi*, White, = *ruber*, Dalm.; *Batocera chinensis*, Thoms., = *lineolata*, Chev.; *Yochostyla japonica*, Thoms., = *Bumetopia oscitans*, Pasc.; *Thyestes pubescens*, Thoms., = *gebleri*, Fald.; H. W. Bates, Ann. N. H. (4) xii. pp. 311-386.

Freya marmorata, Gerst., fig. 5, *Phoryctes mucoreus*, G., fig. 6, *Hippoposicon virgatum*, G., fig. 7, *Tetraglenes phantoma*, G., fig. 8; V. d. Decken's Reisen, iii. pt. 2, pl. xii.

Amphionycha subarmata, Lec., is a *Eupogonius*; Leconte, Sm. misc. Coll. No. 264, p. 236.

Agapanthia asphodeli: larva described by Mulsant & Mayet, Mém. Ac. Lyon, xix. pp. 346-348.

Agapanthia micans, Payk., recorded (doubtfully) from Gt. Britain. E. C. Rye, Ent. M. M. ix. p. 190.

Saperda populnea very injurious to aspens in the forest of Sènant; J. Fallou, Bull. Soc. Ent. Fr. (5) iii. p. cxciii.

Saperda phoca. On its habits in the Grenoble Alps, cf. A. Ponson, Bull. Soc. Ent. Fr. (5) iii. pp. clxii. & clxxxv. Larva and economy described by J. Erné, MT. schw. ent. Ges. iv. pp. 135-137.

New genera and species:—

Microlera, H. W. Bates, *l. c.* p. 380. Facies of *Ptinus*. Apparently belongs to the *Apomecyninae*, except for its short metathorax; also sug-

gestive of *Mesolita* (*Parmenine*), but with non-divaricate claws, middle tibiæ grooved outwardly, &c. *M. ptinoides*, id. l. c. p. 381, Hiogo.

Lasiapheles, id. l. c. p. 382. *Apodasyinae*: but with the middle acetabula open outwardly. Facies of a large *Obrium*. *L. obrioides*, id. *ibid.*, Nagasaki.

Asaperda, id. l. c. p. 385. Facies of the *Saperdæ*, but with diverging, simple claws. Agrees best with the *Apomecyninae*, but perhaps forming a distinct group, near the *Agapanthiinae*. *A. rufipes*, Hiogo, *agapanthina*, Awomori, Yokohama, id. l. c. p. 386.

Sternidius, Leconte, *op. cit.* (264) p. 234, = Div. C of Leconte's *Liopus*, differing from *Leptostylus* in the longer 1st joint of its hind tarsi, and from *Liopus* in its broad truncate mesosternum. *Liopus alpha*, Say (*L. misellus* and *rusticus*, Lec. are varr. of this), and allies; and *S. crassulus*, id. l. c. p. 235, Lower California.

Eutassus, id. l. c. p. 235. *Acanthocininae*: antennæ with joints 5-11 shorter than 4th joint (= *Mecotartarus*, H. W. Bates; Rec. Am. Ent. 1873, p. 96, note). *E. granosus*, *op. cit.* No. 265, p. 339, (=) *asper*, id. *op. cit.* (264) p. 236, Lower California.

Styloxus, id. *op. cit.* (264), p. 239. Allied to *Methia* (see *op. cit.* No. 265, p. 348). *S. lucanus*, id. *op. cit.* (264), p. 240, Lower California.

Rhopaloscelis, Blessig, Hor. Ent. Ross. ix. p. 205. Facies of *Astynomus*, but allied to *Stenidea* and *Pogonocherus*; differing from the latter in its much narrower build, longer antennæ (of which the 5th joint is only slightly shorter than the 4th), and want of tufts on the elytra; and from the former in the strongly clavate femora, laterally tuberculate thorax, &c. *R. unifasciatus*, id. l. c. p. 206, pl. viii. fig. 3, Amur.

Eurycotyle, id. l. c. p. 210. Facies of *Liopus*, but with differently built antennæ, the front acetabula angulated outwards, the thorax with simple sides, &c. *E. maacki*, id. l. c. p. 211, pl. viii. fig. 4, S. E. Siberia.

Tylophorus, id. l. c. p. 213. Near *Niphona*, but with the facies of *Coptops*, and doubtfully distinct from *Hecyrida*, Thoms. *T. wulffi*, id. l. c. p. 215, pl. viii. fig. 3, Port Bruce.

Echthistatus gibber, Bates, l. c. p. 308, Maiyasan.

Monilema gigas, forte, Arizona, *obtusum*, Utah, Leconte, *op. cit.* (264), p. 230.

Dorcadion brunneicolle, 37, *spectabile*, 38, *biforme*, 53, Persia, *mniszzechi*, 39, *semnudum*, 83, *striolatum*, 93, *sericatum*, 98, Caucasus, *lugubre*, 41, Salonica, Macedonia, *impressicolle*, 47, Syria, *pilosellum*, 58, Mytilene, *minutum*, 76, Greece, *forcipiferum*, 60, Palestine, *insulare*, 62, Naxos, *lativittatum*, 66, *aurivittatum*, 81, *semivelutinum*, 82, *piochardi*, 85, *scrobicolle*, 97, Asia Minor, *javeti*, 91, Greece and Asia Minor, *beckeri*, 71, Derbent, *elegans*, 73, *sareptanum*, 74, Sarepta, *semilucens*, 84, Mongolia, *basale*, 86, Armenia, *kollari*, 87, *macropus*, 99, Amasia, *4-pustulatum*, 88, Dardanelles, *fallax*, 89, Roumelia, *heldreichi*, 90, Athens, *libanoticum*, 100, Mt. Lebanon, Kraatz, l. c.; *D. apicale*, Chevrolat, Ann. Soc. Ent. Fr. (5) iii. p. 205, Syria.

Monohammus subfasciatus, p. 308, Nagasaki, *luxuriosus*, Japan and N. China, *fraudator*, Nagasaki, p. 309, *sejunctus* (? = *Oroides sobrius*, Pasc.), *degener*, p. 310, Japan, Bates, l. c.: *M. guttatus*, Blessig, l. c. p. 196,

pl. vii. fig. 2, S. E. Siberia; *M. minor* (? = *titillator*, Ol., var.; Rec. Am. Ent. 1873, p. 96), Georgia, *oregonensis* (= *scutellatus*, Say; Rec. Am. Ent. 1873, p. 96), Oregon, Leconte, *op. cit.* (264), p. 231.

Mesosa japonica, p. 312, Nagasaki, *longipennis*, p. 313, Hiogo, Bates, *l. c.* *Rhodopis lewisi*, *id. ibid.*, Hiogo.

Olenecamptus cretaceus, *id. l. c.* p. 314, Japan.

Elara furcata, *id. ibid.*, Hiogo and Formosa.

Praonetha caudata, *zonata*, *jugosa*, p. 315, *rigida*, p. 316, *angusta*, *liopodina*, p. 317, Japan, *id. l. c.*

Apomecyna nevica, *id. l. c.* p. 317, Japan.

Sybra ordinata and *cribrella*, *id. l. c.* p. 318, Japan.

Atimura japonica, *id. l. c.* p. 381, Hiogo.

Lophopœum volitans, Leconte, *op. cit.* (264), p. 232, Lower California.

Leptostylus palmeri, Arizona, *planidorsus*, Louisiana, p. 233, *parvus*, p. 234, Western States, *id. l. c.*

Eupogonius pubescens, *id. l. c.* p. 236, Ohio.

Mecas marginella, *id. l. c.* p. 239, W. States & Texas.

Dysphaga lævis, *id. l. c.* p. 240, Illinois.

Methia punctata, *id. l. c.* p. 240, note, San Domingo, Cuba.

Pogonocherus seminivens, Bates, *l. c.* p. 382, Japan; *P. dimidiatus*, Blessig, *l. c.* p. 208, S. E. Siberia; *P. crinitus*, *simplex*, and *P. (?) sordidus*, Leconte, *l. c.* p. 237, California.

Smernus (?) bimaculatus, Bates, *l. c.* p. 383, Maiyasan.

Calamobius japonicus, *id. ibid.*, Nagasaki.

Liopus guttatus, *id. l. c.* p. 384, Hiogo.

Exocentrus fasciolatus and *lineatus*, *ibid.*, *tonsus* and *guttulatus*, p. 385, Japan, *id. l. c.*

Glenea ocelota, *id. l. c.* p. 387, Hiogo.

Saperda carinata, p. 219, *8-maculata*, p. 221, Blessig, *l. c.* S. E. Siberia.

Phytocia simulans, Osaka, *ventralis* (Chevr., ? MS.), Nagasaki, Formosa, and China, Bates, *l. c.* p. 388; *P. punctigera*, Blessig, *l. c.* p. 226, Upper Amur.

Conizonia coquereli, Fairmaire, R. Z. (3) i. p. 352, Mers-el-Kebir.

Oberea vittata, Blessig, *l. c.* p. 223, S. E. Siberia; *O. japonica*, p. 388, *hebescens* (? = *japonica*, var.), *mixta*, and *nigriventris*, p. 389, *marginella* and *fulveola*, p. 390, Japan, Bates, *l. c.*

CHRYSOMELIDÆ.

J. S. Baly's 'Catalogue of the Phytophagous Coleoptera of Japan, with descriptions of the species new to Science,' Tr. E. Soc. 1873, pp. 69-99, refers chiefly to species found by G. Lewis in Japan.

G. R. Crotch's 'Materials for the Study of the Phytophaga of the United States,' P. Ac. Philad. 1873, pp. 19-83, although not intended as a monograph, will probably form the starting point for such a work, as regards North American representatives of the group. It contains tables of characters, diagnoses of new genera and species, short descriptions of most known species, and much synonymy.

Sagrides.

Sagra splendida, F. Economy and metamorphoses very fully described

and figured by H. Lucas, Ann. Soc. Ent. Fr. (5) iii. pp. 231-248, pl. vii. The insect is very common at Whampoa, and near Canton and Hong Kong, feeding in stems of *Dioscorea batatas*, without injuring the tubers. A var. from Kian-Si; p. 247, note.

Donaciides.

Donacia. A tabulated list of North-American species given by Crotch, *l. c.* pp. 20 & 21. According to him, *D. rufescens*, Lac., & *pulchella*, Lec., = *lucida*, Lac.; *D. congener* and *alutacea*, Lec., = *piscatrix*, Lac.; *D. confusus*, Say, *fulgens*, Lec., = *subtilis*, Knz.; *D. aurifer* and *dives*, Lec., *pusilla*, Say, = *cuprea*, K.; *D. gentilis*, Lec., = *metallica*, Ahr.; *D. sulcicollis*, Lac., = *kirbii*, Lac.; *D. californica*, Lec., = *proxima*, K.; *D. junci*, Coup., = *emarginata*, K.

Donacia araria, Baly, occurs in Japan, and ? = *javana*, Wied.; J. S. Baly, Tr. E. Soc. 1873, p. 69.

Donacia pubicollis, p. 21, Illinois, *texana*, p. 22, Texas, Crotch, *l. c.* spp. nn.

Orsodachnides.

Crotch, *l. c.* p. 22, associates *Orsodachna*, Latr., *Zeugophora*, Kunze, and *Syneta*, Esch., under this name. *O. hepatica* and *vittata*, Say, *bivittata*, Lac., *ruficollis* and *inconstans*, Newm., *armeniaca*, Germ., = *atra*, Ahr.; *S. costata*, Newm., = *ferruginea*, Germ.; *S. seriata* and *suturalis*, Lec., = *albida*, Lec., ♂.

Zeugophora puberula, *varians*, *consanguinea*, spp. nn., Crotch, *l. c.* p. 23, Illinois.

Criocerides.

Lema trivirgata, Lec., = *trilineata*, Ol., var.; *L. ephippiata* and *albini*, Lac., = *6-punctata*, Ol., varr.: Crotch, *l. c.* p. 26.

Lema concinnipennis, *fortunii*, and *downesi*, Baly, *puncticollis*, Curt., *flavipes*, Suffr., var., *10-punctata*, Gebl. (not a *Criocercis*, as Lacordaire suspects), and *Criocercis 14-punctata*, F., occur in Japan; *L. 4-punctata*, Swartz, *nec* Ol., = *adamsi*, Baly, var.; *Criocercis lateritia*, Baly, = *subpolita*, Mots.; J. S. Baly, Tr. E. Soc. 1873, p. 70 *et seq.*

Lema diversa, p. 71, *lewisi* and *coronata*, p. 72, *honorata*, p. 73, *dilecta*, p. 74, *delicatula*, p. 75, Japan, *id. l. c.*; *L. texana*, Texas, *peninsulae*, Lower California, p. 25, *saji*, Southern States, p. 26, Crotch, *l. c.*: spp. nn.

Criocercis parvicollis, sp. n., Baly, *l. c.* p. 76, Nagasaki.

Megalopides.

Temnaspis japonicus, sp. n., *id. l. c.* p. 78, Nagasaki.

Pedrillia annulata, sp. n., *id. l. c.* p. 19, Japan.

Clithrides.

Crotch, *l. c.* p. 27 *et seq.*, under the name "*Melolonthides*," gives the following synonymy:—*Anomæa mutabilis*, Lac., = *lati-clavia*, Forst.; *Babia pulla*, Lac., and *B. tetraspilota*, Lec., = *biguttata*, Ol.; *Clithra bisignata*, Walk., = *Saxinis saucia*, Lec.; *Euryscopa scapularis*, Lec., *nec*

Lac., is re-named *leontii*; *Coscinoptera franciscana*, Lec., = *dominicana*, F.

H. Lucas, Ann. Soc. Ent. Fr. (5) iii. p. 240, note, gives a list of 8 species described by himself in his Hist. nat. des Anim. Art. de l'Algérie, ii. (1849), and omitted by Lefèvre from his monograph.

Clithra laeviuscula, Ratz., *Gynandrophthalma cyanea* and *aurita*, F., occur in Japan; Baly, *l. c.* pp. 80 & 81.

Clithra (Diapromorpha) hæmorrhagica, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. xii. fig. 9.

Clithra japonica, sp. n., Baly, *l. c.* p. 79, Nagasaki.

Coptocephala orientalis, sp. n., *id. l. c.* p. 81, Hiogo.

Coscinoptera ænescens, Southern States, *major*, Texas, spp. nn., Crotch, *l. c.* p. 29.

Otiocephala warioni, sp. n., Lefèvre, Bull. Soc. Ent. Fr. (5) iii. p. cex. Oran.

Lamprosomides.

Lamprosoma cupreatum, p. 82, *nigricæruleum*, p. 83, spp. nn., Baly, *l. c.* Nagasaki.

Chlamydides.

Chlamys assimilis, Klug, *polycocca*, Lac., = *plicata*, Ol.; *Exema dispar*, Lac., = *conspersa*, Mann.: Crotch, *l. c.* p. 30.

Chlamys lewisi, p. 83, *interjecta*, p. 84, *spilota*, p. 85, spp. nn., Baly, *l. c.* Japan.

Eumolpides.

Fidia viticola, Uhler, = *longipes*, Melsh.; *Chrysochus californicus*, Marshall, and ? *tenebricosus*, Marsh., = *cobaltinus*, Lec.; *Paria 6-guttata*, Lec., and *gilvipes*, Dej., = *6-notata*, Say; *Metachroma suturale*, Lec., = *dubiosum*, Say; *M. puncticolle*, Lec., = *quercatum*, F.; *Colaspis humeralis*, Lec., = *tristis*, Ol.: Crotch, *l. c.* p. 34 *et seq.*

Bromius (Redt., 1848). E. Lefèvre, Bull. Soc. Ent. Fr. (5) iii. p. cxv. points out Baly's correct reference of this genus to *Adoxus* (Kirby, 1837).

Eumolpus vitis. Larva (which feeds on root of the vine, and makes no sack) described and figured with details: Geyza v. Horváth, Verh. z.-b. Wien, xxiii. pp. 36-40, pl. 1 B, figs. 1-5.

Chalcoparia, g. n., Crotch, *l. c.* p. 39. Thorax not margined behind; head deeply immersed, antennæ distant, eyes not emarginate, no ocular sulci; thorax hardly lobed behind eyes, antennæ with joints 2-4 equal, short; tibiæ not produced at apex; claws appendiculate. *C. globosa*, Ol.

Metaparia, g. n., Crotch, *l. c.* p. 40. Head broad, eyes emarginate, thorax not lobed, tibiæ dentate at tip. *M. elytroides*, sp. n., *id. ibid.*, Texas.

Fidia murina, sp. n., *id. l. c.* p. 33, Middle and S. States.

Heteraspis marcessita, sp. n., *id. l. c.* p. 35, Middle and S. States.

Glyptoscelis illustris, p. 35, *squamulatus* and *alternatus*, p. 36, California, *id. l. c.* spp. nn.

Typophorus metasternalis, Illinois, *oregonensis*, Oregon, *id. l. c.* p. 38, spp. nn.

Paria levicollis, Pennsylvania, *viridicyanea*, M. and S. States, Illinois, Mexico, *id. l. c.* p. 40, spp. nn.

Metachroma angustum, Missouri, &c., *californicum*, California, p. 41, *peninsulare*, California, p. 42, *vicinum*, S. Carolina, *marginale*, *levicolle*, *pellucidum*, N. Carolina, *floridanum*, Florida, p. 43, *laterale*, N. Carolina, Kansas, p. 44, *id. l. c.* spp. nn.

Colaspis arizonæ and *nigricyanea*, Arizona, *id. l. c.* p. 45, spp. nn.

Pseudocolaspis cyanea, Raffray, R. Z. (3) i. p. 384, Boghari; *P. cereinigra*, Fairmaire, Ann. Soc. Ent. Fr. (5) iii. p. 392, Algeria: spp. nn.

Nodostoma bimaculatum, sp. n., Raffray, *l. c.* p. 385, Boghari.

Cryptocephalides.

E. von Harold, B. E. Z. xvii. pp. 161-180, discusses the nomenclature of this group, especially with reference to the non-adoption by Suffrian of names earlier than Fabricius (1792). *Griburius*, Hald. (with a protest against its barbarity), is older than, and must be adopted for, *Scolochrus*, Suffr.; *C. apicalis*, Gebl., is adopted for *flaviguttatus*, Suffr., *nec* Schr., which is *moræi*, L.; and *Ochrosopsis apicalis*, Saund., may require re-naming. *C. vittula*, Suffr., = *amænus*, Drap.; *C. huebneri*, F., = *hæmorrhoidalis*, Schn., = *chrysopus*, Gmel., = *biguttatus*, Schall.; *C. lineola*, F., = *limbatus*, Laich.; *C. bohemi*, Germ., = *bohemi*, Drap.; *C. brunnipes*, Ol., is adopted, as older, for *congestus*, F.; *C. cærulescens*, Suffr., *nec* Sahlb., requires re-naming; *C. distensus*, Chev., is adopted for *5-punctatus*, Suffr., *nec* Harrer; *C. tessellatus*, Germ., = *elongatulus*, Ol., = *elegantulus*, Grav.; *C. flavescens*, Schn., = *frenatus*, Laich.; *C. minutus*, F., = *fulvus*, Goeze; *C. geminus*, Gyll., = *ocellatus*, Drap.; *C. bistrispunctatus*, Germ., = *imperialis*, Laich.; *C. marie*, Muls., is adopted for *signatus*, Ol., *nec* Laich.; *C. dispersus*, Hald., = *mutabilis*, Melsh.; *C. fulcratus*, Germ., = *violaceus*, Fourcr., = *livens*, Gmel., = *nigricæruleus*, Goeze; *C. nitida*, L., is adopted instead of *nitens*, L.; *C. variabilis*, Schneid., = *8-punctatus*, Scop.; *C. flavilabris*, F., = *parvulus*, Müll.; *C. coloratus*, F., = *14-maculatus*, Schn.; *C. 12-punctatus*, F., = *5-punctatus*, Harrer; *C. gracilis*, F., = *rufipes*, Goeze; *C. lobatus*, F., = *schæfferi*, Schr.; *C. hypsilon*, Parreyss, = *maculipes*, Zoubk., = *sesquistriatus*, Kryn.; *C. interruptus*, Suffr., = *signatus*, Laich.; *C. 14-pustulatus*, Suffr., = *tesseratus*, Chev.; *C. florentinus*, Ol., = *tricolor*, Rossi; *C. salicis*, F., = *3-maculatus*, Rossi; *C. consobrinus*, Suffr., *nec* L., is re-named *patruelis* (p. 175); *Griburius fallax*, Suffr., = *humeralis*, Stål; *Pachybrachys morosus*, Hald., is adopted for *pubescens*, Ol., *nec* F.; *P. histrio*, Ol., = *tessellatus*, Ol.; *P. fimbriolatus*, Suffr., = *tristis*, Laich. Other alterations are suggested, by which names of authors, not of species, are changed. A list of species not quoted by Suffrian is given, and a table of the European species, as altered, with synonyms.

Monachus affinis, Hald., = *auritus*, Hald., ♀; Crotch, *l. c.* p. 30.

Cryptocephalus. Crotch, *l. c.* p. 31, uses the ♂ characters in grouping the N. American species, in preference to following Suffrian. He unites *C. æneolus*, Lec., *chalconotus*, Mann., and *viridis*, Hald., with *auratus*, F., and suggests other synonymy.

Cryptocephalus apertus, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. xii. fig. 10.

Cryptocephalus stragula, Rossi (♂ unknown), occurs at Sainte-Baume; *C. perrieri*, Fairm., is a good species: G. Tappes, Bull. Soc. Ent. Fr. (5) iii. p. cxxxvii. *C. gamma*, H. Sch. (1829) should be adopted for *sesquistriatus*, Kryn.: *id. l. c. p. ccxviii.*

Pachybrachys albescens, Suffr., = *bivittatus*, Say, which is not synonymous with *P. viduatus*, F. Suffrian, S. E. Z. xxxiv. p. 153.

Monachus thoracicus, sp. n., Crotch, *l. c. p. 31*, S. Carolina, Florida.

Cryptocephalus perelegans, p. 88. *tetradecaspilatus*, *scitulus*, p. 89, *pilosus* (also China), p. 90, *signaticeps* (also Tartary). *instabilis*, p. 91, *japanus*, p. 92, *approximatus*, p. 93, *fortunatus*, p. 94, *permodestus*, p. 95, *amatus*, p. 96, *discretus*, p. 97, *amiculus*, p. 98 (also E. Siberia), Japan, Baly, *l. c.*; *C. fulgurans*, p. 353, pl. xvi. figs. 1, 1a, *acupunctatus*, p. 354, *ibid.* figs. 2, 2a, Fairmaire, R. Z. (3) i. Boghari: spp. nn.

Griburius leontii, sp. n., Crotch, *l. c. p. 32*, Texas.

Pachybrachys xanti, Crotch, *l. c. p. 32*, Lower California; *P. eruditus*, Baly, *l. c. p. 98*, Japan; *P. prasinus*, Fairmaire, *l. c. p. 355*, Boghari: spp. nn.

Cenobius sulcicollis and *piceus*, spp. nn., Baly, *l. c. p. 86*, Nagasaki.

Dioryctus lewisi, sp. n., *id. l. c. p. 87*, Nagasaki.

Chrysomelides.

Colaspidema, Lap. (*Colaphus*, Redt.), is certainly not to be ranked among the *Eumolpides*, but in this group, joining it to the *Galerucides*. A list of the known species is given. E. Lefèvre, Bull. Soc. Ent. Fr. (5) iii. p. cxvii.

Timarcha intertexta, Hald., = *intricata*, Hald., var.; *Chrysomela rogersi*, Lec., = *clivicollis*, K., var.; *C. defecta*, St., = *juncta*, Germ., var.; *C. stolata*, Suffr., *pallida*, Bland, = *conjuncta*, Rogers; *C. casta*, Rog., = *suturalis*, F., var.; *C. hybrida*, Say, = *lunata*, F.; *C. multiguttis*, Stål, is to be used for *scalaris*, Lec., preoccupied; *C. bigsbiana*, K., and *verrucosa*, Suffr., = *multipunctata*, Say, and? = *philadelphica*, L., of which *spirææ*, Say, is a var.; *C. basilaris*, Say,? = *flavimarginata*, Say, var.; *C. cribraria*, Rog., = *auripennis*, Say; *Gastrophysa formosa*, Say,? = *raphani*, auctt.; *Gonioctena rufipes*, Rog., *simplex*, Suffr., = *pallida*, L.; *Plagioderma interrupta*, F., = *lapponica*, L.; *P. confluens*, Rog., = *scripta*, F., var.; *P. æruginosa*, Suffr.,? = *viridis*, Melsh., var.: Crotch, *l. c. p. 46 et seq.*

Timarcha. The European and Mediterranean species revised by L. Fairmaire (using E. Allard's notes); Ann. Soc. Ent. Fr. (5) iii. pp. 143-202 (Supplement, *l. c. pp. 525-528*). *T. punctatella*, Mars., = *turbida*, Er., var.; *T. semipolita*, Chev., and *T. subcyanea* and *iberica*, Mots., = *tenebricosa*, F., varr.; *T. chalcosoma*, Fairm., = *gravis*, Ros. (this collocation withdrawn, and *chalcosoma* re-described, from Tunis?, as distinct, p. 525); *T. levigata*, H. Sch., nec L., is re-named *gallica* (p. 182); *T. cyanescens* and *recticollis*, Fairm., = *monticola*, Duf. *T. lomnickii*, Mill., = *rugulosa*, H. Sch.; *T. galliciana*, Chev., = *chloropus*, Germ.

Doryphora 10-lineata noticed as a new [!] potato-foe in America;

G. v. Frauenfeld, Verh. z.-b. Wien, xxiii. p. 183. It will eat many other plants besides *Solanaceæ*: H. Gillman, Am. Nat. vii. p. 430.

Chrysomela cærulescens, Suffr., = *carnifex*, F., var.; C. Brisout, Bull. Soc. Ent. Fr. (5) iii. p. ccxi.

Phratora tibialis, Suffr., probably = *vulgatissima*, L., var.; Kellner, B. E. Z. xvii. p. 217.

Colaspidema maculicolle, sp. n., Lefèvre, l. c. p. cxviii. Barbary.

Timarcha coarcticollis, p. 147, Andalusia, *sericea*, p. 153, Sierra Nevada, Murcia, *brulerii* (re-named *piochardi*, p. 525, on account of *T. brulerii*, Bellier de la Chavign., 1870, which Fairmaire states to be not specifically separable from *T. gallica* [if this be so, the name *brulerii* will stand for the latter, which is only proposed in 1873 for *laevigata*, H. S., nec L.], p. 154, Barcelona, *erosa*, p. 157, Portalegre, *tingitana*, p. 159, Tangiers, *brachydera*, p. 165, Biskra, Batna, *crassaticollis*, p. 166, Kabylia, *henonii*, p. 167, Constantine, *camoensi*, p. 171, *validicornis*, p. 172, Portugal, *montana*, Macedonia, *sublevis*, Corsica, p. 174, *globata*, p. 177, Bannat, *elliptica*, p. 180, Balearic Isles, *dubitabilis*, p. 183, ? Italy (Algerian Sahara, p. 527), *globipennis*, p. 186, Madrid, *corallipes*, p. 191, Atlas, *sphaeroptera*, p. 192, Spain, *trapezicollis*, p. 196, Portugal, *corinthia*, p. 197, Dalmatia, Fairmaire, l. c.; *T. amethystipes*, Chevrolat, op. cit. p. 206, Syria (= *pimeloides*, Schäf., and the locality is doubtful: Fairmaire, l. c. p. 525); *T. globulata*, Fairm., l. c. p. 526, Armenia: spp. nn.

Chrysomela ruginosa, p. 356, *edoughensis*, p. 357, Bône, *semiopaca*, p. 357, Algiers, spp. nn., *bicolor*, Fab., var. n., *dolorosa*, p. 359, Algerian Sahara, Fairmaire, R. Z. (3) i.

Prasocuris varipes, p. 51, Middle States, *obliquata*, p. 52, Illinois, Crotch, l. c. spp. nn.

Plagioderia arizonæ, sp. n., id. l. c. p. 53, Arizona.

Galerucides.

Phyllec [*h*] *thrus atripennis*, Say, = *dorsalis*, Ol.; *P. nigripennis*, Lec., = *gentilis*, Lec.; *Lyperus rufipes*, Lec., nec F., is re-named *lecontii*; *Galeruca cribrata*, Lec., = *americana*, F., var.; *G. hæmatica*, Lec., = *cavicolis*, Lec.; *G. marginella*, K., and ? *punctipennis*, Mann., = *nymphææ*, L.; *Monoxia obtusa*, *guttulata*, and *debilis*, Lec., are not separable; *Trirhabda* (= *Pyrrhalla*, Joannis, 1866) *tomentosa*, L., *canadensis*, K., and *virgata*, Lec., are one variable species, as are *T. flavilimbata*, Mann., and *luteicincta*, Lec. (and ? *T. attenuata*, Say), and *T. nitidicollis* and *brevicollis*, Lec.: Crotch, l. c. p. 54 et seq.

Adorium palliatum, Gerst., fig. 11, *Apophyllia nobilitata*, G., fig. 12, *Xenarthra* (?) *calcarata*, G., fig. 13; V. d. Decken's Reisen, iii. pt. 2, pl. xii.

Adimonia villæ, Com., = *fontinalis*, Boh.; *A. pallida*, Joann., = *sanguinea*, F., ♂; and observations on various doubtful species are made. Kraatz, B. E. Z. xvii. pp. 198 & 199.

Lyperus. H. v. Kiesenwetter, B. E. Z. xvii. pp. 23-31, makes various remarks as to localities, food-plants, and synonymy of the species described by Joannis (L'Ab. iii.). *L. (Calomicrus) costalis*, Joann., = *cyaneus*, Joann., var.; *L. rufipes*, Goetze, = *niger*, Geoffr.; *L. rufipes*, Joann.,

Redt., Duft., Pz., ? Fab., = *xanthopoda*, Schrank; *L. betulinus*, Joann., = *rufipes*, Thoms., Kies., Gyl., = *longicornis*, Fab.; *L. megalophthalmus*, Joann., = *flavipes*, L., ♂ (all re-described); *L. geniculatus*, Joann., = *nigripes*, Kies.

Andrector, g. n., Horn, Tr. Am. Ent. Soc. iv. p. 152. Allied to *Cerotoma*, but with a vertical and deeply excavated frons, and joints 3 & 4 of antennæ deformed (♂). *A. sexpunctatus*, sp. n., *id. ibid.* Texas.

Androlyperus, g. n., Crotch, l. c. p. 55. Near *Lyperus*, but with apical joint of palpi rather longer than penultimate, and acute, and the prosternum distinctly visible between the coxæ; posterior femora not dilated. Male characters strongly shown in ventral segments, elytra, and antennæ. *A. fulvus*, sp. n., *id. ibid.* San Francisco.

Galerucella, g. n., *id. ibid.* Differs from *Galeruca* in its open coxal cavities. *G. tuberculata*, Say, *nymphææ*, and *sagittariæ*, auctt., &c.

Adimonia tripoliana, sp. n., Chevrolat, Ann. Soc. Ent. Fr. (5) iii. p. 206. Syria.

Tirrhabda lewisi, sp. n., *id. l. c.* p. 56, New Mexico (? = *nitidicollis*, var.).

Calomicrus rottenbergi, Ragusa, Bull. Ent. Ital. v. p. 234, Sicily; *C. sordidus*, Kiesenwetter, l. c. p. 24, Jaen, spp. nn.

Lyperus brunneus, Crotch, l. c. p. 54, N. Carolina; *L. laevis*, Kiesenwetter, l. c. p. 30, Corsica: spp. nn.

Halticidæ.

Hypolampus pilosa, Clk., *nec* Ill., is re-named *clarki*; *Pachyonychus paradoxus*, Clk., is both generically and specifically distinct from Melzheimer's insect of that name, which stands, and the generic name *Hamletia* is proposed for the former, for which Dejean's specific name *dimidiaticornis* can be retained; *Ædionychnus scripticollis*, Say, *discicollis*, Dej., *concinna*, F., = *vians*, Ill., varr.; *Batophila lissotorques*, Lec., = *spuria*, Lec., var.; *Systema ligata* and ? *ochracea*, Lec., = *miles*, Lec.; *S. oblonga*, Lec., = *marginalis*, Ill.; *S. biteniata*, Lec., = *blanda*, Mels.; *Crepidodera erythropus*, Mels., = *rufipes*, L.; *C. nana*, Say, *violacea*, Mels., *areola* and *opulenta*, Lec., = *helwines*, L.; *C. mancula*, Lec., = *modeeri*, L., var.; *Epitrix seminulum*, Lec., = *cucumeris*, Harr.; *Psylliodes interstitialis*, Lec., = *convexior*, Lec.; *P. parvicollis*, Lec., = *punctulata*, Mels.; *Blepharida* must be retained as a separate group with bifid claws: Crotch, l. c. pp. 57-76.

E. Mulsant & C. Rey, Ann. Soc. L. Lyon (n. s.) xx. pp. 215-258, publish a supplement to Foudras's work, giving descriptions of new species and references to others.

Graptodera oleracea, *pusilla*, and *ericeti*, occur near Marly, together, on the same plant, "which tends to prove that they form distinct species:" C. Brisout, Bull. Soc. Ent. Fr. (5) iii. p. clxxix.

Aphthona herbigrada: varr. from S. France named *laevicollis* and *dimidiata*. Mulsant & Rey, l. c. pp. 257 & 258.

Plectroscelis chlorophana lives on *Calamagrostis epigeios*; C. Brisout, l. c. p. cexi.

Longitarsus atricillus, Foudr., *nec* Gyl., is re-named *senecionis*; it is distinct from *piciceps*, Steph., and *atriceps*, Kuts.; *id. l. c.* p. ccxviii.

New genera and species :—

Orthaltica, Crotch, *l. c.* p. 69. Allied to *Systema*, but very distinct by the long antennæ, parallel form, short tarsi, and irregularly striate elytra; the antennæ are closely approximate. The frontal tubercles very distinct; the prosternum rather broad, anterior coxæ distant. *O. copalina* (F.), and *O. recticornis* (Lec.).

Lyperaltica, Crotch, *l. c.* p. 70. Facies of *Lyperus*, but with incrassate femora, entire epipleuræ and separated anterior coxæ. Form of *Orthaltica*, but elytra not striate, first joint of posterior tarsi elongate, &c. *L. fuscula* (Lec.), and *L. tincta* (Lec.), = *senilis* (Say).

Cerataltica, Crotch, *l. c.* p. 73. Between *Mantura* and *Chætocnema*. Antennæ stout, 2nd joint shorter than 3rd, 5–11 stout subquadrate, longer than broad, 11th suddenly constricted at base and acuminate; thorax not margined at base, impunctate, posterior tarsi short, elytra striate. *Sphæroderma insolitum*, Mels.

Euplectroscelis, Crotch, *l. c.* p. 75. Allied to *Chætocnema*, but with posterior tibiæ sulcate throughout. Facies of a Eumolpid. *E. xanti*, id. *l. c.* Lower California.

Hypolampsis mellii, id. *l. c.* p. 58, Kansas.

Edionychis opacior, *lustrans*, *8-maculata*, p. 60, *interjectionis*, p. 61, *flavicyanea*, p. 62, *texana*, p. 63, Texas, *circumcincta*, p. 62, Southern States, *thymoides*, p. 63, Western States; id. *l. c.*

Batophila cyanipennis, id. *l. c.* p. 65, Texas.

Orchestris zimmermanni, Missouri, *oregonensis*, Oregon, *lewisi*, Colorado, Illinois, p. 66, *veicollis*, Texas, M. & S. States, *chalybeipennis*, New Jersey, p. 67, id. *l. c.*

Aphthona texana, id. *l. c.* p. 67, Texas; *A. punctiventris*, p. 250, *punctigera*, p. 252, *subimpressa*, p. 255, Provence, *orientalis*, p. 253, Caramania, *subaptera*, p. 256, Languedoc, Mulsant & Rey, *l. c.*

Systema collaris, Crotch, *l. c.* p. 68, Texas.

Haltica burgessi, id. *l. c.* p. 71, Key West, Florida; *H. splendens*, Mulsant & Rey, *l. c.* p. 244, Pyrenees.

Crepidodera scabricula, p. 71, Texas, *C. ? nana*, p. 72, S. Carolina; Crotch, *l. c.*

Epitrix fuscula, N. & S. Carolina, *lobata*, S. Carolina, Crotch, *l. c.* p. 72.

Mantura floridana, id. *l. c.* p. 73, Florida, Louisiana.

Balanomorpha suturata, Fairmaire, R. Z. (3) i. p. 359, Boghari.

Phyllotreta foudrasi, C. Brisout, Bull. Soc. Ent. Fr. (5) iii. p. lxxv. Paris, Hyères.

Chætocnema crenulata, N. Carolina, *alutacea*, Florida, *parcepunctata*, Pennsylvania, Lake Superior, *texana*, Texas, p. 74, *confinis*, S. Carolina, *elongatula*, Colorado, p. 75, Crotch, *l. c.*; *C. punctatula*, Mulsant & Rey, *l. c.* p. 222, France.

Thyamis australis, p. 227, *obsoleta*, p. 230, *scutellaris*, p. 231, *funerea*, p. 232, *sternalis*, p. 233, *livens*, p. 235, *paleacea*, p. 236 (? = *albinea*, Foudr., var.), *gracilicornis*, p. 238, Mulsant & Rey, *l. c.* France.

Psylliodes sicana, iid. *l. c.* p. 217, Sicily.

Dibolia foudrasi, iid. *l. c.* p. 219, Cluny.

Hispides.

Hispa pachycera, Gerst., figured in V. d. Decken's *Reisen*, iii. pt. 2, pl. xiii. fig. 1.

Languria brevicollis, Rand., = *Stenispia metallica*, F.; *Odontota bacchus*, Newm. = *bicolor*, Ol.; *O. philemon* and *baucis*, Newm., = *rosea*, Web.; *Microrhopala interrupta*, Couper, = *xerene*, Newm., var.; *M. hecate*, Newm., = *cyanea*, Say; *M. erebus* and *pluto*, Newm., = *excavata*, Ol.; Crotch, *l. c.* p. 80 *et seq.*

Odontota omogera, p. 80, Tampico, *walshi*, p. 81, Illinois, *id. l. c.* spp. nn.

Microrhopala melsheimeri, sp. n., *id. l. c.* p. 83, Pennsylvania.

Cassidides.

Cassida. The species are exclusively attached to Composite plants; *C. filaginis*, Perr., = *seladonia*, Gyll.; L. Bedel, Bull. Soc. Ent. Fr. (5) iii. p. lxxxviii. *C. margaritacea* lives on *Gnaphalium stæchas*: Bauduer, *l. c.* p. ccxv. Puton, *l. c.* p. ccxxvii., differs from Bedel's opinion, giving various food-plants of *C. equestris*, *azurea* (? = *lucida*), *austriaca*, *thoracica*, *nobilis*, *nebulosa*, *obsoleta*, *oblonga*, *filaginis*, and *hemispherica*.

Cassida 5-punctata, Walsh, = *Physonota helianthi*, Rand., = *P. 5-punctata*, Say; *C. ellipsis*, Lec., = *nigripes*, Ol., var.; *Coptocyclus aurisplendens*, Boh., = *aurichalcea*, F.; *C. trabeata* and *lucidula*, Boh., = *guttata*, Ol., varr.; Crotch, *l. c.* pp. 77 & 78.

Chelymormpha lewisi, New Mexico, *phytophagica*, Arizona, *id. l. c.* p. 77, spp. nn.

Cassida texana, sp. n., *id. l. c.* p. 78, Texas.

Coptocyclus arizonæ, p. 78, *lecontii*, p. 79, *id. l. c.* Arizona, spp. nn.

EROTYLIDÆ.

G. R. CROTCH, Tr. Am. Ent. Soc. iv. pp. 349-358, gives a "Synopsis of the Erotylidæ of Boreal America." *Dacne*, Latr., 1796 (*Engis*, Payk., 1798), and *Languria* are added to the group (as probably intended by Lacordaire), which is to be placed in the Clavicorn series immediately after the *Cryptophagidæ*. *Dacne*, Lac., *nec* Latr., is re-named *Megalodacne* (p. 352). *Languria puncticollis*, Say, = *bicolor*, F., var.: *L. pulchra*, Lec., *trifasciata*, Say, = *uhleri*, Horn, varr., = *angustata*, Beauv.; *L. nigriceps* and *obscura*, Mots., = *L. latreillii*, Lec., = *bicolor*, Latr., *nec* F., = *gracilis*, Newm., of which *inornata*, Rand., is a var.; *L. apicalis*, Mots., = *mozardi*, Latr., var. minor; *L. rufiventris*, Mots., = *tædata*, Lec.; *Mycotretus dimidiatus*, Lac., = *pulcher*, Say, var.; *Cyrtotriplax brunnea*, Lac., = *angulata*, Say, immat.; *C. livida*, Lac., ? = *affinis*, Lac., immat.; *C. ruficeps* and *vitata*, Lec., *aulica*, Horn, = *humeralis*, F., varr.; *Triplax thoracica*, Say, ? = the European *scutellaris* (*bicolor*, Gyll.).

The same author, Cist. Ent. (vi.) pp. 141-150, gives a list of 28 species from Nicaragua. *Dacne multifida* and *brasiliensis*, Lac., = *Megalodacne 4-guttata*, Ol., varr.; *Pselaphacus signatipennis*, Lac., = *signatus*, Guér., *Oocyanus*, Hope, = *Epytus*, Dej.; *Ægithus clathratus*, Lac., = *4-notatus*, Chev.: *Æ. rufipennis*, Chev., = *cardinalis*, Chev., var., of which a var.

n. *meridionalis* is described, p. 146; *Coccinella surinamensis*, L., = *Æ. clavicornis*, L.; *Brachysphenus irroratus* and *multinotatus* should be referred to *Priotelus*.

Crotch also gives a descriptive list of the species (mostly new) found by G. Lewis in Japan: Ent. M. M. ix. pp. 184–189. *Tritoma*, F., nec Geoffr., is re-named *Cyrtotriplax*, p. 189. Additions are made by E. W. Janson & C. O. Waterhouse, *ibid.*

Languria puncticollis, Say; habits and larva described, and larva and pupa figured; A. S. Packard, Rep. Ins. Mass. iii. pp. 23 & 24, figs. 148 & 149.

Dacne heros, larva and pupa figured; *id. l. c.* p. 24, fig. 150.

Episcapha scenica, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. xiii. fig. 2.

New genera and species :—

Megischyrus, Crotch, Cist. Ent. (vi.) p. 143. Prosternum strongly keeled; antennal club loosely jointed. *M. nicaraguae*, *id. ibid.*, Nicaragua, and *Ischyrus sanguinolentus* and *discipennis*, Lac.

Cypherotylus, Crotch, *l. c.* p. 148. The colour (uniformly black, with pale elytra, irregularly black spotted), margined base of thorax, hardly apparent interstitial punctuation, and "sexual differences" [not specified] combine to separate this at once. Type, *Chrysomela gibbosa*, L., also *C. sphaelatus* (indirectly attributed to *C. gorii*, as a var.), *Erotylus dromedarius*, Lac. [stated, however, not to differ sufficiently to entitle it to specific distinction:—from what other species, is not mentioned], and *C. impressipunctatus*, p. 148, and *jansonii* (? = *gorii*, var., teste Crotch), p. 149, Nicaragua, spp. nn. This genus is also characterized as new by the author in Tr. Am. Ent. Soc. iv. p. 358, where it is stated to have the head produced in front into a rostrum which is narrowed for the insertion of the antennæ; the elytra with irregular deep punctures; the thorax unevenly impressed, base margined; anterior femora globose; 1st ventral segment with pilose dot in ♂. *C. boisduvali* (Chevr.) is added to its species.

Languria lecontii, Crotch, Tr. Am. Ent. Soc. iv. p. 351, Illinois; *L. lewisi*, *nigripes*, p. 184, *præusta*, *atriceps*, *ruficeps*, and (*L.* ?) *jansonii*, p. 185, *id.* Ent. M. M. ix.; *L. prætermissa*. E. W. Janson, *op. cit.* p. 186, *L. nigritarsis*, p. 186, *pectoralis* and *convexicollis*, p. 187, C. O. Waterhouse, *op. cit.*, Japan.

Dacne japonica and *picta*, Crotch, Ent. M. M. ix. p. 188, Japan.

Episcapha fortunii, *id. ibid.*, Japan, China.

Melagodaene ulkii, *id.* Tr. Am. Ent. Soc. iv. p. 353, Kentucky.

Pselaphacus distortus, Mexico, *vitticollis*, New Granada, *nicaraguae*, Nicaragua, *id.* Cist. Ent. vi. p. 142.

Ischyrus nigrans, Florida, *extricatus*, Middle States, *id.* Tr. Am. Ent. Soc. iv. p. 354; *I. tripunctatus*, *id.* Cist. Ent. vi. p. 144, San Domingo.

Mycotretus chontalesi, *id.* Cist. Ent. vi. p. 145, Chontales; *M. dissimulador*, *id.* Tr. Am. Ent. Soc. iv. p. 355, Illinois.

Cyrtotriplax mimetica, *id.* Tr. Am. Ent. Soc. iv. p. 355, Illinois, Georgia; *C. lewisi*, *id.* Ent. M. M. ix. p. 189, Japan.

- Triplax japonica*, id. Ent. M. M. ix. p. 189, Japan.
Aulacochilus japonicus, id. *ibid.*, Japan.
Ægithus jansoni, id. Cist. Ent. vi. p. 146, San Domingo.
Brachysphænus zonula, id. l. c. p. 147, Ecuador.
Erotylus nicaraguæ, id. l. c. p. 148, Nicaragua.
Zonarius jansoni, id. l. c. p. 149, San Domingo.
Scaphidomorphus xanthomelas, id. l. c. p. 150, San Domingo.
Homœotelus confusus, Chontales, Guatemala, Costa Rica, Venezuela,
jansoni, San Domingo, id. l. c. p. 150.

ENDOMYCHIDÆ.

H. S. GORHAM, under the title '*Endomye[h]ici recitati*' (London: 1873. 8vo, pp. 64, pl.), catalogues the species of this group, raised to 302, contained in 46 genera. After bibliographical remarks, geographical distribution is discussed, the tropics being considered as the present home (and probably the original birthplace) of the family. *Stenotarsus* illustrates the theory of a former land connection between S. America and Madagascar; and its antennæ betray an ancient and unsettled form. Where hairy elytra are found, a primitive type is suggested. Some synonymy is given, from the types of Guérin & Deyrolle, and notes are given on various species and synonyms. The new family names *Paleomorphidæ*, for *Stenotarsus* and allies, and *Paussoideidæ*, for *Trochoideus*, Westw., are proposed. New genera and species are described. The following synonymical observations are made, amongst others:—*Eumorphus dehaani*, Guér., = *tetraspilotus*, Hope, var.; *E. 4-verrucosus*, Guér., = *coloratus*, Gerst.; *Encymon gersteckeri*, Dohrn. = *E. (Haplomorphus) immaculatus*, Montr.; *Corynomalus angulicollis*, Bates, = *ferrugineus*, Gerst., = *marginatus*, F., var.; *C. circumcinctus* and *robustus*, Bates, = *aneipennis*, Guér., = *discoideus*, F.; *C. gersteckeri*, Bates, ? = *perforatus*, Gerst., var.; *Lycoperdina glabrata*, Walk., has no resemblance to *Lycoperdina*, and probably (if in the group) will form a new genus near *Cremnodes*; *Stenotarsus lombardeaui*, Perr., is briefly re-described, and doubtfully referred to the genus; *Eucteanus caelestinus*, Gerst., = *hardwicki*, Hope.

The same author, Ent. M. M. ix. pp. 205–207, enumerates the species (mostly new) found by G. Lewis in Japan.

G. R. Crotch, Tr. Am. Ent. Soc. iv. pp. 359–363, gives a "Synopsis of the Endomychidæ of the United States." The family should follow the *Mycetophagidæ* in systematic position. *Mycetæa hirta* occurs in N. America.

New genera and species:—

Coniopoda, Gorham, Ent. M. M. ix. p. 205. Like *Lycoperdina*, but with a 3-jointed antennal club, the anterior coxæ separated from the prosternum, and pilose elytra. *C. orientalis*, id. *ibid.*, Japan.

Panamomus, id. l. c. p. 207. Near *Leiestes*, but with more ample thorax and more convex body; more of the form of *Hylæa*. *P. lewisi*, id. *ibid.*, Japan.

Rhabduchus, id. *l. c.* p. 257. *Dapsini*: allied to *Ædiarthrus*, Gerst.; 9th joint of antennæ incrassate, toothed internally; legs long and thin. *R. denticornis*, id. *ibid.*, Nagasaki.

Heliobletus, id. *Endom. recit.* p. 41. Tropical representative of *Dapsa*, but with prosternum visible between the anterior coxæ. *H. servilis*, id. *l. c.* p. 42, Borneo.

Aphorista, id. *l. c.* p. 45. Apparently near *Mycetina*, but more allied to *Epipocus*, though with the penultimate joints of antennæ not acuminate internally. *Mycetina lata*, Lec., *A. humeralis*, *ibid.*, California, and ? *Epipocus discoidalis*, Lec.

Spathomeles darwinista, C. A. Dohrn, S. E. Z. xxxiv. p. 322, Philippines; *S. insuspectus*, Borneo, *pyramidalis*, Philippines, p. 31, *elegans*, p. 32, Penang, Gorham, *Endom. recit.*

Trycherus hydroporoides, Gorham, *l. c.* p. 33, Senegal.

Eumorphus guerini, p. 34, *costatus*, p. 34, fig. 6, Celebes, *expatriatus*, no locality known, *thomsoni*, Manilla, p. 35, *westwoodi*, p. 36, Tenasserim, *E. (Pedanus ?) gersteckeri*, p. 37, fig. 5, Malacca, id. *l. c.*

Encymon bipustulatus, p. 38, Aru, *angulatus*, p. 39, Moluccas, *resinatus*, p. 40, Borneo, id. *l. c.*

Indalmus insularum, id. *l. c.* p. 40, Timor.

Ancylopus graphicus, id. *l. c.* p. 41, Gambia.

Dapsa inornata, id. *l. c.* p. 43, Beyrouth.

Lycoperdina dux, id. *Ent. M. M.* ix. p. 205, Japan.

Phalantha variegata, id. *Endom. recit.* p. 43, fig. 4, R. Amazon.

Mycetina obliquisignata, id. *l. c.* p. 44, Amoor.

Mycetina horni, Crotch, *l. c.* p. 360, California, Oregon; *M. amabilis* and *ancoriger*, Gorham, *Ent. M. M.* ix. p. 206, Japan.

Anidrytus amazonicus, p. 46, fig. 8, R. Amazon, *fallaciosus*, Cayenne, *liquefactus*, Columbia, p. 47, *humilis*, p. 48, Nicaragua, Gorham, *Endom. recit.*

Epopterus testudinarius, p. 48, fig. 7, *cucullinus*, p. 49, *ryei*, p. 50, fig. 3, *quæsitus*, p. 51, R. Amazon, id. *l. c.*

Stenotarsus grandis, Columbia, *flavicornis*, Brazil, p. 52, *pilatii*, Yucatan, *flavago*, New Friburg, p. 53, *nigricollis*, New Friburg, *brunneus*, New Granada, p. 54, *æquatus*, p. 55, Senegal, *sallwi* (? Guérin), p. 62, id. *l. c.*; *S. nigriclavis*, id. *Ent. M. M.* ix. p. 206, Japan.

Rhymbus seminulum, New Friburg, Guiana, *minutus*, N. America, p. 56, *limbatus* (? Guérin), p. 63, Mexico, id. *Endom. recit.*

Eucteanus marseuli, id. *l. c.* p. 56, "India."

Alexia ulkii and *minor* (? = *Hygrotophila testacea*, Mots.), Crotch, *l. c.* p. 362, Washington.

COCCINELLIDÆ.

G. R. Crotch, Tr. Am. Ent. Soc. iv. pp. 363-382, publishes a "Revision of the Coccinellidæ of the United States." *Coccinella menetriesi*, Muls., = 11-punctata, geographical form; *Hippodamia leporina* and *extensa*, Muls., *mulsanti*, Lec., = 5-signata, K.; *H. punctulata*, Lec., = *ambigua*, Lec.; *H. maesta*, Lec., = *lecontii*, Muls., var.; *H. interrogans*, Muls., = *sinuata*, M.; *Adonia mutabilis*, Scriba, = *constellata*, Laich.; *Anisosticta multi-*

guttata, Rand., *bitriangularis*, Say, = *strigata*, Thunb.; *A. litigiosa*, Muls., = *seriata*, Melsh.; *Coccinella venusta*, Melsh., = *affinis*, Rand.; *C. barda*, Lec., = *juliana*, Muls.; *C. eugenii*, Muls., and *subversa*, Lec., = *trifasciata*, L., varr.; *C. transversalis*, Muls., *californica*, Mann., = *5-notata*, K., varr.; *C. lacustris*, Lec., = *monticola*, Muls., and ? = the Siberian *C. nivicola*; *C. monticola*, Lec., nec Muls., is re-named *prolongata* (p. 371); *C. franciscana*, Muls., = *9-notata*, Hbst., varr.; *Daulis*, Muls., nec Er., is re-named *Cycloneda* (p. 371); *Cycloneda munda*, Say, = *sanguinea*, L.; *C. binotata*, Muls., = *oculata*, F., of which *abdominalis*, Say, is a var.; *Adalia barda* and *melanopleura*, Lec., *ophthalmica*, Muls., *hyperborea*, Payk., = *frigida*, Schn.; *A. humeralis*, Say, = *bipunctata*, L., var.; *Anisocalvia*, Crotch [Zool. Rec. viii. p. 329], is characterized, p. 373; *A. cardisce* and *similis*, Rand., = *14-guttata*, L., of which a var. (?) *hesperia*, from Arizona, is noted, p. 374; *Psyllobora 20-signata*, Boh., Tahiti, and *P. interspersa*, Boh., Sydney, = *20-maculata*, Say, Atlantic region, of which *tedata*, Lec., is queried as a var.; *Chilocorus fraternus*, Lec., = *bivulnerus*, Muls., var.; *Exochomus texanus* and *pleuralis*, Lec., = *pilatii*, Muls., ? = *plagiatus*, Ol., var.; *E. aethiops*, Bland, = *marginipennis*, Lec., var.; *E. guexi*, Lec., *childreni*, Muls., = *contristatus*, Muls.; *Ceneis puncticollis*, Lec., = *pusilla*, Lec., ♀; *Brachyacantha tau* and *quadrillum*, Lec., = *dentipes*, F., varr.; *B. 10-pustulata* and *basalis*, Melsh., *flavifrons*, Muls., *albifrons*, Say, = *ursina*, F., varr.; *B. diversa*, Muls., = *4-punctata*, Melsh.; *Hyperaspis floridana*, Muls., = *Scymnus amabilis*, Lec.; *H. cincta*, Lec., = *fimbriolata*, Melsh.; *H. binotata* and *normata*, Say, = *signata*, Ol.; *H. jucunda*, Lec., *venustula*, Muls., = *lugubris*, Rand.; *H. elegans*, Muls., = *undulata*, Say; *Oxy[o]nychus consimilis*, Lec., = *H. mærens*, Lec., and the genus does not stand; *H. 4-vittata*, Lec., = *annexa*, Lec.

A list of Japanese species, determined by G. R. Crotch, is given by G. Lewis, Ent. M. M. x. pp. 54-56. The fauna is more Indian than Siberian; exclusively Japanese forms are few, and 7 species are common to western Europe, 6 being British. Variations of *Coccinella axyridis*, Pall., referred by Mulsant to 5 of his 'genera.' and of *Propylea conglobata*, L., are mentioned, and new species indicated.

Alesia aurora, Gerst., fig. 3, *Chilomenes* (?) *pardalina*, G., fig. 4, *Epilachna tetracycla*, G., fig. 5, *proserpina*, G., fig. 6, *callipepla*, G., fig. 7, *macropis*, G., fig. 8, *scalaris*, G., fig. 9; V. d. Decken's Reisen, iii. p. 2, pl. xiii.

Exochomus. Kraatz, B. E. Z. xvii. pp. 189-195, revises the European species, 6 in number (one new). *E. unicolor*, Schauf., = *distinctus*, Brullé, and *oblongus*, Wied., = *4-punctulatus*, L., varr., of which a var. n. from Andalusia is described (*6-pustulatus*, p. 192); *E. collaris*, Küst., ? = *auritus*, Scriba, ♂, and a Pyrenean var. ? is named *pyreneus* (p. 194). *E. pubescens*, Küst., is not a *Platynaspis* (p. 422).

Ceratomegilla, g. n., Crotch, l. c. p. 365. Shape and form of *Hippodamia*; claws dentate at base, coxal lines obsolete, thorax sinuate and margined at base; antennæ with 3rd joint longer than 2nd, broadly dilated at apex, with inner apical angle ciliate. *C. ulkii*, sp. n., *id. ibid.*, Hudson's Bay.

Hyperaspidius, g. n., *id. l. c.* p. 382. Differs from *Hyperaspis* in having the elytral epipleuræ not foveolate for reception of the femora. *H. vitiger* (= *3-maculatus*, L.), *arcuatus*, and *militaris*, Lec.

Cephaloscymnus, g. n., Crotch, *ibid.* No differential characters given. *C. zimmermanni*, sp. n. *id. ibid.*, no locality given.

Hippodamia oregonensis, p. 367, Oregon, *falcigera*, Hudson's Bay, *americana*, Kansas, p. 368, *id. l. c.* spp. nn.

Coccinella difficilis, p. 370, Utah, *annectens*, p. 371, Colorado, *id. l. c.* spp. nn.

Mysia horni, sp. n., *id. l. c.* p. 375, Oregon.

Brachyacantha indubitabilis, Illinois, *bolli*, Texas, spp. nn., *id. l. c.* p. 379.

Hyperaspis dissoluta, p. 379, California, Lake Superior, *lewisi*, p. 380, United States, *horni*, p. 381, California, *id. l. c.* spp. nn.

Exochomus minutus, sp. n., Kraatz, *l. c.* p. 195, Thuringia.

HYMENOPTERA.

BY

E. C. RYE, F.Z.S.

THE GENERAL SUBJECT.

CRESSON, E. T. Hymenoptera Texana. Tr. Am. Ent. Soc. iv. pp. 153-292.

A list of over 600 species (nearly 300 of which are treated as new) of all families (except the *Chrysididae*, *Formicidae*, and smaller *Chalcididae*) known to occur in Texas.

GRIBODO, GIOVANNI. Contribuzioni alla Fauna imenotterologica Italiana. Bull. Ent. Ital. v. pp. 73-87.

Observations on *Apidae* and *Sphegides*: 4 new species are described.

KRÄPELIN, C. Untersuchungen über den Bau, Mechanismus, und Entwicklungsgeschichte des Stachels der bienenartigen Thiere. Z. wiss. Zool. xxiii. pp. 289-330, pls. xv. & xvi.

An elaborate discussion on the structure, mechanical action, and morphology of the sting, ovipositor, saws, and other abdominal appendages of the *Aculeata*, *Entomophaga*, and *Phytophaga*, and especially of *Apis mellifica*. Figures (magnified) are given of these organs in *Apis*, *Vespa*, *Ammophila*, *Pompilus*, *Mutilla*, *Myrmica*, *Formica*, *Cynips*, *Tenthredo*, *Cimbex*, *Sirex*, *Banchus*, *Cryptus*, and *Pimpla*, with much detail.

LOWNE, B. T. On the characteristics of certain of the Hymenoptera. J. Quek. Club, iii. pp. 187-191.

A recapitulation of Ganin's paper on embryonic development of *Platygaster*, &c. [Zool. Rec. vi. p. 174].

MARSHALL, T. A. A Catalogue of British Hymenoptera; Oxyura. London: 1873. 8vo, pp. viii. & 27.

The 4th part of the proposed Catalogue of British Insects referred to in Zool. Rec. ix. p. 314. Of the *Proctotrypidae*, 3 genera and 17 species are enumerated; *Ceraphronidae*, 6 genera, 39 species; *Bethylidae*, 5 genera, 6 species; *Dryinidae*, 6 genera, 27 species; *Embolimidae*, 2 genera, 2 species; *Heloridae*, 1 genus, 3 species; *Belytidae*, 10 genera, 26 species; *Diapriidae*, 13 genera, 52 species; *Scelionidae*, 10 genera, 61 species; *Platygastridae*, 15 genera, 111 species; *Mymaridae*, 12 genera, 36 species: in all, 83 genera, 373 species. Complete synonymical and bibliographical references are given. Eight of the species are new to Britain [cf. Ent. Ann. 1874, pp. 131 & 146].

For review by J. W. Dunning of part 2 of this Catalogue, see Ent. M. M. ix. pp. 221-224.

RADOSZKOWSKY, O. DE BOURMEISTER. Supplément indispensable à l'article publié par M. Gerstaecker en 1869, sur quelques genres d'Hyménoptères. Bull. Mosc. xlvii. pp. 133-151, pl. i.

Observations on various genera of *Apides*, especially drawing attention to the structure of the maxillary palpi [cf. Zool. Rec. ix. p. 317]. The author severely criticizes various changes proposed by Gerstaecker.

SAUNDERS, [SIR] SYDNEY SMITH. On the habits and economy of certain Hymenopterous Insects which nidificate in briars; and their parasites. Tr. E. Soc. 1873, pp. 407-414, woodcuts.

Describes the habits of certain *Eumenides*, a new genus of *Crabronidae*, and 2 new species of *Chrysididae* and *Chalcididae*, all from the Albanian district.

SICHEL, J. Considérations zoologiques sur la détermination de l'espèce et sur la fixation des limites entre elle et la variété, tirées principalement de l'étude de l'ordre des Insectes hyménoptères. Mém. Liège (2) iii. pp. 1-19.

A posthumous work. The author's propositions are:—1 & 2, that the characters of a species should be established on great numbers of individuals; 3, habits may serve as auxiliary specific diagnostics; 4, the study of the larva is expedient; 5, parasites, varying in different species, also assist the determination; 6, geological formation has more influence than vegetation upon the degree of rarity of species and genera; 7, climatic influences are the most powerful in the development of varieties; and 8, a species is permanent, but subject to indefinite modification as regards varieties.

SMITH, FREDERICK. Descriptions of Aculeate Hymenoptera of Japan, collected by Mr. George Lewis at Nagasaki and Hiogo. Tr. E. Soc. 1873, pp. 181-206.

Refers only to the *Aculeata*, out of 80 species of which, 52 were undescribed, the rest being known from N. China, India, Borneo, and islands in the Indian and Australian regions of the Archipelago: 3 were identical with European and 2 with N. American species.

VOLLENHOVEN, S. C. SNELLEN VAN. Nieuwe Naamlijst van Nederlandsche vliesvleugelige Insecten (Hymenoptera). Tweede Stuk. Tijdschr. Ent. (2) viii. pp. 147-203.

Continues the work mentioned in Zool. Rec. vi. p. 305, by enumerating the "*Ichneumonidea*," "*Braconidea*," and "*Chalcididea*;" the total number (including the 1st part) being 1072. Some new species are described at the end.

WALSH, B. D. Descriptions of North American Hymenoptera. Tr. Ac. St. Louis, iii. pp. 65-166.

Observations on *Tenthredinide*, and new genera and species of *Ichneumonide*, with valuable comparative and other remarks. These are reproduced from the deceased author's MS., and notes are added by E. T. Cresson, who has examined the types. No specific localities are mentioned; but, from a remark in Rec. Am. Ent. for 1873, p. 67, it seems that the species probably come for the most part from Northern Illinois.

In "Jottings during the Cruise of H. M. S. Curaçoa among the South Sea Islands in 1865" (Julius L. Brechley. London: 1873, 8vo, pls. xliii.-l.), are descriptions by F. Smith of 7 new species of Aculeate Hymenoptera, with notices and figures of a few other known species.

Captures at Velzen, by Everts; Tijdschr. Ent. (2) viii. Versl. p. xxx.

APIDÆ.

H. MÜLLER'S 'Anwendung der Darwin'schen Lehre auf Bienen' (Lippstadt: 1873, 8vo, 96 pp. 2 pls.), has not been seen by the Recorder. It is exhaustively reviewed by A. Hensel in B. E. Z. xvii. pp. 153-158.

Dours, R. Z. (3) i. pp. 274-325, pl. xiv., continues his "Hyménoptères du Bassin Méditerranéen," describing new genera and species (many by Sichel & Dufour, not before published), and figuring the abdominal segments of some of them.

Andrenides.

Halictus subopacus, Sm., from Japan, = *H. opacus*, from N. China; F. Smith, Tr. E. Soc. 1873, p. 200.

Andrena and *Halictus*: diagnostic observations and suggestions as to synonymy of various allied species. Schenck, B. E. Z. xvii. pp. 254-259.

Andrena doursana, Duf.: ♀ from Algiers described; Dours, R. Z. (3) i.

p. 281; abdomen figured (as *doursella*) pl. xiv. figs. 9 & 10. *A. hemipyrrha* and *circiliata*: abdomens figured, *id. ibid.*, figs. 3, 4, & 5.

Nomia amenula, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. xiii. fig. 11.

Stenotritus smaragdinus, Sm., Champion Bay, ♀ figured by Smith, Cruise of Curaçoa, pl. xlv. fig. 6.

Steganomus, g. n., C. Ritsema, Tijdschr. Ent. (2) viii. p. 224. Apical joint of antennæ compresso-dilatate, tegulæ large. Allied to *Nomia*, but with only 2 cubital cells. *S. javanus*, sp. n., *id. l. c.* p. 226, pl. x. fig. 4, Soerabaija.

Campylogaster, subg. n. of *Andrena*, Dours, *l. c.* p. 286. Unites *Systropha* and *Andrena*: abdomen very convex, recurved inwardly, set with stiff hairs at the sides. *C. fulvicrustatus*, *ibid.*, pl. xiv. figs. 12 & 13, *subglobosa*, p. 287, fig. 11, *abbreviata*, p. 288, spp. nn., *id. l. c.*, Grecian Archipelago.

Biareolina, g. n., *id. l. c.* p. 288. Facies of *Halictus*, "differt præcipue 5° segmento rimâ denudato." *B. neglecta*, p. 289, Algeria, France, Spain, *perezella*, p. 290, Bordeaux, *id. l. c.* spp. nn.

Colletes texana, sp. n., Cresson, Tr. Am. Ent. Soc. iv. p. 249, Texas.

Prosopis floralis, perforata, spp. nn., F. Smith, Tr. E. Soc. 1873, p. 199, Japan.

Sphecodes simillima, Smith, *l. c.* p. 199, Hiogo; *S. texana*, p. 249, *mandibularis*, p. 250, Cresson, *l. c.* Texas: spp. nn.

Halictus costulatus, p. 59, Tyrol, Rosenheim, Munich, *morbillosus*, p. 61, Bozen, Turin, Padua, *gribodi*, p. 62, Turin, Kriechbaumer, *l. c.*; *H. occidentens, scitulus*, p. 200, *tarsatus, ararius*, p. 201, Japan, F. Smith, Tr. E. Soc. 1873; *H. occidentalis, armaticeps*, p. 250, *texanus, bardus*, p. 251, *ornatipes, impurus, lusorius*, p. 252, *connexus, disparilis*, p. 253, *coactus, stultus, albitalarsis*, p. 254, Texas, Cresson, *l. c.*; *H. grisescens*, Schenck, B. E. Z. xviii. p. 259, Löwenzahn: spp. nn.

Agapostemon texanus, sp. n., Cresson, *l. c.* p. 255, Texas.

Nomia japonica, sp. n., F. Smith, *l. c.* p. 201, Japan.

Dufourea putoniana, sp. n., Dours, *l. c.* p. 291, Hospenthal, Lautaret.

Ancyla brevis, sp. n., *id. l. c.* p. 292, Algeria.

Andrena reflexa, belfragii, p. 256, *permitis, melliventris, verecunda*, p. 257, *imitatrix, brunneiventris, texana*, p. 258, *miserabilis, bipunctata*, p. 259, Texas, Cresson, *l. c.*; *A. vulcana*, p. 274, *circinata*, p. 275 (also in S. France), pl. xiv. fig. 5, ♂, *rubiginosa*, p. 276, figs. 7 & 8, *giraudi*, p. 280, figs. 1 & 2, *albivirescens*, p. 282, *cerinifrons* [eri-], p. 283, *nigriviridula* and *flavipicta* (also at Montpellier), p. 284, Algeria, *miegiella*, p. 276, Spain, *ventricosa*, Grecian Archipelago, *nigriolivacea*, Bordeaux, p. 278, Dours, *l. c.*; *A. pyropygia*, Jerusalem, *macularis*, Lesina, Sicily, p. 52, *rhodia*, Rhodes, *apiformis*, p. 54, *punctatissima*, p. 59, Lesina, *parviceps*, p. 55, Chur, and var. *basalis*, p. 56, Trieste, *mucida*, p. 56, *basilinea*, p. 57, Turin, *vulpecula*, p. 58, Veglia, Kriechbaumer, Verh. z.-b. Wien, xxiii.: spp. nn.

Apides.

Megachile, Chalicodoma, Osmia, Diphysis, Anthocopa, Lithurgus, Chelostoma, Heriades, Anthidium. Discrepancies in the number of joints of the

maxillary palpi attributed to these genera by various authors are pointed out by Radoszkowsky, Bull. Mosc. xlvii. p. 137, who lays great stress upon the structure of these and other minute organs. He objects to Gerstäcker's definition of *Chalcidodoma*, for which he proposes fresh characters (p. 142), figuring the maxillary palpi of *C. murarium* and *siculum*, pl. i. figs. 1 & 2, the only species contained in it as restricted by him. *Megachile* is re-characterized in like manner (p. 148), the mandibles, tarsal hooks, and ♂ abdominal peculiarities being figured, pl. i. figs. 3-7. A table of the species, following both ♂ & ♀ characters, is given. The author criticises Gerstäcker severely upon various points.

Anthophora canescens, Brullé, = *nigricincta*, Lep., ♀, *certe*, of which the prior *Megilla subterranea*, Germ., is the ♂. *Anthophora*, grounded only on *Anthocopa papaveris*, is proposed to be adopted for *Megilla*, or to be dropped entirely. *Apis papaveris*, F., was apparently mixed with *Megachile argentata* by Fabricius. *Apis grisea*, Chr., is a ♂ *Bombus* or *Psithyrus*. *Osmia platycera*, Gerst., = *villosa*, Schenck, *ex. typ.*; *O. montivaga*, Mor., is a good species, and occurs at Chur and Turin. Morawitz is wrong in referring the ♂ of *O. cylindrica*, Ger., to *leucomelana* instead of *tuberculata*, Nyl.; but right in considering *O. quadricornis*, Kriechb., to be *latreillii*, Spin. Kriechbaumer, *l. c.* pp. 67 & 68.

Osmia leucomelana, Smith, *nec* K., = *interrupta*, Schenck, *nec* Latr., and the latter species is re-named *foveolata* [already re-named *claviventris*, by Thomson : Zool. Rec. ix. p. 317]; *O. platycera*, Gerst., = *villosa*, Sch. : Schenck, B. E. Z. xvii. p. 249.

Nests of two species of *Osmia*, separated by a nest of *Anthidium*, found in one reed-stem : J. Lichtenstein, Bull. Soc. Ent. Fr. (5) iii. p. xvi.

Megachile monstrosa, Sm., Champion Bay, W. Australia, ♀, figured by Smith, Cruise of Curaçoa, pl. xlv. fig. 5.

Anthidium curvipes, Imhoff, occurs from Andermatt to the Oberalpsee : A. Müller, S. E. Z. xxxiv. pp. 154-156 (with critical remarks upon W. Schmid's paper on the genus in MT. schw. ent. Ges. iii.).

Anthidium strigatum, Pz., and *contractum*, Latr.; Kriechbaumer, MT. schw. ent. Ges. iv. p. 199, suggests the specific distinctness of these insects, and remarks on Swiss examples.

Heriades truncorum. Note on its nidification and parasite (*Anthrax athiops*, F., *Diptera*) : A. Laboulbène, Ann. Soc. Ent. Fr. (5) iii. pp. 57-60.

Nomada lateralis, Pz., = *ochrostoma*, K.; *N. borealis*, Zett., *flava*, F., *signata*, Jur., = *ruficornis*, L., varr., of which *hillana*, K., with varr. *leucophthalma*, K., ? *conjungens*, H. S., and *affinis*, H. S. (pt.), is the male. *N. germanica*, Pz., and *nigrita*, Sch., = *fabriciana*, L., varr. *N. xanthostica*, K., = *flaviguttata*, K., ♀. Schenck, *l. c.* pp. 252 & 253.

Epeoloides, *Tiphia*, *Pasites*, *Phileremus*, *Ammobatoides*. Schenck, S. E. Z. xxxiv. pp. 141-152, defends himself against Gerstäcker's attacks with respect to various species of these genera.

Pasites punctata, Schek., and *Phileremus punctatus*, F. : Schenck, B. E. Z. xvii. pp. 250-252, again discusses the question as to these much vexed species, endorsing Radoszkowsky's opinions. *Ph. punctatus*, Gerst., = *Nomada truncata*, Nyl.; *P. punctata*, Sch., must remain in *Pasites*, or be placed in a new genus, for which the name *Biastoides* is suggested.

Phileremus, Gerst., is re-characterized as a new genus, under the name *Melittoxena*, for the reception of *Nomada truncata*, Nyl. (*P. punctatus*, Gerst.). The maxillary palpi are 4-jointed, not 2-jointed, as Gerstacker states, and differences are pointed out between *N. truncata*, Nyl., and *Epeolus punctatus*, F. *Ammobates*, Latr., has 6-jointed maxillary palpi, and comprises *muticus*, Spin. (= *rufiventris*, Latr.), *vincus*, Gerst., and *setosus*, Mor. *Phileremus*, Latr. (*Ammobatoides*, Schenck), has 3-jointed max. palpi, and contains one species, *bicolor*, Lep., = *kirbianus*, Latr., = *punctatus*, F.; [*? gen.*] *carinatus*, Mor., has 2-jointed max. palpi. Morawitz, Hor. Ent. Ross. ix. pp. 154-159.

Crocisa histrio, F., and *Anthophora nidulans*, F., are recorded from Japan, and the queen of *Apis nigricincta*, Sm., is described: F. Smith, Tr. E. Soc. 1873, p. 204 *et seq.*

Megilla caligata, Gerst., from Mombas, figured in V. d. Decken's Reisen, iii. pt. 2, pl. xiii. fig. 10.

Anthophora retusa, L. & Kirby, and *A. aestivalis*, Pz.: Schenck, *l. c.* p. 248, discusses the confusion of nomenclature attending these species, and gives various sexual diagnostic characters.

Anthophora borealis, Mor., occurs in N. Germany, and is distinct from *A. 4-maculata*, F.; errors in Dours's monograph of the genus are pointed out. F. Morawitz, Hor. Ent. Ross. ix. pp. 152 & 153.

Xylocopa mesoxantha, Lep., ? = *perversa*, Wied. (from Java), the ♂ of the latter and ♀ of the former being figured. C. Ritsema, Tijdschr. Ent. (2) viii. pp. 221-223, pl. x. figs. 1-3.

Baltimore orioles decapitate carpenter-bees, and take the honey from their abdomens; Campbell (from "American Artizan"), Nature, viii. p. 253.

Psithyrus lugubris, Kriechb. The author describes a ♂ from South Tyrol, dubiously referred by him to this species. Verh. z.-b. Wien. xxiii. pp. 65 & 66.

Bombi in the Swiss Alps: MT. schw. ent. Ges. iv. pp. 151 & 152.

Bombus fragrans, *distinguendus*, *mesomelas*, and *equestris*: observations on their affinities by Kriechbaumer, S. E. Z. xxxiv. pp. 335-338. *B. montanus*, Gerst., *nec* Lep., is re-named *alticola*: *id. l. c.* p. 339.

Bombus soroensis, Panz. (? F.), has 3 forms, the 2nd of which is *proteus*, Gerst., the 3rd not named; its confused synonymy is discussed, and diagnostic characters given: Schenck, B. E. Z. xvii. pp. 243-246. Variations in colour, &c., in other species are noticed; *B. lucorum* and *terrestris* are not specifically separable; *B. tristis* and *feberanus*, Seidl., = *muscorum*, F., varr.; *B. mniorum*, Schi., = *agrorum*, F., var.; *B. equestris*, Schi., *arenicola*, Thoms., = *sylvarum*, var.; *id. l. c.* pp. 246-248.

Trigona. A small species is supposed to suck the secretions of a *Membracis* (? : *Homoptera*) found on *Cassia multijuga* at St. Catharina, Brazil; it has also been seen sucking putrefying pieces of a toad and a hen, and juice flowing from trees. H. Muller, Nature, viii. p. 201, figs. 1-3: *cf.* W. E. Hart, *op. cit.* p. 263.

Apis mellifica. Bees in the San Joaquin Valley, California, collect and fill their comb-cells with honey-dew and manna, though these substances are never mixed in the same cell. The 'manna' is supposed not to be an insect secretion. J. Applegarth, P. Cal. Ac. v. p. 42.

'Annals of Bee-culture for 1872'; a Bee-keeper's year-book, Louisville, Kentucky, 1872, 8vo, pp. 64, edited by D. L. Adair, appears to be a new annual of more than usually scientific character, judging from notice in *Am. Nat.* vii. p. 43.

A hive constructed by L. Ridolfi is referred to in *Bull. Ent. Ital.* v. p. 67, as described and figured in the "Effemeridi del Comizio agrario di Firenze," v. p. 93.

M. Girard records Lance's experiments, by which he obtains honey from any particular flowers; *Bull. Soc. Ent. Fr.* (5) iii. p. cxxii. He records circular combs; *l. c.* p. ccxxxvii.

Hive-bees 'recognizing individuals': J. Potts, *Ent.* vi. p. 415.

The queen-bee does not and cannot sting; she inserts her sting into one of the spiracles of her adversary: W. A. Munn, *Sci. Goss*, 1873, p. 251. W. Carr, *op. cit.* p. 273, adopts this opinion, and gives personal observation on impregnation of the queen-bee, and on unusual phenomena in swarming.

Elaborate observations upon barren bee-eggs, in connection with the doctrine of parthenogenesis, are made by C. Claus & C. v. Siebold, *Z. wiss. Zool.* xxiii. pp. 198-210, figs. 1 & 2.

C. T. von Siebold's "Mittheilung über die Speichelorgane der Biene" (Nördlingen, 1872) has not been seen by the Recorder: it is translated in *P. E. Soc.* 1873, p. v.

New species :—

Panurgus aethiops, p. 259, *albitarsis*, *ornatipes*, p. 260, *picipes*, p. 261, Texas, Cresson, *Tr. Am. Ent. Soc.* iv.

Osmia tricuspidata, p. 293, *ruficollis*, *microgramma*, p. 297, Grecian Archipelago, *cincta*, p. 295, *cinctella*, p. 296, G. Archipelago and Algeria, *mucida*, p. 293, *pseudaurulenta*, p. 294, Algeria, Dours, *R. Z.* (3) i.; *O. taurus*, F. Smith, *l. c.* p. 201, Hiogo; *O. texana* and *subfasciata*, Cresson, *l. c.* p. 261, Texas.

Lithurgus collaris, F. Smith, *l. c.* p. 202, Hakodadi.

Chalicodoma nobilis [-le], p. 298, S. France, Algeria, *luctuosa* [-sum], p. 299, *leuco-pogonata* [rectius *albibarbatum*], p. 300, Grecian Archipelago, Dours, *l. c.*

Megachile fortis, *comata*, p. 262, *albitarsis*, p. 263, *disparilis*, p. 264, *amica*, *exilis*, p. 265, *facunda*, *frugalis*, p. 266, *gentilis*, *inimica*, *lucrosa*, p. 267, *grandis*, *optiva*, *nupta*, p. 268, *studiosa*, *osmioides*, p. 269, *variolosa*, p. 270, Texas, Cresson, *l. c.*; *M. dimidiativentris*, p. 300, Algeria, *montenegrensensis*, p. 301, Grecian Archipelago and Algeria, *clavicus*, p. 302, Grecian Archipelago, Dours, *l. c.*

Anthidium leviventre, p. 303, Spain, Montpellier, *undulatum*, p. 304, Montpellier, *stigmaticorne*, p. 305, Algeria, Dours, *l. c.*; *A. 4-seriatum*, and var. *circumcinctum*, Kriechbaumer, *Verh. z.-b. Wien*, xxiii. p. 63, Corfu, Syra, Bozen; *A. zebratum* and *concinnum*, Cresson, *l. c.* p. 270, Texas.

Nomada pyrosoma, p. 308, *tridentirostris*, p. 309, Algiers, Dours, *l. c.*; *N. japonica* and *fervens*, Smith, *l. c.* p. 203, Hiogo; *N. texana*, Cresson, *l. c.* p. 271, Texas.

- Epeolus aurivestitus*, Dours, *l. c.* p. 306, Algeria.
Celiorys fenestrata, Smith, *l. c.* p. 203, Hahodadi, N. China, *C. texana edita*, p. 272, *insita*, *scitula*, p. 273, Cresson, *l. c.* Texas.
Stelis costalis, Cresson, *l. c.* p. 274, Texas.
Melecta interrupta, id. *l. c.* p. 275, Texas; *M. rugosa*, Dours, *l. c.* p. 307, Grecian Archipelago, Algeria.
Eucera canescens, *tomentosa*, p. 311, *nigrithoracica*, p. 313, *trizona* (? = *bicincta*, Lep.), *dizona*, p. 316, *tenuimarginata*, *collaris*, p. 319, *obesa*, p. 320, *brevicornis*, p. 322, Algeria, *consimilis*, p. 311, Algeria, Spain, *pulveracea*, p. 312, Spain, *albipunctulata*, p. 313, Constantinople, *bibalteata*, p. 314, *pedata*, p. 315, *semistrigosa*, p. 318, Algeria, Grecian Archipelago, *ephippia* [ta], p. 317, Grecian Archipelago, *eucnemidea*, p. 321, Algeria, S. France, Dours, *l. c.*; *E. concinna*, Gribodo, *l. c.* p. 82, Susa; *E. sociabilis*, F. Smith, *l. c.* p. 204, Hiogo, N. China, Siberia.
Tetralonia (Macrocera) nigrifacies, p. 323, Algeria, S. France, *cælebs*, Algeria, *subaurata*, Spain, S. France, *inæquidistans*, Spain, Algeria, S. France, p. 324, *coangustata*, Algeria, Spain, *canescens*, Algeria, Spain, S. France, p. 325, Dours, *l. c.*
Melissodes atripes, p. 275, *comanche*, *texana*, p. 276, *rivalis*, p. 277, *intorta*, *belfragii*, *intermedia*, p. 278, *honesta* (? = *intermedia*, ♂), *pygmaea*, p. 279, *enavata*, *spissa*, p. 280, *brevicornis*, *albata*, and *M. (?) ursina*, p. 281, *M. (?) densa* and *marginella*, p. 282, Texas, Cresson, *l. c.*
Anthophora segusina, p. 79, *mucida*, p. 80, Susa, Gribodo, Bull. Ent. Ital. v.; *A. texana*, Cresson, *l. c.* p. 282, Texas.
Xylocopa circumvolans, Smith, *l. c.* p. 205, Hiogo; *X. texana*, p. 283, *purpurea*, p. 284, Cresson, *l. c.* Texas.
Centris lanosa, Cresson, *l. c.* p. 284, Texas.
Apathus variabilis, id. *ibid.*, Texas.
Bombus speciosus, p. 205, *terminalis*, *ignitus*, p. 206, Smith, *l. c.* Japan; *B. senex*, Vollenhoven, Tijdschr. Ent. (2) viii. p. 229, pl. x. figs. A & B, Sumatra.

VESPIDÆ.

- Paragia vespiformis*, Sm., Champion Bay, figured by Smith, Cruise of Curaçoa, pl. xlv. fig. 2.
Masaris occidentalis, Cresson, ♀, from Texas, described by Cresson, Tr. Am. Ent. Soc. iv. p. 231.
R[h]aphi[do]glossa eumenoides, Saund., and *Psiliglossa [Psilo-] odyneroides*, Saund.: adult larvæ figured (p. 408), and the segmental analogies discussed, with habits of the imago: Sir S. S. Saunders, Tr. E. Soc. 1873, pp. 407-410.
Eumenes coarctatus, L., var. ♀, and *E. dimidiatus*, Brullé, var. *baeri*, Rad., from Krasnowodsk: F. Morawitz, Hor. Ent. Ross. ix. pp. 294 & 295.
Discoelius insignis, Sauss., New Holland, fig. 1, and *Rhynchium magnificum*, Sm., Nicol Bay, fig. 4, figured by Smith, *l. c.*
 Puton, Pet. Nouv. p. 344, gives an analytical table of the social wasps found in France.

On the preservation and examination of wasps'-nests: A. Rouget, *Pet. Nouv.* p. 348.

Habits of wasps: J. Anderson & J. Hardy, *P. Berw. Club*, vii. p. 127.

Polistes gallicus and *diadema* nest in old domestic utensils on rubbish heaps at Dijon: Rouget, *Pet. Nouv.* p. 269.

Polistes. Aggregation of clay nests in Maryland: P. R. Uhler, *Am. Nat.* vii. p. 678.

Polistes canadensis, L.: nidification, H. Lucas, *Ann. Soc. Ent. Fr.* (5) iii. pp. 106-108, pl. iii. figs. 10, *a* & *b*.

Polistes badia, Gerst., figured in V. d. Decken's *Reisen*, iii. pt. 2, pl. xiv. fig. 1.

Vespa japonica, Radosz., *nec* Sm., = *mandarinia*, Smith; *V. simillima*, Sm., = *auraria*, Sm., worker; *Polistes chinensis*, F., = *biglumis* (*diadema*); vars. of *P. hebraeus*, F., and *novaræ*, Sauss., are described: F. Smith, *Tr. E. Soc.* 1873, pp. 197 & 198.

Vespa crabo, *media*, *sylvestris*, *rufa*, *germanica*, and *vulgaris*, *Polistes gallicus* and *diadema*: economy fully discussed, and the specific distinctness of the two latter affirmed in opposition to Sichel, by A. Rouget, *Mém. Ac. Dijon* (3) i. pp. 164-200. *V. germanica* occurs in Texas: E. T. Cresson, *Tr. Am. Ent. Soc.* iv. p. 248.

Vespa sylvestris nests in the ground at Dijon: Rouget, *Pet. Nouv.* p. 268. On *V. germanica* and *vulgaris* and parasites, *id. l. c.* p. 335.

Masaris edwardsi, sp. n., Cresson, *l. c.* p. 87, California.

Eumenes sinensis, Smith, *Cruise of Curaçoa*, p. 462, pl. xlv. fig. 3, ♀, N. China; *E. fraterna*, *id. Tr. E. Soc.* 1873, p. 195, Hiogo; *E. belfragii* and *bolli*, Cresson, *Tr. Am. Ent. Soc.* iv. p. 232, Texas: spp. nn.

Rhynchium ardens, sp. n., F. Smith, *Tr. E. Soc.* 1873, p. 196, Nagasaki.

Odynerus texanus, *clusinus*, p. 234, *euctus*, *designatus*, p. 235, *delicatus*, *cultus*, p. 236, *verus*, p. 237, *ductus*, *fusus*, p. 238, *firmus*, p. 239, *geminus*, p. 240 (? = *firmus*, var.), *manifestus*, *colon*, p. 241, *fundatus*, p. 242, *austrianus*, *bellulus*, *electus*, p. 243, Cresson, *l. c.* Texas; *O. (Symmorphus) captivus*, F. Smith, *Tr. E. Soc.* 1873, p. 197, Hiogo: spp. nn.

Lionotus caspicus, sp. n., Morawitz, *l. c.* p. 295, Krasnowodsk.

Pterochilus fausti, *id. l. c.* p. 296, Krasnowodsk; *P. texanus* and *laticeps*, Cresson, *l. c.* p. 244, Texas: spp. nn.

Polistes perplexus (? = *rubiginosus*, St. F., var.), p. 245, *generosus* (? = *perplexus*, var. [!]), *texanus*, p. 246, *bellicosus*, *variatus*, p. 247, spp. nn. *id. l. c.* Texas.

CRABRONIDÆ.

Scoliides.

Myzine and *Plesia*: general observations by Gerstäcker, in V. d. Decken's *Reisen*, iii. pt. 2, pp. 336 & 339. *Elis (Dielis) soleata*, Gerst., fig. 4, *Myzine xanthocera*, G., fig. 5, figured, *tom. cit.* pl. xiv. *M. hamata*, Say, = *costata*, Say, ♀; Cresson, *Tr. Am. Ent. Soc.* iv. p. 200.

Elis regina, Cress., = *xantiana*, Sauss.; *id. l. c.* p. 202.

Typhia fuscipennis, *punctata*, p. 183, *rufimandibulata*, *ordinaria*, *agilis*, p. 184, spp. nn., F. Smith, *Tr. E. Soc.* 1873, Japan.

Myzine dubiosa and *texana*, p. 200, *rufiventris*, p. 201, Cresson, *l. c.* Texas, spp. nn.

Scolia fascinata, *japonica*, p. 185, *ventralis*, p. 186, spp. nn., Smith, *l. c.* Japan.

Elis lupina, sp. n. Cresson, *l. c.* p. 202, Texas.

Pompilides.

Pompilus atrox, Dahlb.; this N. American species occurs also in Japan. Smith, *l. c.* p. 188.

Pompilus philadelphicus, St. F.; var. n. *sericatus* from Texas; Cresson, *l. c.* p. 202.

Pompilus pictipennis, Sm., Moreton Bay, figured by Smith, Cruise of Curaçoa, pl. xliii. fig. 5.

Priocnemis polydorus, Sm., Moreton Bay, pl. xliii. fig. 6, *affectatus*, Sm., pl. xlv. fig. 1, *ephippiatus*, Sm., *ibid.* fig. 2: *id. l. c.*

Hemipepsis, Dahlb. (1845), = *Mygymia*, Shuckard (Hist. and Nat. Arrangement of Insects in Lardner's Cabinet Cyclopaedia, 1840, p. 179), Smith (1855): F. Smith, Ann. N. H. (4) xii. p. 256.

Hemipepsis prodigiosa, Gerst., pl. xiii. fig. 12, *H. contumax*, G., pl. xiv. fig. 2; V. d. Decken's Reisen, iii. pt. 2.

Pepsis formosa, Say, ? = *cærulea*, L.; a var. of *P. marginata*, Beauv., is described from Texas as *P. sericata*; Cresson, *l. c.* p. 209.

Pompilus fragilis, *maculifrons*, p. 186, *arrogans*, *consanguineus*, p. 187, *bilunatus*, *exortivus* (also India and N. China), *erebus*, p. 188, *reflexus*, p. 189, F. Smith, Tr. E. Soc. 1873, Japan; *P. fervidus*, p. 441, *decedens*, *diversa*, p. 442, *varietatis*, p. 443, *vitabilis*, *exclusus*, *iratus*, p. 444, *conterminus*, p. 445, Pará, *viduus*, p. 443, *detectus*, p. 444, Santarem, *id.* Ann. N. H. (4) xi.: spp. nn.

Priocnemis heiligbrodti and *texanus*, p. 204, *facetus*, p. 205, Cresson, *l. c.* Texas; *P. irritabilis*, *atropos*, F. Smith, Tr. E. Soc. 1873, p. 189, Japan: spp. nn.

Agenia constructor, F. Smith, *l. c.* p. 190, Japan; *A. agitata*, p. 445, *multipicta*, *gloriosa*, *comparata*, p. 446, *cæruleocephala*, *deceptor* [*-trix*], *timida*, p. 447, *reversa*, *gracilentata*, *modesta*, p. 448, *ordinaria*, *auricornis*, *gratiosa*, p. 449, *tarsata*, *letabilis*, *fortipes*, *conspicua*, p. 450, *cursor*, p. 451, Amazons, *id.* Ann. N. H. (4) xi.; *A. belfragii* and *longa*, Cresson, *l. c.* p. 205, Texas: spp. nn.

Parapompilus vicinus, *texanus*, *contiguus*, spp. nn., Cresson, *l. c.* p. 206, Texas.

Notocyphus dorsalis and *texanus*, *id. l. c.* p. 207, Texas; *N. maculifrons*, Smith, Ann. N. H. (4) xii. p. 49, Pará: spp. nn.

Pepsis eximius, p. 49, Santarem, *tinctipennis*, *fuscipennis*, *optimatis*, p. 50, *purpureus*, p. 51, Pará, Smith, *l. c.* spp. nn.

Ceropales crassicornis, p. 51, *pedestris*, *irregularis*, p. 52, Pará, *lugubris*, p. 52, Santarem, *id. l. c.*; *C. texana*, *elegans*, *fulvipes*, Cresson, *l. c.* p. 208, Texas: spp. nn.

Planiceps feralis, sp. n., Cresson, *l. c.* p. 207, Texas.

Aporus minimus and *rufiventris*, *id. l. c.* p. 207, Texas; *A. quadrimaculatus*, *canescens*, *minutus*, Smith, Ann. N. H. (4) xii. p. 53, Pará: spp. nn.

Salix bipunctatus, p. 254, Tuscany, *dorsalis*, p. 255, Angara, Siberia, spp. nn. Smith, *l. c.*

Chirodamus distinctus, sp. n., *id. l. c.* p. 255, Coquimbo.

Mygimia bellicosa, Bengal, *sarvissima*, Bombay Presidency, p. 256, *læta*, Birmah, *intermedia*, N. India, Ceylon, *vitripennis*, Sumatra, p. 257, *purpureipennis*, Java, *momentosa*, Borneo, *pulchripennis*, Philippine Islands, p. 258, *australasiae*, N. W. Australia, *id. l. c.* spp. nn.

Sphegides.

Ammophila ponderosa, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. xiv. fig. 3. *Parapsammophila miles*, Taschen., = *A. cyanipennis*, Lep.; Gerstäcker, *ibid.* p. 332, note.

? *Pelopæus*. Observations on a nest made of very friable earth, from Melbourne; H. Lucas, Bull. Ent. Soc. Fr. (5) iii. p. cxxviii.

Sphex argentata, Dahlb., known in Africa, India, and N. America, occurs also in Japan; F. Smith, Tr. E. Soc. 1873, p. 191.

Ampulex novaræ, Sauss., ♀ described, from Japan; F. Smith, *l. c.* p. 191; *A. europæa*, Gir., recorded from Italy: Gribodo, Bull. Ent. Ital. v. p. 85.

Ammophila infesta, Smith, *l. c.* p. 190, Hiogo; *A. spinosa*, Hong Kong, *læviceps*, Santiago, p. 259, *barbata*, p. 260, Mexico, *id.* Ann. N. H. (4) xii.; *A. grossa* and *inepta*, Cresson, Tr. Am. Ent. Soc. iv. p. 209, Texas: spp. nn.

Trigonopsis cyclocephalus and *plesiosaurus*, spp. nn., Smith, Ann. N. H. (4) xii. p. 53, Ega.

Pelopæus texanus, sp. n., Cresson, *l. c.* 210, Texas.

Chlorion regalis, sp. n., Smith, Ann. N. H. (4) xii. p. 291, Beluchistan, Afghanistan, Scinde.

Sphex torrida, Madagascar, *tuberculata*, Sierra Leone, *id. ibid.*; *S. aurifex*, p. 460, fig. 3, and *decorata*, p. 461, fig. 4, N. W. Coast of Australia, *prætexta*, p. 461, fig. 5, Moreton Bay, *id.* Cruise of Curaçoa, pl. xlv.; *S. sellæ*, Gribodo, *l. c.* p. 86, Sicily; *S. abdominalis* and *rufiventris*, p. 211, *texana*, *belfragii*, *lauta*, p. 212, *dubitata*, p. 213, Cresson, *l. c.* Texas: spp. nn.

Priononyx brunnipes, sp. n., Cresson, *l. c.* p. 213, Texas.

Ampulex trigonopsis, p. 53, Ega, *apicalis*, p. 292, S. Africa, Smith, Ann. N. H. (4) xii., spp. nn.

Dolichurus levis, sp. n., *id. l. c.* p. 292, Brazil.

Larrides.

Tachytes pompiliformis, Pz., stores its galleries with grasshoppers (*Chortipus*). J. Lichtenstein, Bull. Soc. Ent. Fr. (5) iii. p. cxxii.

Pison jurinii, Spin.: pseudo-pupa from briar-stems, shores of the Ambracian Gulf, described. Sir S. S. Saunders, Tr. S. Soc. 1873, p. 413.

Larrada docilis, *nigricans*, *tisiphone*, p. 192, *amplipennis*, *erebus*, p. 193, F. Smith, Tr. E. Soc. 1873, Japan; *L. fasciata*, p. 55, *facilis*, *tenebrosa*, *pruinosa*, *æthiops*, p. 56, *limpidipennis*, p. 57, Amazons, *vestita*, N. India, *cælestina*, Hong Kong, p. 293, *ferox*, Africa, *diabolica*, Sierra Leone, Natal, *clypeata*, New Caledonia, *crassipes*, S. Australia, p. 294, *id.* Ann.

N. H. (4) xii.; *L. americana, texana*, p. 214, *belfragii*, p. 215, Texas, Cresson, Tr. Am. Ent. Soc. iv.; spp. nn.

Tachytes elongatus, p. 215, *validus* (and var. *breviventris*), *sericatus*, p. 216, *obscurus, texanus, rufifasciatus* (? = *abdominalis*, Say, ♂), p. 217, Cresson, *l. c.*, Texas; *T. iridipennis, fervens*, p. 57, *simulans, frontalis, aurivestitus*, p. 58, Amazons, Smith, Ann. N. H. (4) xii.: spp. nn.

Astata rufiventris and *terminata*, spp. nn., Cresson, *l. c.* p. 218, Texas.

Pison maculipennis and *pilosus*, spp. nn., Smith, *l. c.* p. 295, Ega.

Bembicides.

Bembex albifasciata, Zulu Country, *crabroniformis*, Port Essington, p. 296, *diversipennis*, Angola, *severa*, Australia, p. 297, *palmata*, N. Australia, *tridentifera*, Queensland, p. 298, *flaviventris*, Swan River, *flavilabris*, W. Australia, p. 299, *multipicta, pallidipicta*, Mexico, p. 300, Smith, *l. c.*; *B. niponica*, id. Tr. E. Soc. 1873, p. 194, Hiogo; *B. nubilipennis*, p. 218, *texana*, p. 219, *belfragii*, p. 220, Cresson, *l. c.*: spp. nn.

Monedula formosa, p. 221, *neglecta*, p. 222, spp. nn., Cresson, *l. c.*, Texas.

Nyssonides.

Stizus pectoralis, Sm., Australia, figured by Smith, Cruise of Curaçoa pl. xliv. fig. 6.

Megalomma [*Megalommus*, name only, Swainson & Shuckard, Lardner's Cab. Cyclop., Hist and Nat. Arrangement of Ins., 1840, p. 181; *Megalomma*, Westwood, *Coleoptera*, 1841], g. n., Smith, Ann. N. H. (4) xii. p. 405. Section of *Gorytes*, with a petiolated abdomen. *M. politum* and *elegans*, p. 406, *nigriceps*, p. 407, Brazil, *id. l. c.* spp. nn., and *Gorytes natalensis*, Smith.

Stizus texanus, p. 222, *fervidus*, p. 223, spp. nn., Cresson, *l. c.* Texas.

Larra agilis, p. 402, Ega, *cornuta*, Bombay Presidency, *magnifica*, Egypt, p. 403, *flavimaculata*, p. 404, S. Africa, Smith, Ann. N. H. (4) xii. spp. nn.

Nysson pilosus, *id. l. c.* p. 404, Pará; *N. texanus*, p. 223, *N. (?) inermis*, p. 224, Cresson, *l. c.* Texas: spp. nn.

Sericophorus bicolor, sp. n., Smith, *l. c.* p. 405, Swan River.

Gorytes specialis, vespoides, p. 407, *triangularis, facilis*, p. 408, Amazons, *id. l. c.*; *G. belfragii*, p. 224, *costalis, bolli*, p. 225, Cresson, *l. c.* Texas: spp. nn.

Alyson texanus, sp. n., Cresson, *l. c.* p. 226, Texas.

Crabronides.

Psen: note on a swarm. J. Weir, P. E. Soc. 1873, p. xxviii.

Niteliopsis [*Nitelopsis*], g. n., S. S. Saunders, Tr. E. Soc. 1873, pp. 410-412. Unites *Pison* and *Nitela*, having the wing-neuration approximating to that of the former, and the antennæ and entire eyes of the latter. Type, *N. pisonoides*, sp. n., *id. ibid.*, figured with detail, p. 411, Ionian Islands.

Trypoxylon obsonator, F. Smith, Tr. E. Soc. 1873, p. 194, Hiogo; *T. vagum*, p. 99, *superbum, rugifrons*, p. 100, *lævifrons, fabricator*, p. 101, Amazons, *id. Ann. N. H. (4) xii.*: spp. nn.

Crabro nasicornis, *pugnans*, *megacephala*, p. 102, *carinatus*, *sculpturatus*, p. 103, *dentalis*, *verticalis*, p. 104, Amazons, *id.* Ann. N. H. (4) xii.; *C. texanus*, Cresson, *l. c.* p. 227, Texas: spp. nn.

Mimesa tibialis, sp. n., Cresson, *ibid.*, Texas.

Philanthides.

Cerceris mimica, p. 228, *gnara*, *firma*, p. 229, *morata*, *fasciola*, p. 230, *jucunda*, p. 231, Cresson, *l. c.* Texas; *C. navitatis*, F. Smith, Tr. E. Soc. 1873, p. 195, Hakodadi; *C. reversus*[-*sa*], *pullatus*[-*ta*], p. 105, *modestus*[-*ta*], *nigriceps*, p. 106, *ruficeps*, p. 107, Amazons, *striata*, Pará, *rostrata*, Mexico, p. 409, *exsecta*, *graphica*, p. 410, Mexico, *multipicta*, Angola, *fervens*, N. India, p. 411, *albipicta*, India, *fluvialis*, Swan River, p. 412, *varipes*, Adelaide, *venusta*, Queensland, *opposita*, Victoria, p. 413, *seva*, Victoria, *aurantiaca*, S. Australia, p. 414, *id.* Ann. N. H. (4) xii.: spp. nn.

Philanthus niloticus, White Nile, *elegans*, N. India, *id.* Ann. N. H. (4) xii. p. 415, spp. nn.

Trachypus disjunctus, p. 107, *basalis*, p. 108, St. Paulo, *id. l. c.* spp. nn.

THYNNIDÆ.

Thynnus pulchralis, Sm., Adelaide, figured by Smith, Cruise of Curaçoa, pl. xliii. fig. 4, ♂.

Thynnus brechleyi, p. 456, fig. 2, Champion Bay, *conspicuus*, p. 457, fig. 3, N. W. Coast of Australia, *unifasciatus*, p. 458, fig. 1, Queensland, *id. ibid.* spp. nn.

MUTILLIDÆ.

BLAKE, C. A. Synopsis of North American Mutillidæ, Tr. Am. Ent. Soc. iii. pp. 217-265. [This vol. not having yet come to England, the quotations from it are taken from Rec. Am. Ent. 1872.]

— Additions to the Synopsis of N. Am. Mutillidæ, *op. cit.* iv. pp. 71-76.

Mutilla bilunata, Gerst., *nec* Burm., is re-named *stupidia*; Gerstäcker, in V. d. Decken's Reisen, iii. pt. 2, p. 340, note. *M. straba*, G., fig. 6, *pygidialis*, G., fig. 7, figured, *ibid.* pl. xiv.

Psammotherma ajax. Blake, *l. c.* iii. Florida.

Mutilla briaxus, Philadelphia, *grotii*, p. 228, Colorado, *oajaca*, Mexico, *promethea* and *sayi*, p. 229, Texas, *leona*, *cinaloa*, *yucatanana*, Mexico, *copano* and *seva*, p. 232, *auripilis* and *gorgon*, p. 233, *zelaya* and *comanche*, p. 234, Texas, *coccineihirta*, California, *sumichrasti*, Mexico, *hector*, Kansas, *castor*, p. 237, Texas, *bezar* and *waco*, p. 238, Texas, *apicalata*, Mexico, *canella* and *macilenta*, p. 239, Texas, *obscura*, Massachusetts, *azteca*, Mexico, *melanosoma*, Panama, *3-signata*, Florida, *cressoni*, *nortoni*, *toluca*, *ariadne*, *formosa*, *balopilus*, *altimie*, *xalisco*, Mexico, *floridana*, Florida, *tolteca*, Mexico, *cypris*, Guatemala, *mutata* and *scævola*, p. 247, *balteola*, p. 248, Texas, *oceola*, Florida, *sanborni*, Massachusetts, *flavida*, p. 249, Texas, *laticeps*, *xalapa*, *hapoteca*, Mexico, *gila*, p. 250, Texas, *robinsoni*, *lerma*, *bisignata*, *gothica*, *izucar*, *chiapã*, *petricola*, *auripes*, *minutissima*, *psammodroma*, Mexico, *canadensis*, Canada, *brazoria*, p. 255,

Texas, Blake, *l. c.* iii. ; *M. clotho*, *leda*, *chiron*, p. 72, *creon*, p. 73, *admetus* (? = *waco*, Blake, ♂), *albipilosa*, *grandiceps*, p. 74, *electra*, p. 75, Texas, *id. l. c.* iv. ; *M. pustulata*, *insidiator*, *ardescens*, and *pungens*, F. Smith, Tr. E. Soc. 1873, p. 182, Japan ; *M. suavis*, p. 341, pl. xiv. fig. 8, Mombas and Cape of Good Hope, *porphyrea*, p. 437. See Jipe, Gerstäcker, *l. c.* : spp. nn.

Agama mendica, Nevada, *imperialis* and *nokomis*, p. 260, Texas, *danaus* and *melicausa*, p. 261, *tapajos*, p. 262, Texas, *triangularis*, Nevada, *pal-lida*, *hyalina*, and *belfragii*, p. 263, Texas, *alcanor*, Arizona, Blake, *l. c.* iii. ; *A. aulus*, p. 75, *minuta*, *juxta* [!], *attenuata*, p. 76, Texas, *id. l. c.* iv. spp. nn.

DORYLIDÆ.

Dorylus. Affinities fully discussed by Gerstäcker in V. d. Decken's Reisen, iii. pt. 2, pp. 347-357.

Labidus nigrescens, p. 194, *minor*, p. 195, spp. nn., E. T. Cresson, Tr. Am. Ent. Soc. iv. Texas.

Iswara fasciata, sp. n., F. Smith, Ann. N. H. (4) xii. p. 252, Scind.

FORMICIDÆ.

J. TRAHERNE MOGGRIDGE, in "Harvesting Ants and Trap-door Spiders" (London: 1873. pt. i.: pp. 1-69. pls. i.-vi.) after recapitulating biblical and classical notices of the habit of storing grain by ants, usually considered by modern authors to be attributed to those insects in error (the grain being thought to be represented by their pupæ), proves from his own observations at Mentone the possession of such a habit by *Atta barbara*, *A. structor*, and *Phidole megacephala*, and mentions other species (stated to be 19 in number, at p. 59, but which, as named, are only 9, viz., the 3 above-named and *Myrmica barbata*, *Ceodoma cephalotes*, *providens*, and *diffusa*, *Atta rufa*, and *Pseudomyrma rufinigra*) in which a similar custom prevails. Other species are elsewhere noted as occasionally carrying seeds. Rejected portions of seeds, &c., are heaped outside the nests (pl. i. A). Granaries are described and figured, with galleries, pls. ii.-vi. D, and woodcuts. Seeds in the granaries do not germinate, though they readily do so when taken out and sown. The ants probably allow seeds to be softened by damp, and the young sprout or radicle is certainly gnawed off (see pl. vi.) Nests are noted as designedly constructed by ants near a cornchandler's shop and close to a bird's-cage. The ants work by night, and combats of long duration occur between rival colonies, originating in attempts to plunder the stores. The probable influence of this storing habit on dissemination of plants is discussed. In an appendix, 16 species of ants observed on the Riviera are briefly described, and instructions as to collecting and studying the *Formicidæ* are given. The observations of Jerdon, Buchanan, White, and Horn (chiefly on East Indian species) are also reproduced. In a posthumous supplement (1874: but continuing the pagination of the original work, and partly issued with it), the author, pp. 157-179, records the fact of *Atta barbara* and *structor* storing grain at Cadenabbia, Lake Como, and Montpellier, and

adds many details from his own observation. The nests are not habitually abandoned every year; and it is reckoned that one pound weight (avoirdupois) of seeds was contained in one nest. Wakefield's original observations on the habit of *Formica nigra* collecting seeds of *Viola odorata* are reproduced from P. L. S. ii.

Ants instinctively realize danger, on seeing for the first time the dead bodies of their fellows, and they seem to dislike the taint of a track drawn by the human hand: C. Darwin (quoting Traherne-Moggridge and J. D. Hague), *Nature*, viii. p. 244. As to the latter point, *cf. l. c.* p. 303.

Thirty species of ants from Calcutta, including some new (not described) named by F. Smith, P. E. Soc. 1873, p. viii. One of these, *Sima rufinigrum*, Jerdon, is simulated by a *Salticus*.

A list of 19 species occurring in Voigtland (Saxony) is given by Köhler, with dates, localities, &c.: SB. Ges. Isis, 1873, pp. 32-34.

Swarming of a brood of winged ants: C. C. Abbott, *Am. Nat.* vii. pp. 369-371.

Formica sanguinea. Observations on the habits of its neuters by T. G. Gentry, P. Ac. Philad., 1873, pp. 298 & 299, who comes to the conclusions—1, that there are 2 sets of neuters, respectively caring for the able and helpless members of the community; 2, that the more vigorous are confined to superficial cavities; and 3, that the young are conveyed to deep seated chambers.

Formica gracilescens, Nyl., = *Prenolepis longicornis*, Latr., and occurs both in the old and new worlds: H. Lucas, *Bull. Soc. Ent. Fr.* (5) iii. p. lxvii.

Camponotus chrysurus, Gerst., fig. 9, *erinaceus*, G., fig. 10, *Phidole talpa*, G., fig. 11; Gerstäcker, in V. d. Decken's *Reisen*, iii. pt. 2, pl. xiv.

Camponotus ligniperdus. J. Labhardt's observations on destruction caused by this insect (*Vierteljahrsschr. Zürich. Naturf. Ges.*) are reproduced in *Das Ausland*, xlv. (1872), p. 600.

Myrmecocystus mexicanus, Westw. Its economy fully noted, and a diagram of the exterior of its nest given, by H. Edwards, P. Cal. Ac. v. pp. 72-75 (also in *Am. Nat.* vii. pp. 722-726). The community consists of 3 distinct kinds of ants, "probably of two separate genera," viz.:—1, yellow workers, nurses and feeders; 2, yellow workers, honey-makers; 3, black workers, guards and purveyors. The honey-makers secrete the food of the entire population: the abdomen in this class is distended to the size of a pea. The honey is used by Mexicans as food, and they ascribe great healing properties to it.

J. Blake, *op. cit.* p. 98, states that the intestine of the honey-maker is not continued beyond the thorax, so that the food-remains can only be expelled by the mouth. The honey-bag is formed by the expansion of the abdominal segments, which is greater on the dorsal than the ventral surface.

Ectatomma (?) *sociale*, spp. nn., W. MacLeay, *Tr. Ent. Soc. N. S. W.* iii. p. 369, Murrumbidgee, Australia.

Phidole scabriuscula, sp. n., Gerstäcker, *l. c.* p. 360, Endara.

CHRYSIDIDÆ.

Stilbum calens is parasitic on *Chalicodoma murarium*, and another (blue) species devours the larva of a *Pelopæus*. *Chrysis cyanea* is parasitic on *Trypoxylon figulus*. J. Lichtenstein, Bull. Soc. Ent. Fr. (5) iii. pp. xv. & xvi.

Homalus nanus, sp. n., S. S. Saunders, Tr. E. Soc. 1873, p. 411, Ionian Islands, parasitic on *Nitelopsis pisonoides*.

ICHNEUMONIDÆ.

E. T. CRESSON, in his "Descriptions of Mexican Ichneumonidæ," P. Ac. Philad. 1873, pp. 104-176, 374-413, enumerates or describes as new a large number of species, mostly taken by F. Sumichrast near Orizaba and Cordova. Some new sub-genera are characterized.

The following North American species are stated in Tr. Ac. St. Louis, iii. p. 114 *et seq.*, to have been described in Tr. Am. Ent. Soc. iii., and are given here instead of under their several sub-families, as that vol. of the Tr. Am. Ent. Soc. has not been seen by the Recorder, and there may be many other species described in it [N.B.; these species are not given in Rec. Am. Ent. 1870-1873]:—*Cylloceria occidentalis*, Cresson, p. 160, *Lampronota scutellaris*, Cresson, p. 161, *L. tegularis*, Cresson, p. 163, *L. varia*, Cresson, p. 164, *L. rubrica*, Cresson, p. 165, *L. nigrita*, Walsh, p. 159 (an *Arenetra*; Cresson, Tr. Ac. St. Louis, iii. p. 123), *Glypta simplicipes*, Walsh, p. 156, *G. tuberculifrons*, Walsh, p. 152, *G. rufiscutellaris*, Walsh, p. 163, *G. longiventris*, Walsh, p. 154, *G. scitula*, Cresson, p. 155, *Pimpla annulicornis*, Walsh, p. 147, *P. scriptifrons*, Walsh, p. 148, *P. (?) indagatrix*, Walsh, p. 146, *P. alboricta*, Cresson, p. 147, *Acenites rupinsulensis*, Walsh, p. 152, *Phytodietus vulgaris* and *distinctus*, Cresson, p. 166, *Tryphon (?) submarginatus*, Cresson, p. 274, *Xylonomus albipictus*, Cresson, p. 168.

Woldstedt's "Materialier till en Ichneumonologia Fennica," Helsingfors: 1873, 8vo, has not been seen by the Recorder.

F. Walker, Ent. vi. p. 431, gives a list of species occurring in the Isle of Man.

Ichneumonides.

Tischbein, S. E. Z. xxxiv. pp. 345-356, 417-444, commences a synopsis of the European species of *Ichneumon*, Wesm., with an account of those occurring at Birkenfeld. and descriptions of new species. *Ichneumon multiguttatus*, Gr., = *centummaculatus*, Christ.; *I. stramentarius*, W., is distinct from *suspiciosus*, W. The sexes of various species are carefully distinguished.

Patroclus, subg. n., Cresson, P. Ac. Philad. 1873, p. 104. Distinguished from typical *Ichneumon* by the ungues being pectinate. *P. nigricæruleus*, sp. n., *id. ibid.* Orizaba, and *Ichneumon lectus* and *toltecus*, Cress.

Ortezia, subg. n. of *Ichneumon*, *id. l. c.* p. 130. Abdomen longitudinally rugose or aciculated, with the segments more or less constricted at the base. *Joppa (?) egregia* and *aciculata*, Cresson.

Ichneumon mayri, p. 350, Vienna, *falcatus*, p. 352, Birkenfeld, *holsaticus*, p. 418, Holstein, *retractus*, p. 419, Birkenfeld, *retectus*, Stettin, *crassicornis*, Holstein, p. 421, *flavifemur*, p. 422, Saxony, *vivacior* and *majusculus*, (? = *horridator*, Ziegl., ♀), p. 424, *ochraceus*, p. 426, *rarus*, p. 427, *simulans* and *perhiematus*, p. 428, *oblongatus*, p. 434, *rugosus*, p. 435, *guttatus*, p. 436, *perfidus*, p. 439, Birkenfeld, *flavipetiolus*, p. 436, Vienna, *brevis*, p. 437, Austria (parasitic on *Thecla ilicis*); Tischbein, l. c.; *I. chiapus*, *curiatus*, *dilucidus*, p. 112, *ablutus*, *passivus*, p. 113, *additus*, *citrinus*, *izucarus*, p. 114, *arrogans*, *cupidus*, *opaculus*, p. 115, *junceus*, *zacatecus*, p. 116, *actuosus*, p. 117, *solitarius*, *prolixus*, p. 118, *zaplanus*, *excukuratus*, p. 119, *inoratus*, *mendicus*, p. 120, *ignarus*, *placitus*, *epicus*, p. 121, *nigrifemoratus*, *abjectus*, p. 122, *cephalotes*, *amecus*, p. 123, *parandus*, *abaculus*, p. 124, *abitus*, *durus*, p. 125, *virescens*, p. 126, *abactus*, p. 127, *similans*, p. 128, E. T. Cresson, P. Ac. Philad. 1873, Mexico; *I. belfragii* and *propitius*, Texas, *id.* Tr. Am. Ent. Soc. iv. p. 156: spp. nn.

Edicephalus vicinus, sp. n., Cresson, P. Ac. Philad. 1873, p. 130, Orizaba.

Joppa incerta, sp. n., *id.* l. c. p. 131, Orizaba (? = *decorata*, Cress., ♀).

Trogus latipennis and *blandita*, spp. nn., *id.* l. c. p. 132, Orizaba.

Cryptides.

C. G. THOMSON, Opusc. Ent. (v.) pp. 455-527, pl., commences an arrangement and description of the Swedish *Crypti*, entering at great length upon the terminology (details figured). He comprises *Ichneumon* and *Cryptus*, Grav., under the term *Ichneumones pentagoni*, having the areola regularly pentagonal or quadrate; and *Pimpla*, *Ophion*, and *Tryphon*, Grav., under the term *I. deltoidei*, having the areola deltoid or absent. The *Cryptide* are subdivided into *Cryptina*, *Phygadeuonina*, *Hemitelina*, and *Stilpnina*. In the CRYPTINA the following new genera and species are described:—

Iocryptus, p. 472; *Phygadeuon regius*, Tasch.

Macrocryptus, p. 486; *Echthrus lancifer*, Grav.

Brachycryptus, p. 487; *B. erythrocerus* and *sordidulus*, p. 488, *fusiventris*, p. 489, Scandinavia: spp. nn.

Liocryptus, p. 489; *C. analis*, Grav.

Gonicryptus, p. 490; *G. glabriculus*, p. 491, *annulitarsis*, p. 492, Scandinavia, *macrurus*, p. 492, Denmark, *pictus*, Scandinavia, *clypearis*, Sweden and Denmark, p. 494, spp. nn., and *Cryptus titillator*, L.

Cenocryptus, p. 494; *Cryptus rufiventris*, Grav., and *bimaculatus*, Ratz. (re-named *apum*, p. 497), also *Cen. tener*, p. 496, *inflatus*, *pubiventris*, p. 497, Scandinavia, Seland, spp. nn.

Habrocryptus, p. 498; *Cryptus assertorius*, *brachyurus*, and *alternator*, Grav., and *C. minorius*, F.

Pycnocryptus, p. 500; *C. peregrinator*, Gr.

Spilocryptus, p. 501; *C. incubitor*, L., *migrator*, *fumipennis*, *ornatus*, *tricolor*, *adustus*, and *grossus*, Grav., and *S. tibialis*, p. 503, *zygænarum*, *dispar*, p. 504, *nasutus*, p. 505, *ornatulus*, p. 507, Scandinavia, spp. nn.

Hoplocryptus, p. 508; *H. pulcher*, *mesoxanthus*, p. 509, *elegans*, p. 511, *binotatulus*, p. 512, spp. nn., Scandinavia, and *Cryptus dubius*, Tasch., *confector*, *fugitivus*, and *occisor*, Grav.

Hygrocryptus, p. 513; *Cryptus carnifer*, Grav. (♂, *varicoxis*, Tasch.), and *H. drewseni* and *palustris*, spp. nn., p. 514, Scandinavia.

Cryptus serratus, *subquadratus*, p. 478, *infumatus*, p. 481, *latitarsis*, p. 483, *borealis*, *arenicola*, p. 484, Scandinavia.

Mesostenus subovalis, p. 516, Sweden.

In the PHYGADEUONINA the following new genera are briefly characterized in the table: *Mesocryptus*, *Calocryptus*, *Cælocryptus*, *Plectocryptus*, p. 519, *Cratocryptus*, *Stenocryptus*, *Mecocryptus*, *Trichocryptus*, *Microcryptus*, *Acanthocryptus*, *Stylocryptus*, *Gnathocryptus*, p. 520, *Leptocryptus*, p. 521.

Cratocryptus is described at length, p. 521, and contains *Cryptus furcator*, *anatorius*, *subpetiolatus*, and *parvulus*, Grav., and *Crat. sternocerus*, *opacus*, p. 523, *ruficoxis*, p. 525, *pleuralis*, *annulitarsis*, p. 526, *femoralis*, p. 527, spp. nn., Scandinavia.

Ischnus albitarsis, Cress., re-described, and dubiously referred to *Cryptus*; if correctly so referred, it will require re-naming: B. D. Walsh, Tr. Ac. St. Louis, iii. pp. 76 & 81. Cresson, *op. cit.*, states his insect, p. 77, to be *C. americanus*, Cress., ♂, and p. 81, to be *C. similis*, Cress., ♂.

Joppidium, g. n., Walsh, *l. c.* iii. p. 69. Differs from *Joppa* by the ♂ antennæ not being submoniliform, and by the long and slender first abdominal joint, long ovipositor, and entire 4th tarsal joint. Also distinguished by the author from *Barycerus*, *Helwigia*, and *Eucerus* (Cresson, *ibid.*, gives a wood-cut illustrating "bullæ" on the nerves of the wings referred to by Walsh in this and other descriptions). *J. ruficeps*, sp. n., Walsh, *l. c.* p. 70, N. America (of which *Banchus æquatus*, Say, is queried as the ♂); also *J. dubiosum*, p. 138, *ardens*, *donabile*, p. 139, Cordova, Cresson, P. Ac. Philad. 1873; *J. rubriceps* and *apicale*, *id.* Tr. Am. Ent. Soc. iv. p. 160, Texas: spp. nn.

Polyænus, sub-g. of *Mesostenus*, differing from *Polycyrtus* in having two short nearly contiguous spines on the front. *P. ectypus* and *ablutus*, spp. nn., Orizaba: Cresson, P. Ac. Philad. 1873, p. 149.

Cryptus atricollaris, p. 72, *rhomboidalis*, *cinctipes*, p. 74, *rufifrons*, p. 75, *nigricalceatus*, p. 77, *albisoletus*, p. 80, *albicaligatus* (= *albitarsis*, Cress., var.; E. T. Cresson, *ibid.*), *picticoxus*, p. 82, sp. (= *iridescens*, Cress.) p. 77, sp. (= *limatus*, Cress.), p. 81, Walsh, *l. c.*; *C. aztecus*, p. 133, *tantillus*, *tenuiventris*, p. 134, *celaya*, *arcuatus*, p. 135, *transversus*, *angulatus*, p. 136, *citus*, *pulchripennis*, p. 137, Mexico, Cresson, P. Ac. Philad. 1873; *C. laticeps* and *exulans*, p. 157, *albicollaris*, p. 158, *sororius*, *buccatus*, and *comalensis*, p. 159, *id.* Tr. Am. Ent. Soc. iv. p. 160, Texas; *C. longicauda* and var. *obscurata*, Kriechbaumer, Verh. z.-b. Wien, xxiii. p. 49, Fiume, Volosca, Trieste: spp. nn.

Phygadeuon satageus, Cordova, *zapotecus*, Orizaba, Cresson, P. Ac. Philad. 1873, p. 140; *P. texanus* and *intermedius*, p. 160, *timidus*, p. 161, Texas, *id.* Tr. Am. Ent. Soc. iv.: spp. nn.

Polycyrtus ferox, *major*, p. 143, *acerbus*, *macer*, p. 144, *mancus*, *paululus*, *junceus*, p. 145, *reliquus*, *copiosus*, p. 146, *accuratus*, *fervus*, p. 147, *univittatus*, *pallidus*, *atriceps*, Mexico, *id.* P. Ac. Philad. 1873, spp. nn.

Mesostenus maurus, T. A. Marshall, Ent. M. M. ix. p. 241, England; *M. aztecus*, *propinquus*, p. 152, *compactus*, *discus*, *facilis*, p. 153, *acceptus*, *modicus*, *communis*, p. 154, *chichimecus*, *admirandus*, p. 155, *arcuatus*, *admotus*, p. 156, *mexicanus*, *lassatus*, p. 157, *moratus*, *absolutus*, p. 158, *accolens*, *novatus*, *stupidus*, p. 159, *abactus*, *admonitus*, p. 160, *incertus*, *animatus*, p. 161, *pertenuis*, *collaris*, *arctus*, p. 162, Mexico, Cresson, P. Ac. Philad. 1873; *M. introitus*, *discoidalis*, *paludatus*, p. 162, *dejectus*, *pertinax*, *arvalis*, p. 163, *longicaudis*, p. 164, Texas, *id.* Tr. Am. Ent. Soc. iv. : spp. nn.

Christolia nubecula, p. 163, *calcarata*, *zapoteca*, p. 164, *mirabilis*, *miranda*, *abdominalis*, p. 165, Orizaba, Cresson, P. Ac. Philad. 1873 : spp. nn.

Cryptanura sumichrasti, p. 166, *delecta*, *acolhua*, p. 167, *C. ? pachymenæ*, p. 168, Mexico, *id. l. c.* spp. nn.

Hemiteles lascivus, *patruelis*, p. 170, *exilis*, *rarus*, *irritatus*, p. 171, *ingenuus*, *adjicialis*, p. 172, *adultus*, *bimaculatus*, p. 173, *centralis*, *junctus*, *scitulus*, *monilis*, p. 174, *admirabilis*, *sulsus*, *transilis*, p. 175, *servilis*, p. 176, Mexico, Cresson, P. Ac. Philad. 1873; *H. conspicuus*, *id.* Tr. Am. Ent. Soc. iv. p. 161, Texas : spp. nn.

Agrothereutes batavus, sp. n., Vollenhoven, Tijdschr. Ent. (2) viii. p. 209, pl. ix. fig. 1, Holland.

Aptesis longicauda, sp. n., *id. l. c.* p. 210, Gelderland.

Ophionides.

Labena, Cresson, re-characterized, and both sexes of *L. grallator*, Say, described : Walsh, Tr. Ac. St. Louis, iii. pp. 160-163.

New genera and species :—

Nonnus, Cresson, P. Ac. Philad. 1873, p. 386. Between *Limmeria* and *Mesochorus*. *N. atratus* and *antennatus*, p. 387, Mexico.

Pharsalia, *id.* Tr. Am. Ent. Soc. iv. p. 177, wing figured. Facies of *Iphosoma*, sculpture of *Trachynotus*. *P. texana*, Texas, *virginiensis*, West Virginia, *id. ibid.*

Cryptocentrus, Walsh, *l. c.* p. 156 (? = *Cryptocentrum*, Kby.). Ovipositor very short, cubito-discoidal cell receiving only one recurrent vein, 6th ventral segment in ♀ not prolonged, areolet obsolete. *Tryphon* (?) *submarginatus*, Cresson.

Ophion mexicanus and *atriventris*, Cresson, P. Ac. Philad. 1873, p. 374, Mexico.

Thyreodon niger, *maculipennis*, p. 375, *laticinctus*, *ornatipennis*, p. 376, *id. l. c.* Mexico.

Anomalon mexicanum, p. 376, *viticolle*, *magnum*, *peritum*, p. 377, *residuum*, *scelerosum*, p. 378, *fumipenne*, *agnatum*, and *A. ? elegans*, p. 379, *id. l. c.* Mexico; *A. magniceps*, *pallitarse*, *orbitale*, p. 170, *melleum*, p. 171, *id.* Tr. Am. Ent. Soc. iv. Texas; *A. fasciatum*, T. A. Marshall, Ent. M. M. ix. p. 240, England.

Paniscus ornatus, Vollenhoven, Tijdschr. Ent. (2) viii. p. 218, Groningen.

Ophiopterus ferrugineus, Cresson, P. Ac. Philad. 1873, p. 380, Mexico.

Trachynotus texanus, id. Tr. Am. Ent. Soc. iv. p. 169, Texas.

Charops tibialis, id. l. c. p. 173, Texas.

Porizon audax, *orbitalis*, *hyalinipennis*, *stigmaterus*, p. 174, *facilis* and *macer*, and *P. (?) agilis*, p. 175, *P. (?) delicatus*, p. 176, id. l. c. Texas.

Cremastus piceus, id. l. c. p. 176, Texas.

Iphosoma texanum, id. *ibid.* Texas; *I. mexicanum*, p. 380, *azteca*, p. 381, Mexico, id. P. Ac. Philad. 1873.

Campoplex opimus, *tepanecus*, p. 382, *lacivius* [sic], *aurifer*, *flavipennis*, *melliventris*, p. 383, *lectus*, *gnarus*, *calcaratus*, *macilentus*, p. 384, *divisus*, *maceratus*, *nefastus*, *legalis*, p. 385, *inaequalipes*, p. 386, id. P. Ac. Philad. 1873, Mexico; *C. expertus*, p. 171, *bellus*, p. 172, id. Tr. Am. Ent. Soc. iv. Texas.

Limmeria (?) insolens, id. P. Ac. Philad. 1873, p. 386, Mexico; *L. corrupta*, *illepida*, *infesta*, p. 172, *fura* and *rivalis*, p. 173, id. Tr. Am. Ent. Soc. iv. Texas.

Mesochorus totanacus, id. P. Ac. Philad. 1873, p. 388, Mexico; *M. uniformis* and *electilis*, id. Tr. Am. Ent. Soc. iv. p. 171, Texas.

Pristomerus mexicanus, id. P. Ac. Philad. 1873, p. 388, Mexico.

Exetastes vittatipes, *tarsalis*, *mexicanus*, id. P. Ac. Philad. 1873, p. 389, Mexico; *E. bioculatus* (? = *decoloratus*, Cress., ♂) id. Tr. Am. Ent. Soc. iv. p. 169, Texas; *E. suaveolens*, Walsh, Tr. Ac. St. Louis, iii. p. 146, N. America.

Tryphonides.

Ceratosoma, Cress.: the mouth is rostriform, and in the ♂ the claw has 7 or 8 long pectinations. *C. apicale* and *fasciatum*, Cress., are re-described; they differ solely in wing-coloration, and occur together: Walsh, Tr. Ac. St. Louis. iii. pp. 101-103. *Exenteron flavicoxus*, Cress., ♂ described: id. l. c. p. 105.

Metopius pinatorius and *cordiger*, Brullé, = *pollinatorius*, Say; id. l. c. p. 91.

Catocentrus, g. n., id. l. c. p. 89. Allied to *Metopius*, but with facial swelling not scutiform, scutellum rounded, areola small, &c.; also allied to *Exochus* and *Orthocentrus*, but with non-inflated cheeks, constricted abdomen, &c. *Metopius philanthoides*, Walsh.

Exochiscus, g. n., id. l. c. p. 96. Differs from *Exochus* by its large pentagonal areolet, long claws, and long and coarsely sculptured 1st and 2nd abdominal joints; from *Periope*, by its sessile abdomen; from *Orthocentrus*, by its simple claws. *E. pusillus*, sp. n., id. l. c. p. 97, N. America.

Polyrhabdus, g. n., id. l. c. p. 98. Differs from *Exochus* by its carinated abdomen, excavated venter, and short wings, and from *Alomyia* by its sessile abdomen, obsolete areolet, &c. *P. cariniger*, sp. n., id. l. c. p. 98, N. America.

Pachyonyx, g. n., id. l. c. p. 99 & 100 (= *Orthocentrus*, Grav.; Cresson, op. cit. p. 100). *P. trifasciatus*, p. 100, *stigmatias*, p. 101, spp. nn., Walsh, l. c. N. America.

Mesoleptus aztecus, p. 390, *M. ? anguina*, p. 391, Mexico, Cresson, P. Ac. Philad. 1873; *M. bicoloratus* and *delicatus*, p. 166. *M. ? strigosus*, *rotundiceps*, and *stigmaterus*, p. 167, Texas, id. Tr. Am. Ent. Soc. iv. spp. nn.

Tryphon mexicanus, p. 391, *T. ? maculipennis*, p. 392, Mexico, *id.* P. Ac. Philad. 1873; *T. atricoxus*, Walsh, *l. c.* p. 104, N. America (? = *dimidiatus*, var.; Cresson, *ibid.*): spp. nn.

Excenteron ornatus, sp. n., Walsh, *l. c.* p. 105, N. America.

Cteniscus albilineatus, sp. n., *id.* *l. c.* p. 107, N. America.

Exochodes texana, sp. n., Cresson, Tr. Am. Ent. Soc. iv. p. 167, Texas.

Exochus evectus and *texanus*, *id. op. cit.* p. 168, Texas; *E. annulicrus* and *atriceps*, p. 95, *albiceps*, p. 96, N. America, Walsh, *l. c.*: spp. nn.

Bassus sp. (= *scutellaris*, Cress.), p. 84, *tripicticus*, p. 85 (? = *syco-phanta*, Walsh, var.; Cresson, *op. cit.* p. 86), *ruficus*, p. 86, *semifasciatus*, p. 87, *bicapillaris*, p. 88, Walsh, *l. c.* N. America; *B. 4-guttatus*, Vollenhoven, Tijdschr. Ent. (2) viii. p. 211, Leyden: spp. nn.

Scolobates corallinus, sp. n., Vollenhoven, *l. c.* p. 211, Holland.

Metopius femoratus, *scutatifrons*, p. 393, Mexico, Cresson, P. Ac. Philad. 1873; *M. hageni*, *id.* Tr. Am. Ent. Soc. iv. p. 168, Texas: spp. nn.

Pimplides.

Thalessa clavata: the ♀ captured, and observations on its economy, &c., made by V. Ghiliani, Bull. Ent. Ital. v. pp. 287-243.

Pimpla rufata, parasitic on *Phyllæcus* (?), in the Landes: larva described: É. Perris, Ann. Soc. Ent. Fr. (5) iii. p. 83.

Pimpla eating a small Lepidopterous larva; P. Cameron, Scot. Nat. ii. p. 161.

Pimpla annulipes, Br., figured: parasitic on *Carpocapsa*. C. V. Riley, Rep. Ins. Mo. v. p. 49, fig. 26.

Cylloceria. An American type described as new (= *occidentalis*, Cress.; Cresson, *ibid.*), and the generic characters discussed: Walsh, *l. c.* pp. 113 & 114.

Odontomerus and *Xylonomus* re-characterized; *id. l. c.* pp. 163 & 164.

Pararhyssa, sub-g. n. of *Rhyssa*, *id. l. c.* p. 109, with rhomboid-triangular areolet, for *R. persuasoria*, L., *albimaculata*, Cress., and *humida*, Say (these species belong to *Rhyssa* proper, and Walsh's other species are to be referred to *Thalessa*, Holmgr.: E. T. Cresson, *ibid.*).

New species:—

Coleocentrus abia, p. 215, pl. ix. fig. 3, Holland, *sivi*, p. 216, fig. 4, Utrecht, Vollenhoven, Tijdschr. Ent. (2) viii.

Rhyssa fractinervis, p. 67, pl. iv. fig. 1, Auckland, N. Zealand, *laniaria*, p. 68, pl. iv. fig. 2, Amboina, *doreica*, p. 69, pl. iv. fig. 3, Dorey, New Guinea (? = *maculipennis*, Sm., var.); *id. l. c.*

Epirhyssa mexicana, Cresson, P. Ac. Philad. 1873, p. 394, Mexico.

Ephialtes atriceps, *id. l. c.* p. 394, Mexico; *E. gigas*, p. 110 (? = *manifestator*, L.), *pygmaeus*, *pusio*, p. 111, Walsh, *l. c.* N. America.

Epimecis ? thoracicus, Cresson, *l. c.* p. 395, Mexico.

Theronia montezuma, p. 395, *tolteca*, *melloso*, p. 396, *tacubaya*, p. 397, *id. l. c.* Mexico.

Pimpla cæruleata, p. 397 (? = *cærulea*, Brullé), *croceipes*, *puniceipes*, p. 398, *feralis*, *crassicauda*, *albipes*, p. 399, *semisanguinea*, *sumichrasti*, p. 400, *azteca*, *marginipennis*, *zonata*, p. 401, *zapoteca*, and *P. ? chickimeca*,

p. 402, *P. ichneumoniformis*, p. 403, *P. ? pulcherrima*, *P. braconoides*, *atriceps*, p. 404, *id. l. c.* Mexico; *P. sanguinipes*, *petulca*, *animosa*, p. 165. *id.* Tr. Am. Ent. Soc. iv. Texas; *P. sp.*, p. 153 (= *pterelas*, Say; Cresson, *ibid.*), *pictipes*, p. 135, *vidua*, p. 140, *celebs*, p. 141 (= *inquisitor*, Say, ♂; Cresson, *ibid.*), *investigatrix*, p. 142, *sp.*, p. 143 (= *albiricta*, Cress.; Cresson, *ibid.*), Walsh, *l. c.* N. America; *P. vincta*, p. 212, *levi-dorsum*, p. 213, Vollenhoven, *l. c.* Holland.

Glypta diversipes, *rufipl[e]uralis*, p. 125, *albiscutellaris*, p. 127, *ruficornis*, p. 129, Walsh, *l. c.* N. America; *G. longula*, *albipicta*, p. 405, *decolorata*, p. 406, Cresson, P. Ac. Philad. 1873, Mexico; *G. elegans*, Vollenhoven, *l. c.* p. 214, pl. ix. fig. 2, Holland.

Lycorina ? (? g. n., described as *Toxophoroides*, p. 406) *apicalis*, Cresson, *l. c.* p. 407, Mexico.

Lampronota mexicana, p. 407, *azteca*, *bella*, *orbitalis*, p. 408, *L. ? jucunda*, p. 409, *id. l. c.* Mexico: *L. spp.*, p. 116 (= *scutellaris* and *tegularis*, Cress.; Cresson, *ibid.*), *amphimelena*, p. 117 (? = *varia*, Cress., var.; Cresson, *ibid.*), *sp.* (= *frigida*, Cress.; Cresson, *ibid.*), and *interpellata*, p. 118, *pictiventris*, p. 119, *breviventris*, p. 120, *sp.* (= *americana*, Cress.; Cresson, *ibid.*), and *imitatrix*, p. 121, *sp.*, p. 122 (= *rubrica*, Cress.; Cresson, *ibid.*), Walsh, *l. c.* N. America.

Meniscus crassitarsus, p. 409, *mexicanus* and *M. ? alternatus*, p. 410, *M. ? orbitalis*, p. 411, Cresson, P. Ac. Philad. 1873, Mexico.

Phytodietus gracilicornis, p. 411, *mexicanus*, p. 412, *id. l. c.* Mexico.

Labena gloriosa, p. 412, *id. l. c.* Mexico.

Grotea mexicana, p. 413, *id. l. c.* Mexico.

Polysphincta nigriceps and *nigrita*, p. 144, *P. (?) pimploides*, p. 145, *spp. nn.*, Walsh, *l. c.* (the first of the genus in) N. America.

Echthrus annulicornis, *id. l. c.* p. 159, N. America.

BRACONIDÆ.

Bracon kersteni, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. xiv. fig. 12.

Bracon denigrator, F.: habits in connection with *Hesperophanes* and *Saperda*. J. Lichtenstein, Bull. Soc. Ent. Fr. (5) iii. p. xxii.

Toxoneuron (Tenthredoides) re-characterized, and the species tabulated. E. T. Cresson, Canad. Ent. v. p. 66.

Bracon scolytivorus, *sp. n.*, (Cresson, MS.) Riley, Rep. Ins. Mo. v. p. 106, Missouri, parasitic on *Scolytus caryæ*.

Spathius 3-fasciatus, *sp. n.*, *id. ibid.*, Missouri, parasitic on *Scolytus caryæ*.

Vipio insularis, *sp. n.*, Vollenhoven, Tijdschr. Ent. (2) viii. p. 218, pl. ix. figs. 5 & 5a, Zeeland.

Polemon albimanus, *sp. n.*, *id. l. c.* p. 219, Holland.

Ascogaster ? rufiventris, *sp. n.*, Philippi, S. E. Z. xxxiv. p. 300, pl. i. fig. 3, Chili.

Microdus imitatus, *simillimus*, *calcaratus*, p. 51, *divisus*, *agilis*, *discolor*, p. 52, *pallens*, *laticinctus*, *cinctus*, *annulipes*, p. 53, *earinoides*, p. 54, *spp. nn.*, Cresson, Canad. Ent. v., various States of N. America.

Toxoneuron aethiops, *minutum*, *orizabæ*, *mexicanum*, p. 67, *apicale*, *thoracicum*, *abdominale*, p. 68, *ornatum*, p. 69, spp. nn., *id. l. c.* U. S. America and Mexico.

Proterops californicus, sp. n., *id. l. c.* p. 69, California.

Helcon borealis, *albitarsis* (? = *dentipes*, Brullé, ♂), [p. 83, *frigidus americanus*, p. 84, *pedalis*, p. 85, spp. nn., *id. l. c.* N. America.

Cresson, Tr. Am. Ent. Soc. iv., describes the following new species from Texas:—

Opius brunneiventris, p. 178.

Eubadizon maculiventris, *ibid.*

Phylax melleus, *ibid.*

Macrocentrus nuperus and *delicatus* (redescribed and figured, from Missouri; C. V. Riley, Rep. Ins. Mo. v. p. 50, fig. 27), *ibid.*

Helcon texanus, p. 179.

Ichneutes abdominalis, *ibid.*

Sigalphus texanus, *ibid.*

Chelonus texanus, *ibid.*, *electus*, *connectens*, *cautus*, *laticinctus*, p. 180 *minimus*, p. 181.

Microdus thoracicus and *texanus*, p. 181, *nigriceps*, *verticalis*, *pygmaeus*, p. 182.

Ischius leviventris, p. 182.

Agathis exoratus, *ibid.*, *meabilis* and *rubripes*, p. 183.

Microgaster croceipes and *maculipennis*, p. 183.

Bracon epicus, p. 183, *rugiceps*, *simplex*, *orbitalis*, p. 184, *radiatus*, *faustus*, p. 185, *disjunctus*, *mavoritus*, *belfragii*, *novitus*, p. 186, *texanus*, *nuperus*, *minimus*, p. 187.

Rhogas molestus, *graphicus*, *mandibularis*, *atricornis*, p. 188, *delicatus*, *pilosus*, p. 189.

Exotheclus atriventris, p. 189, *rugulosus*, p. 190.

Hormius (?) *aciculatus*, p. 190.

Megischus texanus, *ibid.*

Dacnusa laviceps and *minima*, p. 191.

EVANIIDÆ.

Plumarius, g. n., Philippi, S. E. Z. xxxiv. p. 299. Type, *P. niger*, sp. n., *id. ibid.* pl. i., fig. 2, Santiago. [The author calls this "eine neue Evaniade?" and the ? would seem well deserved, judging by the figure.]

Aulacostethus, g. n., *id. op. cit.* p. 302. Type, *A. rubriventer*, sp. n., *id. ibid.* pl. i., fig. 4, Santiago.

CHALCIDIDÆ.

F. Walker, Canad. Ent. v. pp. 16-18, 43-44, briefly refers to the names and salient features of species of *Perilampus*, *Callimome*, *Isosoma*, *Pteromalus*, and *Megastigmus*, occurring in N. America. The same author, Ent. vi. p. 273, &c., continues the rambling notes, with reproductions of Haliday's figures and Förster's tables, mentioned in Zool. Rec. ix. p. 327.

Leucaspis (" *Leucospis* " and " *Leucopsis* "), *Smicra*, and *Chalcis*. E. T. Cresson, Tr. Am. Ent. Soc. iv. pp. 29-60, gives a synopsis of the N. American species. *Leucaspis canadensis*, Walk., *basalis* and *subnotata*, Westw., *fraterna*, Say, = *affinis*, Say, of which a var., *floridana* is described, pp. 32 & 33. *L. integra*, Hald., ? = *Chalcis ovata*, Say; p. 35. A ♂ var. of *Smicra braccata*, Samb. (? = *nigricornis*, F., or *maculata*, F.), is described from Massachusetts, under the name *coequalis*: id. l. c. p. 46. *Chalcis incerta*, Cresson, *annulipes*, Walk., = *ovata*, Say; ; p. 59.

Exurus, g. n., R. A. Philippi, S. E. Z. xxxiv. p. 296. *Pteromalides*. Type, *E. colliguayæ*, sp. n., id. *ibid.* pl. i. figs. 1 a-c, from galls on *Colliguaya odorifero* (*Euphorbiaceæ*), Chili.

Leucaspis bulbiventris, p. 29, *apicalis*, p. 30, *sumichrasti*, p. 31, *azteca*, p. 33, *dubiosa* (? = *azteca*, var.) and *tolteca*, p. 34, Mexico, *texana*, p. 31, Texas; Cresson, l. c. spp. nn.

Smicra canadensis, p. 39, Canada; *flebilis*, p. 39, *delumbis* and *torvina*, p. 40, Massachusetts; *rufifemorata*, p. 39, *delira*, p. 41, *subobsoleta*, p. 42, *sanguiniventris* and *bioculata*, p. 43, *barbara*, p. 47, *dorsata*, p. 49, *delicata*, p. 54, Texas; *mendica*, p. 41, *toluca* and *mexicana*, p. 42, *lecta* and *ambigua*, p. 44, *lauta*, p. 45, *coccinata* and *flammeola*, p. 48, *miranda*, p. 49, *exornata* and *compactilis*, p. 50, *montezuma*, and *azteca*, p. 51, *lenta*, p. 52, *tolteca*, p. 53, *juxta* [!], p. 54, Mexico; *arcana*, p. 44, *coxalis*, p. 45, Delaware; *nortoni*, p. 45, Columbia; *encausta*, p. 46, Colorado; *mirabilis*, p. 53, Georgia, Texas; id. l. c. spp. nn.

Chalcis tegularis and *pedalis*, Texas, *coloradensis*, Colorado, id. l. c. p. 60, spp. nn.

Isosoma romana [-um], p. 395, *semilutea* [-eum], p. 396, *luteicollis* [-le], *insolita* [-tum], p. 397, (presumably) spp. nn., Walker, Ent. vi. Italy.

Eurytoma aequalis, Italy, *japonica*, Japan, id. l. c. p. 398, (presumably) spp. nn.

Haltichella includens, (presumably) sp. n., id. l. c. p. 399, Japan; *H. osmi* [i] *cida*, sp. n., S. S. Saunders, Tr. E. Soc. 1873, p. 414, parasitic on *Osmia tridentata*, Epirus.

Misocampus lætus, sp. n., Philippi, l. c. p. 298, parasitic on *Exurus colliguayæ*, Chili.

Chirolophus halidayi, (presumably) sp. n., Walker, l. c. p. 399, Lucca.

PROCTOTRYPIDÆ.

S. C. Snellen van Vollenhoven, in the 4th of his " Schetsen ten Gebruike bij de Studie der Hymenoptera " ('s Gravenhage: 1873, oblong folio), pls. xi.-xiv., gives (copied) outlines, sometimes of the whole insect, sometimes of details only, of the types of the following genera: Pl. xi., *Olynx*, *Sympiesis*, *Rhopalotus*, *Astichus*, *Holcopelte*, *Secodes*, *Pleurotropis*, *Chrysocharis*, *Poropæa* and *Centrobia*, Först.; *Cirrospilus*, *Melittobia*, *Pleuropachys*, *Derostenus*, *Pterothrix*, and *Trichogramma*, Westw.; *Eulophus*, Geoffr.; *Epicleris*, *Omphale*, and *Tetrastichus*, Halid.; *Entedon*, Dalm.; *Thysanus*, *Ceranisius*, and *Chætosticha*, Walk.: Pl. xii., *Dryinus* (and *D. formicarius* from nature), *Bethylus*, and *Proctotrypes*, Latr.; *Gonatopus*, Ljung.; *Labeo*, *Chelogyne*, *Thoron*, and *Bæus*, Hal.; *Anteon* and

Ceraphron, Jur.; *Aphelopus*, Dalm.; *Embolemus*, *Cephalonomia*, *Epyris*, and *Megaspilus*, Westw.; *Scleroderma*, Klg.; *Ateleopterus*, *Perisemus*, *Goniozus*, *Isobrachium*, *Lagynodes*, *Trichosteresis*, *Lygocerus*, and *Acolus*, Först.; *Xenomerus*, Walk.: Pl. xiii., *Teleas*, *Sparasion*, *Scelio*, and *Platygaster*, Latr.; *Prosacantha*, Nees; *Telenomus*, *Gryon*, *Iphitrachelus*, *Inostemma*, and *Ooctonus*, Hal.; *Anteris*, *Allotropia*, *Metaclisis*, *Isostasius*, *Catillus*, *Xestonotus*, *Amblyaspis*, *Leptacis*, *Sactogaster*, *Synopeas*, *Isocybus*, *Polygnotus*, *Camptoptera*, and *Limacis*, Först.: Pl. xiv., *Gonatocerus*, Nees; *Polynema*, *Mymar*, *Anaphes*, *Labolips*, and *Ismarus*, Hal.; *Entomacis*, *Hemilexis*, *Loxotropa*, *Oxylabis*, *Pantolyta*, *Zygota*, *Acropiesta*, *Xenotoma* and *Leptorhaptus*, Först.; *Platymischus*, *Aneurhynchus*, *Paramesius*, *Spilomicrus*, and *Basalys*, Westw.; *Diapria* and *Helorus*, Latr.; *Belyta* and *Cinetus*, Jur. [These figures, judging from their inaccuracy in points of essential detail, are of little use to the student.]

Dryinus atriventris, sp. n., E. T. Cresson, Tr. Am. Ent. Soc. iv. p. 193, Texas.

Gonatopus (?) *alatus*, sp. n., *id. ibid.* Texas.

Epyris leviventris and *analis*, spp. nn., *id. ibid.* Texas.

CYNIPIDÆ.

Cynips quercus-operator, O. S., is almost certainly double-brooded; its habits, and those of *C. quercus-botatus*?, Bassett, and *C. q.-futilis*, O. S., are recorded, with the suggestion that all N. American *Cynips* proper are double-, and *Diastrophus* and *Rhodites* single-brooded. Galls produced from leaf-buds are recorded, and the weights of individual insects given. H. F. Bassett, Canad. Ent. v. pp. 91-94, and P. E. Soc. 1873, p. xv.

E. Newman, Ent. vi. pp. 275-278, suggests the adoption of the theory that galls are 'pseudo-balani' or false acorns; adducing the globular gall of *Cynips kollari* as an instance. Cf. E. Parfitt, quoted, *op. cit.* p. 338.

"Flea seeds," or jumping galls, made by *Cynips* on oak in California, briefly described: R. H. Stretch & C. D. Gibbes, P. Cal. Ac. iv. pp. 265 & 266.

Cynips ferruginea in Scotland: P. Cameron, Ent. M. M. x. p. 85.

Biorhiza aptera bred from galls at roots of a conifer (*Deodara*); A. Müller, P. E. Soc. 1873, p. xxvii.

Trigonaspis megaptera, Pz., in Scotland: P. Cameron, Scot. Nat. ii. p. 15.

Synergus larvæ feeding on juices of gall of *Cynips divisa*: P. Cameron, Scot. Nat. ii. p. 62. As they reach maturity they form woody partitions, thus making the gall polythalamous: *id. op. cit.* p. 161.

Andricus amenti, Gir., and *A. 4-lineatus*, Htg., new to Britain: J. W. H. Traill, Scot. Nat. ii. p. 128. Galls described, p. 171; also Ent. M. M. x. pp. 39 & 85.

Spathogaster vesicatrix, Schl.; galls from Scotland described. J. W. Traill, Ent. M. M. x. p. 85.

URO CERIDÆ.

Sirex. Brief notes on geographical distribution by F. Walker, Canad. Ent. v. p. 78, and Ent. vi. p. 359.

Oryssus dentifrons, sp. n., Philippi, S. E. Z. xxxiv. p. 303, pl. i. figs. 5 a-e, from fragments in a spider's web, Valdivia.

TENTHREDINIDÆ.

NORTON, E. "Notes on North American Tenthredinidæ, with descriptions of new species." Tr. Am. Ent. Soc. iv. pp. 77-86. A var. of *Abia kennicotti*, N., is described from Texas, p. 77; larva of *Hylotoma macleayi* described, p. 78; *Pristiphora idiota*, Norton, = *P. identidem* [!], *id.* p. 79; larva of *Nematus trilineatus*, N., described, *ibid.*; of *Emphytus maculatus*, N., p. 80; var. *yukonensis* of *Doleris similis* from Alaska, p. 82; *Selandria caryæ*, Norton (in Packard's 'Guide,' p. 224; 1868), re-described, and its habits referred to, p. 83; *S. q-album*, N., re-described, p. 85; and varieties of other species briefly noted.

Tenthredinidæ in the Glenelg valley, Inverness-shire, including *Trichiosoma lucorum*, very small var., at an elevation of 1100 feet. P. Cameron, Scot. Nat. ii. p. 61.

Nematus gallicola, Steph.; habits described, and ♀ and larva figured, with details; *id. op. cit.* pp. 11-15, pl. i. *N. degeeri*, Kl., habits and principal stages described; pp. 113-116. Parasites on *N. gallicola* described; pp. 116-119, 160 & 161.

Blennocampa pusilla, Htg., *Hoplocampa rutilicornis*, Klug, *Taxonus coxalis*, Htg., and ? *T. sticticus*, Klug.; R. McLachlan, Ent. M. M. x. p. 113; *Tenthredo moniliata*, Klug, and *Nematus quercûs*, Htg.; P. Cameron, *l. c.* p. 160; *Strongylogaster filicis*, Klug; T. J. Bold, Ent. M. M. x. p. 69; *Pæcilosoma pulveratum*, Retz.; P. Cameron, *ibid.*: *Cenoneura dahlbomi*, Thoms.; P. Cameron, *l. c.* p. 85; *Lophyrus pallipes*, Fall., and *L. virens*, Klug; P. Cameron, Scot. Nat. ii. p. 15: new to Britain.

In *Hylotoma scutellata*, Say, *dulciaria*, Say, and *H. calcarea*, Say (*scapularis*, Klg.), of which both sexes are described, the 2nd recurrent vein sometimes coincides with the 2nd submarginal cross-vein, with intermediate grades between that and the normal structure; *Scobina*, St. F. & S., must therefore apparently be suppressed. *H. coccinea* (? ?), F., with differently coloured head in ♂ & ♀, described. B. D. Walsh, Tr. Ac. St. Louis, iii. pp. 65-69.

Lophyrus virens, Klug, pp. 1-5, pl. i. figs. 1-7; *Lyda clypeata*, Klug, pp. 6-12, pl. ii. figs. 1-9, pl. iii. figs. 10-13; economy fully described by S. C. S. v. Vollenhoven, Tijdschr. Ent. (2) viii.

Leptocercus, Htg. (1837), = *Hemichroa*, Steph. (1835); *Camponiscus healei* [sic], Newm., = *Nematus (Leptocercus) hypogastricus*, Htg., = *luridiventris*, Fall.; P. Cameron, *l. c.* x. p. 84. Habits, larva, and imago described (one specimen with only 3 sub-marginal cellules, as in *Cryptocampus*); *id.* Scot. Nat. ii. pp. 158-160.

Selandria rubi, Harr.: economy fully described by W. Saunders, Canad. Ent. v. pp. 101-103.

Allantus consobrinus, Klug (*nec* Rudow), var. n. *zwickoviensis*; Von Schlechtendal, S. E. Z. xxxiv. pp. 88-92, Zwickaus.

Tenthredo nimbipennis, Nton.: ♀ from Texas described by E. T. Cresson, Tr. Am. Ent. Soc. iv. p. 155.

Ptenos, g. n., Norton, *l. c.* p. 77 (*Ptilia*, section 2, Norton, *op. cit.* ii. p. 367). *Ptilia texana*, Nt., and *P. niger* and *nigripectus*, spp. nn., *id. l. c.* iv. p. 77, Texas.

Hylotoma consobrina, sp. n., *id. l. c.* p. 78, Mexico.

Cladius æqualis, sp. n., *id. ibid.* Connecticut.

Pachylota varicolor, sp. n., *id. l. c.* p. 79, Mexico.

Emphytus bolli, sp. n., *id. l. c.* p. 80, Texas.

Dictynna cordovensensis and *polita*, spp. nn., *id. l. c.* p. 81, Mexico.

Hemichroa albidivariata and *fraternalis*, spp. nn., *id. ibid.* Texas.

Dolerus distinctus and *coccinifer*, spp. nn., *id. l. c.* p. 82, California.

Selandria sumichrasti, p. 82, *longipennis* and *fasciipennis*, p. 84, *coccinata*, p. 85, Mexico, *inæquidens*, p. 84, *albicollis*, p. 85, Texas, *id. l. c.*; *S. cereipes*, Vollenhoven, *l. c.* pp. 13-15, pl. iii. figs. 1-7, Gelderland, on *Polystichum filix-mas*: spp. nn.

Lophyrus fulvus, sp. n., Norton, *l. c.* p. 86, Texas.

Cephus cinctus, sp. n., *id. ibid.* Colorado.

Xyela anea (? = *tricolor*, var.), sp. n., *id. ibid.* Texas.

Phyllæcus (?) *rubi*, sp. n., Perris, Ann. Soc. Ent. Fr. (5) iii. p. 83, Landes, larva and pupa described, pp. 81 & 82.

LEPIDOPTERA.

BY

W. F. KIRBY, M.E.S., &c.

GENERAL NOTES.

P. MILLIÈRE has published the 25th and 26th livraisons of his "Iconographie et Description des Chenilles et Lépidoptères inédits;" Ann. Soc. Lyon (2) xix. pp. 1-90, pls. cix.-cxvi.

Parts 85-88 of W. C. HEWITSON'S "Exotic Butterflies," parts 15-18 of A. G. BUTLER'S "Lepidoptera Exotica," and parts 2-7 of H. STRECKER'S "Lepidoptera," have appeared within the year.

A. G. BUTLER has also published "Tropical Butterflies and Moths, with descriptions." London: 1873, sm. 4to; a series of 10 cards, printed in colours, containing a selection of showy species.

On Scudder's determination of the generic types of butterflies, *cf.* Grote, Canad. Ent. v. pp. 62 & 63, 143-145.

On the affinity of the *Papilionide* with the *Heterocera*; R. Trimen, P. E. Soc. 1873, pp. xxii. & xxiii.

Snellen reviews Staudinger and Wocke's Catalogue, discussing the question of priority, and adding a series of valuable notes on individual species. Tijdschr. Ent. (2) viii. pp. 36-60.

Grote criticises the classification proposed in Wallengren's 'Lepidoptera Scandinaviæ Heterocera'; Bull. Buff. Soc. i. pp. 183 & 184.

Mary Trent asserts that if larvæ are supplied with plenty of food, the perfect insects will be nearly all females; and that if the larvæ are half starved, nearly all are males: Am. Nat. vii. pp. 129-132. C. V. Riley details experiments opposed to these results: *op. cit.* pp. 513-521.

On rearing larvæ; E. Lelièvre, Pet. Nouv. 1873, p. 275.

On venomous caterpillars: A. Murray and others, Nature, viii. pp. 7, 8, 44, 45, 101, 102, 303, 466, 467, 487.

On cannibalism (designated 'Autophagy' and 'Campephagy') in the larvæ of *Scopelosoma satellitia*, *Cosmia trapezina*, and *Crocallis elinguarua*, cf. E. Delessert, Bull. Soc. Vaud. xi. pp. 366-369. A larva of *S. satellitia* seemed to feel no pain while being devoured alive by one of *C. trapezina*; and when the protruding intestines of the former were presented to its own mouth, it began to devour itself until there were only 3 segments left [! ?]. The larva most relished by *Cosmia trapezina* is that of the destructive *Chimatobia brumata*.

Kalender thinks that the hybernation of larvæ which usually pass the winter in that state is not indispensable to their development: S. E. Z. xxxiv. pp. 366 & 367.

Floods and hibernating larva; G. B. Corbin, Ent. vi. pp. 414 & 415.

R. MELDOLA (*suprà*, p. 219) records the result of experiments on the loss of weight in pupæ of *Bombyx quercus*, and in the pupæ and perfect insects of *Liparis dispar* during definite periods. The loss of substance in the pupa state differs in amount in different individuals of the same species, when exposed to the same temperature; and is less in amount than that occurring in the perfect state of the same species, or in a dead pupa by desiccation. The variation in the loss is sufficient to make it probable that the size, or at least the specific gravity of the imago will be influenced by it. In the case of *Papilio ajax*, the size of the variety is directly instead of inversely proportioned to the ratio of the pupal to the larval period, and *vice versâ*, though *a priori* we should expect the contrary. He adds suggestions for the management of future observations, and for the elimination of disturbing factors likely to interfere with the accuracy of the results.

On larvæ injurious to crops in Germany, with special reference to *Pieris*: Pabst, Ber. Ges. Chemn. xi. (abridged, Verh. Ver. Regensb. xxvi. pp. 104-106.

On damage caused by the larvæ of various *Lepidoptera* in forests of Livonia and Courland: M. Willkomm, SB. Ges. Dorp. iii. pp. 238 & 239, 242 & 243.

On butterflies flying against the wind in Ceylon: E. W. H. Holdsworth, Ent. vi. pp. 330-332.

On the different modes of flight of New England butterflies, and on their positions when at rest: C. S. Minot, P. Bost. Soc. xiv. pp. 55 & 56.

On the influence of heat on the development of chrysalides: V. Ghiliani, Bull. Ent. Ital. v. pp. 69-72.

De Borre gives an abridged translation of the Recorder's paper on the

geographical distribution of butterflies (Zool. Rec. ix. pp. 336 & 337) with additional comments. C. R. Ent. Belg. xvi. pp. 138-163.

MIMICRY. R. Meldola (*suprà*, p. 218) discusses mimicry and allied phenomena in all stages of *Lepidoptera*.

On mimicry in butterflies: G. Seidlitz, SB. Ges. Dorp. iii. pp. 215-217.

The chief object of warty or hairy dermal appendages of larvæ or pupæ is protective: T. Goossens, Ann. Soc. Ent. Fr. (5) iii. pp. 123-128.

COLLECTING. W. Couper, Canad. Ent. v. pp. 18-20. *Micro-Lepidoptera*; H. de Peyerimhoff, Pet. Nouv. 1873, pp. 294, 298, 300-302. On use of sugar and cyanide bottle; T. L. Mead & W. V. Andrews, Canad. Ent. pp. 78-80, 208-210. On attracting by nitric ether; Pet. Nouv. 1873, p. 292. New sugaring lamp; G. Norman & F. B. White, Ent. M. M. ix. pp. 199, 220, 250. E. L. RAGONOT publishes a series of notes on the collection and preservation of *Micro-Lepidoptera*; Pet. Nouv. 1873, pp. 273, 274, 277, 278, 290: on the collection of larvæ, *l. c.* pp. 302, 306, 338, 345, 349, 350, 353.

On preserving the skins of caterpillars for collections; Sanborn, P. Bost. Soc. xiv. pp. 55 & 56.

On arranging collections; Pet. Nouv. 1873, pp. 291 & 292.

Great Britain.

A re-issue of the second edition of Doubleday's Synonymic List of British *Lepidoptera*. with an additional supplement of 4 pages, has been published within the year.

On the origin and distribution of the insects of the British Isles [chiefly *Lepidoptera*]; E. Birchall, Ent. vi. pp. 349-351.

Lists of captures are published by E. N. Bloomfield, at Guestling (Ent. M. M. ix. pp. 218, 249, 250); C. W. Dale, at Glanville's Wootton (*op. cit.* x. p. 118, 140); C. S. Gregson, in Wales, and at Delamere Forest (Ent. vi. pp. 404-406, 452, 453); J. B. Hodgkinson, at Grange-over-Sands Ent. M. M. x. pp. 39, 40); J. A. Jenner, in Sussex (*op. cit.* ix. p. 249); W. Machin, at Epping Forest (Ent. vi. p. 335); W. Maling, at Newcastle (*op. cit.* p. 283); G. T. Porritt, in the Isle of Man and at Huddersfield (*op. cit.* pp. 454, 455; Ent. M. M. ix. p. 248); J. M. Simpkinson, in Ayrshire (Ent. vi. pp. 313, 314); W. Slade, near Buckingham (*op. cit.* pp. 379-385); W. H. Tugwell, in the New Forest and Isle of Wight (*op. cit.* pp. 476-479); J. Jenner Weir, at Lewes (*op. cit.* p. 455); J. W. H. Traill, in Aberdeenshire and Sutherland, Scot. Nat. ii. pp. 20, 163; and by T. Moncreiffe, at the Bridge of Earn in 1873, *op. cit.* p. 120.

List of *Lepidoptera* first discovered by the late J. C. Dale, in Britain; C. W. Dale, Ent. M. M. ix. p. 271.

List of insects reared during 1872; W. Machin, Ent. vi. pp. 282 & 283.

On the occurrence of *Lepidoptera* in Northumberland and Durham in 1872; T. J. Bold, Tr. North. Durh. v. pp. 37-41.

F. B. White continues his list of the *Lepidoptera* of Scotland, from the *Cossidae* to the genus *Xanthia*, Scot. Nat. ii. pp. 34-45, 81-88, 128-136, 177-184.

E. Birchall publishes a list of 60 species recorded as new to Ireland since 1866 (Ent. M. M. x. pp. 153-156). 16 species formerly included are now regarded as doubtful.

List of Macro-Lepidoptera of Guernsey and Sark; W. A. Luff, Ent. vi. pp. 322-324, 351-357, 375-379.

List of butterflies of Jersey; F. G. Piquet, *op. cit.* pp. 399-401.

France.

P. MILLIÈRE, 'Catalogue raisonné des Lépidoptères du Département des Alpes Maritimes,' Pts. 1 & 2, Cannes: 1871 & 1873, 8vo, pp. 1-135 & 136-247 (extr. Mém. Soc. Cannes. Jan. 1871; March, 1873) gives notes on habits, transformations, &c., chiefly of local interest, to the end of the *Pyrales*. Several larvæ, described years ago by various entomologists, are noticed as unknown (e.g., *Lycæna semiargus* and *dorylas*; *Hesperia actæon*, &c.).

Belgium.

L. QUÆDVLIEG has published a synopsis of the butterflies of Belgium (Les Papillons Diurnes de Belgique; Manuel du jeune Lépidopteriste, Bruxelles: 1873, 12mo, p. 70, map), enumerating 101 species. The introduction by P. de Borre (pp. 7-22) consists of notes on the geographical distribution of the Belgian *Lepidoptera*.

List of Belgian species; L. Quædvlieg, C. R. Ent. Belg. xvi. pp. 75 & 76.

Captures by various entomologists; *op. cit.* pp. 76, 77, 81.

Holland.

Species new to the Fauna:—Snellen & De Graaf, Tijdschr. Ent. (2) viii. pp. lxxv. lxxvi. 26-35, 231-235.

A supplementary list of the *Lepidoptera* of Breda; F. J. M. Heylaerts, *op. cit.* p. 146.

Captures in the North Sea Islands; J. Ritzema Bos, *op. cit.* pp. 252 & 253; Naar de Peel; Heylaerts & Snellen, *op. cit.* pp. 126-130.

Germany.

Captures in the Upper Harz; by W. Henäcker, S. E. Z. xxxiv. pp. 95 & 96.

Captures at Spalato in Dalmatia; V. Geiger, Verh. z.-b. Wien, xxiii. pp. 167 & 168 (petroleum recommended for destruction of insects injurious to collections).

Switzerland.

Captures by H. C. Long, Ent. vi. pp. 300-303. In the Eastern Alps: A. Curó, Bull. Ent. Ital. v. pp. 267-270.

Italy.

C. Tacchetti continues his catalogue of the *Lepidoptera* of Padua through the *Sphinges*: Atti Soc. Pad. i. p. 144-158.

Captures in Tuscany, from April to July, 1872 (774 species); J. Mann, Verh. z.-b. Wien, xxiii. pp. 117-129.

Sicily.

A few *Lepidoptera* new to the Sicilian or European Fauna enumerated by A. Kalchberg, Bull. Ent. Ital. v. p. 51.

Norway.

Captures in Norway in the summer of 1869 & 1870; H. Siebke, N. Mag. Naturw. xvii. pp. 278-284; xix. pp. 68-73.

Russia.

J. G. Schilde (Lepidopterologische Mittheilungen aus Nord-Finn-

land; S. E. Z. xxxiv. pp. 157-184) remarks on the general character of the northern Fauna, and notices several butterflies in considerable detail.

Additions to the Fauna of St. Petersburg; N. Erschoff, Hor. Ent. Ross. ix. p. 160.

Captures:—Riga (additions to Fauna), by A. Dihrik, S. E. Z. xxxiv. pp. 113, 114; Lenkoran, Madschalis & Derbent, by A. Becker, Bull. Mosc. xlvi. pp. 256 & 257.

Asia.

G. KOCH has published a new edition of 'Die Indo-Australische Lepidopteren-Fauna' (Berlin: 1873, pp. xix. 119, coloured plate and map). It is merely a reprint of the first edition (1865), even the paging being identical, with the addition of a map republished from Geogr. MT. 1870 (*cf.* Zool. Rec. vii. pp. 368, 372-374), and an additional preface, in which the author dissents from Bates's theory of "mimicry" [which he has misunderstood, having been misled by the literal meaning of the word], and suggests that variation in *Lepidoptera* is due to chemical changes in the pupa, caused by differences of food during the larval state.

H. CHRISTOPH has published an important paper on the *Lepidoptera* of North Persia, with descriptions of many new species. Hor. Ent. Ross. x. pp. 3-55, pl. 1 (the plate, though quoted in the text, and, for convenience, in the present Record, was published in 1874).

W. ATKINS publishes 'Notes on Southern Indian Lepidoptera,' Ent. vi. pp. 446-448, 474-476, 506-509, 542-544.

H. DRUCE has published a list of the collections of Diurnal *Lepidoptera*, made by Mr. Lowe in Borneo, with descriptions of new species (P. Z. S. 1873, pp. 337-361, pls. 32 & 33), 301 species are enumerated; 29 of which are described as new.

Africa.

C. WARD ('African Lepidoptera, being descriptions of new species, with illustrations,' London: Feb. 1873, 4to, pt. 1, pp. 10, 6 col. plates) has commenced a work to illustrate new or rare species of butterflies received by him from Africa and Madagascar.

Snellen (Tijdschr. Ent. (2) viii. pp. 71-74) enumerates 11 *Rhopalocera*, 2 *Noctue*, 1 *Pyralis*, and 1 new *Geometra*, captured by J. Keulemans on Prince's Island, in the Gulf of Guinea.

On the *Lepidoptera* of St. Vincent's (Cape Verdes); Weyenbergh, Ent. M. M. x. pp. 121, 122. 6 small species noticed, 1 new. Both the Fauna and Flora are poorer now than in former years.

A. Gerstäcker gives a list of 40 *Lepidoptera* from Zanzibar. Von der Decken's Reisen in Ost Afrika, iii. pt. 2, pp. 363-384, pls. xv. & xvi. [*Ante*, p. 216]. Most of the new species previously described in Arch. f. Nat. xxxvii. pp. 359-361, are figured.

On the scarcity of *Lepidoptera* in Equatorial Central Africa; J. A. Grant, P. Geogr. Soc. xlii. p. 304.

Australasia.

G. MASTERS has published a "Catalogue of the described Diurnal

Lepidoptera of Australia" (Sydney: 1873, 8vo, pp. iv. 24) compiled, with scarcely an alteration, and inclusive of press errors, from the Recorder's 'Synonymic Catalogue of Diurnal Lepidoptera.'

Captures in S. Australia, by H. R. Cox, Ent. vi. pp. 357-359, 401, 402.

G. SEMPER notices 12 *Lepidoptera* collected in the Island of Yap, in the South Seas, and figures the earlier stages of several. J. Mus. Godefr. ii. pp. 59-64, pl. vii.

A. G. Butler re-describes and figures a few previously unfigured butterflies, chiefly from the South Sea Islands: Brenchley's Cruise of the Curaçoa, [ante, p. 346], pp. 464-474, pls. xlvi.-l.

North America.

A. M. Ross ('The Butterflies and Moths of Canada, with descriptions of their colour, size, and habits, and the food and metamorphoses of their larvæ': Toronto: 1873, 8vo, pp. 93, woodcuts) gives a selection from the more common and conspicuous species.

Grote has published a supplement to the Descriptions of American *Lepidoptera* by himself and Robinson, including a systematic list of the species published in this series of papers. Tr. Am. Ent. Soc. iv. pp. 425-435. He has also published a series of papers on North American moths, remarking on various known species, describing many new ones, and remarking on the classification of the *Lepidoptera* generally. Bull. Buff. Soc. i. pp. 1-16, 73-94, 168-174, pl. i.

A. S. PACKARD (Am. Nat. vii. pp. 453-458, reprinted from P. Bost. Soc. 1873) compares the distribution of Californian moths with that of other animals. The *Geometræ* may be classed into 4 groups: 1, exclusively American; 2, European and American; 3, Circumpolar or Cosmopolitan; 4, Species common to both the Atlantic and Pacific States.

The same author has also published 'Notes on North American Moths of the families *Phalenidæ* and *Pyralidæ* in the British Museum' (Rep. Peab. Ac. v. pp. 82-92). These notes do not admit of abridgment, and relate solely to the specimens now extant in the British Museum under Walker's names, without any attempt to compare them with his published descriptions. Grote (*l. c.* pp. 156-160) compares Packard's results with his own.

P. C. ZELLER has published 'Beiträge zur Kenntniss der nordamerikanischen Nachtfaltern, besonders der Microlepidopteren,' pt. 2 (Verh. z.-b. Wien, xxiii. pp. 201-334, pls. iii. & iv.). A great number of new species are described, and known species criticised. The N. American *Tineina* will probably prove to be about as numerous as the European; but the number of peculiar forms is very small.

South America.

Captures at Huasampilla, Peru, by H. B. Whitely, with descriptions of new species; A. G. Butler, Ann. N. H. (4) xii. pp. 219-230.

PAPILIONIDÆ.

Papilio (Ornithoptera) cassandra, Scott, figured and re-described; A. G. Butler, Brenchley's Cruise of the Curaçoa, p. 474, pl. l.

Papilio alphenor, Cram. Transformations, &c., described and figured; G. Semper, J. Mus. Godeffr. ii. pp. 59 & 60, pl. viii. figs. 1-3, 15-18.

Papilio merope. On aberrant neuration in a ♂: R. Trimen, P. E. Soc. 1873, pp. xxi. & xxii. fig.

C. Ward re-describes and figures his *P. constantinus* (African Lepidoptera, p. 1, pl. i. figs. 1 & 2), and figures *P. evombar*, Boisd., l. c. figs. 3 & 4.

Papilio kirbyi figured and re-described by Hewitson, Ex. Butt. v. pt. 87, Pap. pl. xiii. fig. 42.

H. Strecker (Lepidoptera) figures and re-describes *P. indra*, Reak., p. 9, pl. ii. fig. 1; *P. pilumnus*, Boisd., p. 13, pl. ii. fig. 3; *P. eurymedon*, Bd., p. 25, pl. iv. fig. 1; *P. marchandi*, Bd., l. c. fig. 2; *P. daunus*, Bd., p. 45, pl. vi. figs. 1 & 2; *P. zolicaon*, Bd., p. 46, pl. vii. fig. 3; and *P. asterioides*, Reak., p. 47, pl. vi. fig. 4.

Papilio burtoni and *caleli*, Reak., = *P. columbus*, Hew., and *P. polymetus*, Godt., respectively. H. Strecker, l. c. p. 15.

Parnassius. On its distribution, &c.; H. W. Bates, in Henderson & Hume's 'Lahore to Yarkand,' p. 307.

Parnassius acco figured by Bates, l. c. p. 305.

Parnassius mnemosyne, var. *nubilosus*, from N. Persia described; H. Christoph, Hor. Ent. Ross. x. p. 19.

Bhutanitis, g. n., Atkinson, P. Z. S. 1873, p. 540. Intermediate between *Thais* and *Sericinus*. Type, *B. lidderdalii*, sp. n., id. l. c. p. 571, pl. 1, Bhutan [= *Armandia thaidina*, Blanch.].

Ornithoptera flavicollis, sp. n., Druce, P. Z. S. 1873, p. 356, Borneo.

Papilio illyris, Hewitson, Ent. M. M. ix. p. 232, Ex. Butt. v. pt. 87, Pap. pl. xiii. figs. 43 & 44, Gold Coast; *P. lowii*, pl. xxxiii. fig. 6, and *acuta*, Druce, P. Z. S. 1873, p. 358, Borneo; *P. colonna* and *philonoe* Ward, Ent. M. M. x. pp. 151 & 152, Ribé; *P. anticostensis* (? = *asterias*, var.), Strecker, Lepidoptera, p. 10, pl. ii. fig. 2, Fox Bay, Anticosti Island, Labrador (cf. also W. Saunders & W. H. Edwards, Canad. Ent. v. pp. 117-119, 153 & 154. Edwards states that it is distinct from *asterias*, but = *brevicauda*, Saund.); *P. mayo* [!], Atkinson, P. Z. S. 1873, p. 736, pl. lxiii. fig. 1, Andaman Islands: spp. nn.

Mesapia shawii, sp. n., H. W. Bates, in Henderson & Hume's 'Lahore to Yarkand,' p. 305, Chang Lang Pass, 18,000 feet.

PIERIDÆ.

Tachyris ada and *Terias hecabe* noticed from Yap, and larvæ and pupæ figured by G. Semper, J. Mus. Godeffr. ii. pp. 60 & 61, pl. viii. figs. 4 & 5.

Dismorphia. Butler ('Lepidoptera Exotica,' pl. xlvi.) figures and re-describes his *D. sorana*, p. 122, figs. 1 & 2; *hagaresa*, p. 123, figs. 3; *viridifascia*, p. 123, figs. 4 & 5; *lubina*, p. 124, figs. 6 & 7; and *lunina*, p. 124, figs. 8 & 9.

Terias ingana, Wallace, figured and re-described by Butler, Brenchley's Cruise of the Curaçoa, p. 470, pl. xlix. fig. 3.

Terias rahel (Snellen nec Fab.), = *brigitta*, Cram. [*zoe*, Hopff., and *pulchella*, Trim., will be the ♀, according to Snellen's previous remarks]; Snellen, Tijdschr. Ent. (2) viii. p. 124.

Pieris. Ward (African Lepidoptera) figures and re-describes his *P. mananhari*, p. 2, pl. ii., figs. 1-4; *antsianakā*, p. 2 pl. ii. figs. 5 & 6; *cebron*, p. 3, pl. iii. figs. 1 & 2; *capricornus*, p. 3, pl. iii. figs. 3-7; and *rhodanus*, p. 4, pl. iv. figs. 1 & 2.

Pieris brassicæ, *rapæ*, and *calypso*. On specimens striped with green along the nervures by bursting of the pigment cells; Gregson, Meldola, and Powell, Ent. vi. pp. 286-288, 315.

Pieris oleracea, *rapæ*, and *protodice*. A popular account, with figures of larvæ and perfect insects, by W. Saunders, Canad. Ent. v. pp. 37-39, 41-43.

Pieris rapæ. Scudder re-describes var. *novangliæ*, from New England: Bull. Soc. Ent. Fr. (5) iii. p. lvii. On yellow vars. bred from mignonette, in both sexes; F. B. Caulfield, Canad. Ent. v. p. 59.

Pieris menapia, Feld., figured and re-described by Strecker, Lepidoptera, p. xiv. pl. ii. fig. 4.

Pieris rapæ and *Anthocharis cardamines* taken in *coitû*; L. G. Pike, Ent. vi. p. 291.

Appius melania, Fab., re-described and figured by Butler, Brenchley's Cruise of the Curaçoa, p. 471, pl. xlix. figs. 4 & 5.

Eronia. Ward (African Lepidoptera, p. 4, pl. iv.) re-describes and figures his *E. vohemara*, figs. 3 & 4, and *verulanus*, figs. 5-7.

Callidryas. Butler ('Lepidoptera Exotica') figures and re-describes *C. agarithe*, Boisd., p. 121, pl. xlv. figs. 1-4; *trite*, L., p. 121, pl. xlv. figs. 5-8; *wallacii*, Feld., p. 122, pl. xlv. figs. 9 & 10; *statira*, Cr., p. 142, pl. li. figs. 1-4; *jaresia*, Butl., p. 144, pl. li. figs. 5 & 6; *jada*, Butl. p. 144, pl. li. figs. 7-10; *neleis*, Boisd., p. 145, pl. lii. figs. 1-4; *godartiana*, Swains., p. 145, pl. liii. figs. 5-8; *hartonia*, Butl., p. 147, pl. lii. figs. 9-12; *orbis*, Poey, p. 153, pl. lv. figs. 1-4; and *intermedia*, Butl., p. 155, pl. lv. figs. 5-8. He concludes his monograph (which is also published separately), having enumerated 43 species, which he proposes (pp. 154 & 155) to divide into 4 genera, as follows;—*Catopsilia*, Hübn., type, *P. crocale*, Cram.; *Phæbis*, Hübn., type, *P. cipris*, Cram.; *Callidryas*, Boisd., type, *P. eubule*, Lim.; *Aphrissa*, Butl. (g. n.), type, *P. statira*, Cram.

Callidryas lactea, Butler, figured and re-described; Brenchley's Cruise of the Curaçoa, p. 470, pl. xlix. figs. 1 & 2.

Rhodocera rhamni observed to mistake a piece of rose-coloured paper for a flower; A. Müller, Ent. M. M. x. p. 20. Its occurrence in Fife recorded by J. Boswell Syme, Scot. Nat. ii. p. 20.

Rhodocera rhamni and *cleopatra*. Hermaphrodites recorded by A. Dihrik, S. E. Z. xxxiv. p. 113, and E. Ragusa, Bull. Ent. Ital. v. p. 50.

Colias. On the Persian species, with special reference to *C. sagartia*, *myrmidone* (of which *thisoa* is a var.), and *aurorina* (with var. *libanotica*); Christoph, Hor. Ent. Ross. x. pp. 20-22.

Colias palæno. J. G. Schilde, S. E. Z. xxxiv. pp. 169-175. *C. pelidne*, *lapponica*, the alpine *verdandi*; and probably also *interior*, *occidentalis*, and *labradorensis*, are forms of this species.

Colias hyale and *erate* may be forms of one species; *id. l. c.* pp. 174 & 175.

Colias nastes and *C. palano*. On their distribution; H. W. Bates, P. E. Soc. 1873, p. xviii.

Colias dimera, Doubl. & Hew., and var. *semperi*, Reak. [*ubi* ?], figured and re-described by Strecker, Lepidoptera, p. 27, pl. iv. figs. 3 & 4.

Callosune casta, figs. 1 & 1a, and *hetæra*, fig. 2, figured and re-described by Gerstæcker, V. d. Decken's Reisen, pt. iii. 2, p. 365, pl. xv.

Callosune theopompe, Feld., = *eupompe*, Klug; and *C. exole* ♀ (*nec* ♂), Reiche, = *achine*, Cr.; Gerstæcker, l. c. p. 364.

Anthocharis danae, Doubl. & Hew., Trimen (*nec* Cram.) is re-named *Callosune cinerascens*; Butler, Cist. Ent. vii. p. 172.

Anthocharis lanceolata, Boisd., figured and re-described by Strecker, Lepidoptera, p. 49, p. vi. fig. 5.

Euterpe rosacea, Quito, *approximata*, Polochic Valley, *nigripennis*, Bogota; Butler, Cist. Ent. vii. p. 174, spp. nn.

Leptosia sinensis, sp. n., *id. l. c.* p. 173, Shanghai.

Nychitona nupta, sp. n., *id. l. c.* p. 175, Angola [= *alceota*, ♀, Hopffer, Peters' Reise, Ins. p. 349.]

Elodina quadrata, sp. n., *id. l. c.* p. 175, Australia.

Sphenogona graduata, p. 174, Para, *ectriva* (Doubl. MS.), p. 175, Archidona, *id. l. c.*, spp. nn.

Synchloe megamera, sp. n., *id. l. c.* p. 173, Japan.

Eronia zelinda, sp. n., Ward, Ent. M. M. x. p. 59, Ribé, Angola.

Megonostoma cynops, sp. n., Butler, l. c. p. 171, Haiti.

Anthocharis julia, sp. n., Strecker, Lepidoptera, p. 50, pl. vi. figs. 6 & 7, Colorado.

DANAIDÆ.

Danais archippus. Transformations described with figures of all stages, and details; W. Saunders, Canad. Ent. v. pp. 4-8. On its spread in Australia and Tasmania; M'Coy, Ann. N. H. (4) xi. pp. 440 & 441; xii. p. 184. On its appearance in the South Sea Islands, Australia, and Celebes; G. Semper, J. Mus. Godefr. ii. pp. 117-119.

Danais insolata, Butler, figured and re-described in Brenchley's Cruise of the Curaçoa, p. 467, pl. xlviii. figs. 1 & 2.

Danais limniace; the var. *petiverana*, Doubl., from Africa, is regarded by Gerstæcker as distinct: V. d. Decken's Reisen, iii. pt. 2, p. 368.

Amauris nossima, Ward, figured and re-described, African Lepidoptera, p. 5, pl. v. fig. 1.

Euplœa. Butler, l. c., figures and re-describes his *E. brenchleyi*, p. 464, pl. xlvi. figs. 1-4; *imitata*, figs. 1 & 2, and *lorenzo*, figs. 3 & 4, p. 466, pl. xlvi.

Euplœa lorraini, Chapman, Ent. M. M. ix. p. 263, Java; *E. zonata*, Druce, P. Z. S. 1873, p. 338, Borneo; *E. andamanensis*, Atkinson, *op. cit.* p. 736, pl. lxiii. fig. 2, Andaman Islands; *E. mesocala*, Vollenhoven. Tijdschr. Ent. (2) viii. p. 244, pl. xi. figs. 1 & 2, Waigiou: spp. nn.

HELICONIIDÆ.

Butler (Lepidoptera Exotica, pl. 1.) figures and re-describes his *Olyras montagui*, p. 138, fig. 1; *Dircenna lonera* and *relata*, p. 139, figs. 2 & 3;

Ithomia plaginota, p. 139, fig. 4; *Pteronymia fulvimargo*, *olyrilla*, and *notilla*, p. 140, figs. 5-7; and *Leucothyris rubescens*, p. 141, fig. 9.

Melinæa cydippe, Salvin, = *Mechanitis methone*, Hewitson: Butler, Cist. Ent. vii. p. 154.

Heliconia choarina, Hewitson, figured, Ex. Butt. v. (86), *Tithorea* and *Heliconia*, pl. vii. figs. 24 & 25.

Methona confusa, sp. n., Butler (= *M. psidii*, Bates, nec Linn.), Cist. Ent. vii. p. 151, Tapajos, Peru.

Dircenna obfuscata, sp. n., *id. l. c.* Ega.

Ceratinia intermedia and *fulminans*, Bogota, *lurida*, Pusartambo, Peru, *id. l. c.* p. 152, spp. nn.

Mechanitis fallax, Bogota; *deceptus*, Cuença, Bolivia, Rio Napo, p. 154, *veritabilis*, p. 155, Bogota, Venezuela: *id. l. c.* spp. nn.

Napeogenes flossina, sp. n., *id.*, Lepidoptera Exotica, p. 141, pl. 1. fig. 8, Colombia.

Hymenitis albinotata, sp. n., *id.* Cist. Ent. vii. p. 153, Bogota.

Ithomia nigrimargo, sp. n., *id. l. c.* Cuença.

Melinæa parallelis, sp. n., *id. l. c.* p. 155, Panama.

Tithorea pseudethra, Brazil, p. 155; *egaensis*, Ega, p. 156; *pavonii*, Panama, Central America, p. 156, *id. l. c.* *T. tamassa*, Hewitson, Ex. Butt. v. (86), *Tith.* and *Heliconia*, pl. vii. figs. 1-3, New Granada: spp. nn.

Heliconius vetustus, Demerara, p. 165, *radiosus*, Villa Nova, *vittatus*, Bogota, p. 166, *bicoloratus*, E. Peru, *metabilis*, Venezuela, p. 167, *diffusus*, Pará, *mimulinus*, Bogota, p. 168, and *rufilimbatus*, Tapajos, p. 169, Butler, *l. c.*; *Heliconia tamarinda*, Hewitson, *l. c.* fig. 23, New Granada: spp. nn.

Eueides unifasciatus, Ega, and *hippolinus*, E. Peru, Butler, *l. c.* p. 169: spp. nn.

ACRÆIDÆ.

Acraea. Ward (African Lepidoptera, pl. vi.) figures and re-describes his *A. satis*, p. 6, fig. 1; *pentapolis*, p. 6, fig. 2; *peneleos*, p. 7, figs. 3 & 4; *polydectes*, p. 8, figs. 5 & 6, and *pharsalus*, figs. 7 & 8.

Acraea seis, Feisth., is referred to *neobule*, Doubl.; Gerstäcker, V. d. Decken's Reisen, iii. pt. 2, p. 368.

Acraea janisca, Godt., *manjaca*, Boisd., *rougeti*, Guér. *eponina*, Cr., = *serena*, F.; *id. ibid.*

Acraea rogersi, Hewitson, Ent. M. M. x. p. 57, Angola; *A. cydonia*, Camaroons, Angola, and *A. sambavae*, Madagascar, p. 59, *A. rabbale*, Ribé, p. 152, Ward, *op. cit.*: spp. nn.

Actinote griseata, sp. n., Butler, Cist. Ent. vii. p. 170, Pucartambo, Peru.

NYMPHALIDÆ.

Dione. Butler refers *Colænis telesiphe*, Doubl. & Hew., to this genus; Ann. N. H. (4) xii. p. 227.

Agraulis glycera, Feld., = *Dione moneta*, Hübn.; *A. moneta*, Poey, Doubl. & Hew., nec Hübn., is re-named *pocyi*; Butler, *l. c.*

Terinos fulminans and *lucilla*, Butler, figured and re-described, Lep. Ex. pp. 151-152, pl. liv. figs. 2 & 3.

Argynnis adippe, var.; B. Lockyer, Ent. vi. p. 484.

Argynnis aglaia, var., figured and described; E. Newman, *op. cit.* p. 369.

Argynnis aphirape, var. *ossianus*. Larva described; J. G. Schilde, S. E. Z. xxxiv. pp. 175 & 176.

Argynnis freija, *chariclea* and *amathusia* may be forms of one species, *id. l. c.* pp. 176 & 177.

Argynnis frigga. Larva and variation described; *id. l. c.* pp. 177 & 178.

Argynnis laodice. Larva and pupa described and figured; G. Künow, Schr. Ges. Königsb. 1872, pp. 447-449, pl. vii.

Argynnis lathonia, var. figured and described: E. Newman, *l. c.* p. 393.

Argynnis niobe. On its supposed occurrence in England; Doubleday, Ent. vi. p. 447.

Argynnis vorax, Butler, figured and re-described; Lep. Ex. p. 151, pl. liv. fig. 1.

Brenthis bellona. Scudder's paper on this species is translated, with remarks on the allied European species by A. Speyer, Verh. z.-b. Wien, xxiii. pp. 145-152, from Am. Nat. vi. pp. 514-518 [Zool. Rec. ix. p. 343].

Melitea artemis. E. Birchall describes the Irish form as var. *hibernica*, and figures the various forms occurring in the British Isles, Ent. M. M. x. p. 154, pl. i. [the plate is separately published].

Melitea dia supposed to have occurred in Kent; Ent. vi. p. 484.

Melitea didyma. H. Christoph describes a var. *saxatilis* from the mountains of North Persia; Hor. Ent. Ross. x. p. 28.

Melitea euphrosyne, var. described and figured; E. Newman, *l. c.* p. 447.

Melitea athalia and *M. dictynna*. A supposed hybrid between these species from Berlin described by Pfützner under the name *melicerta*; B. E. Z. xvii. pp. 159 & 160.

Eresia yorita, Reakirt, = *E. ezra*, Hewitson; *E. sydra*, Reak., = *E. acesas*, Hew., Strecker, Lepidoptera, p. 24.

Grapta dryas and *comma* are forms of one species: W. H. Edwards, Canad. Ent. v. p. 184.

Vanessa antiopa. On its occurrence in Britain, &c., Ent. M. M. ix. pp. 193-195, 217, 218, 245, 246; x. pp. 40 & 41; Ent. vi. pp. 285 & 286; F. B. White, Scot. Nat. ii. pp. 16-20. On its recent occurrence in Northumberland and Durham, T. J. Bold, Tr. North. Durh. v. pp. 30-33; in Norfolk, C. G. Barrett, Tr. Norw. Soc. 1872-1873, pp. 24-26. Most observers agree that the majority of the specimens taken in Britain are bred in the country, and not immigrants. On the colour of the border, &c., in America; W. V. Andrews, Ent. vi. pp. 329, 484.

Grote proposes the name *Scudderia* for the genus *Papilio*, Scudd., *nec* auctt., type, *V. antiopa*, auctt.; Canad. Ent. v. p. 144.

Vanessa urticae. Boisduval describes and figures a var. *atrebatensis*, from Arras; R. Z. (3) i. p. 409, pl. xvii. [= *ichnusoides*, De Sélys; Pet. Nouv. 1874, p. 387.]

Pyrameis atalanta. G. W. Royston Pigott, 'On the Spherules which compose the Ribs of the Scales of the Red Admiral Butterfly (*Vanessa atalanta*),' &c., M. Mic. J. ix. pp. 59-63, describes the structure of the black scales in great detail.

Pyrameis cardui, var. figured and described; E. Newman, l. c. p. 345.

Junonia kowara, Ward, figured and re-described; Ward, African Lepidoptera, p. 6, pl. v. figs. 5 & 6.

Junonia anone. Gerstäcker considers *Pap. clelia*, Cr., to be this species. V. d. Decken's Reisen, iii. 2, p. 369.

Junonia pluto, Heer, is refigured, with remarks on its supposed affinities, by Butler, Lep. Exot. pp. 127 & 128, pl. xlvi. fig. 7; Geol. Mag. x. pp. 3 & 4, pl. i. fig. 7: *V. attavina*, Heer, is possibly the reverse. A wing of *J. hedonia* is figured for comparison (fig. 6).

Junonia vellida and *Diadema auge* recorded from Yap, and the larva and pupa of the latter figured; G. Semper, J. Mus. Godefr. ii. p. 61, pl. viii. figs. 6 & 7.

Salamis anteva, Ward, figured and re-described, l. c. p. 5, pl. v. figs. 2-4.

Epiphile grandis, Butler, figured and re-described; Lep. Exot. p. 152, pl. liv. fig. 4.

Catagramma bonplandi. The varieties figured by Hewitson (Ex. Butt. Cat. figs. 72 & 66) are named *Perisama bourcieri*, (Boisd. MS.) and *albipennis* respectively. Butler, Cist. Ent. vii. p. 160. [The former = *Callicore occidentalis*, Guén.]

Catagramma humboldti, var., Hewitson, Ex. Butt. Cat. figs. 82 & 83, is named *Perisama divergens*, Butler, l. c. p. 162.

Callizona aceste, Doubl. & Hew. (*nec* Linn., Cram.), is named *C. latifascia*; Butler, l. c.

Diadema. On the African species of the section *Euralia*; R. Trimen, Tr. E. Soc. 1873, p. 107, notes.

Diadema bolina, var.; Butler, Brenchley's Cruise of the Curaçoa, p. 468, pl. xlvi. figs. 3 & 4.

Calinaga buddha certainly belongs to the *Nymphalidæ*, and not to the *Papilionidæ*. It is most nearly related to *Euripus*. Snellen, Tijdschr. Ent. (2) viii. pp. 123 & 124.

Rhomaleosoma viridinatatum, Butler; ♂ described, Cist. Ent. vii. p. 159.

Apatura ilia. On its supposed occurrence in England; Butler & Doubleday, Ent. M. M. ix. pp. 217, 244, 245, 270, 271.

Apatura lycaon and *herse*; Butler, P. E. Soc. 1873, p. xxxi.

Charaxes jasius. On the habits of the larva, &c.; J. H. Pearson, Ent. M. M. x. pp. 113-116.

Charaxes antamboulou, Lucas, is probably a Madagascar form of *C. candiope*, Godt.; and *C. antanala*, Luc., = *C. cacuthis*, Hew.: C. Ward, Ent. M. M. ix. p. 210.

Mynes guerini, Wall., = *M. geoffroyi*, Guér.; W. H. Miskin, P. E. Soc. 1873, p. xxvii.

Paphia glycerium. Transformations, &c., noticed by Riley, Rep. Ins. Mo. v. pp. 145-149.

Siderone ide, Hübn., = *Pap. nemesi*, Ill.; Kirby & Weymer, Pet. Nouv. 1873. p. 283.

Protogonius. Reviewed by A. G. Butler, P. Z. S. 1873, pp. 772-775, pl. lxix. 8 new species are described; and *Pap. fabius*, Drury, nec Cram., nec *Pap. hippona*, Fab., from Brazil, is re-named *drurii* (p. 773).

New species :—

Cethosia insulata, A. G. Butler, Cist. Ent. vii. p. 165, Ké Island.

Cynthia ada, M. R. Butler, P. Z. S. 1873, p. 686, Queensland.

Atella bowdenia, id. l. c. p. 687, Friendly Islands.

Argynnis pallescens, Hakodadi, and *inconstans*, Australia, A. G. Butler, l. c. p. 164.

Cybdelis whitelii [?-*leyi*], id. Ann. N. H. (4) xii. p. 226, Huasampilla, Peru.

Eunica octomaculata, id. Cist. Ent. vii. p. 160, East Peru.

Perisama lineata, Peru, p. 160; *viridinota*, E. Peru, *ochreipennis*, Bolivia, and *tristrigosa*, Pucartambo, Peru, p. 161, *rhodoptera*, Peru, Bolivia, p. 162: id. l. c.

Callizona tapajona, p. 162, Tapajos, *fulvescens*, p. 163, E. Peru: id. l. c.

Diadema wallaciana, ? India, *interstincta*, Assam; id. l. c. p. 157; *D. chapmani*, Hewitson, Ent. M. M. ix. p. 233, Calabar; *D. deceptor*, Trimen, Tr. E. Soc. 1873, p. 105, Natal.

Godartia wakefieldi, C. Ward, Ent. M. M. x. p. 152, Ribé.

Pseudacraea simulator, A. G. Butler, Cist. Ent. vi. p. 125, West Africa.

Heterochroa tumida, id. op. cit. vii. p. 163, E. Peru, Bogota.

Athyma amhara, Druce, P. Z. S. 1873, p. 344, pl. xxxii. fig. 2, Borneo.

Euryphene pluto, C. Ward. l. c. p. 59, Camaroons.

Rhomaleosoma inanum, Ashanti, and *permixtum*, Gaboon, A. G. Butler, l. c. p. 158; *R. imitator*, Trimen, l. c. p. 107, Natal.

Adolias bellata, Druce, l. c. p. 344, pl. xxxii. fig. 3, Borneo.

Tanæcia flora, M. R. Butler, l. c. p. 235, Penang.

Apatura substituta, A. G. Butler, l. c. p. 158, North China, Japan; *A. cleocharis*, Hewitson, Ent. M. M. x. p. 58, Angola.

Charoxes andare and *andriba*, C. Ward, Ent. M. M. ix. pp. 209 & 210, Madagascar; *C. nobilis*, Druce, op. cit. x. p. 13, Old Calabar; *C. pythoderus*, Hewitson, op. cit. p. 57, Angola.

Mynes doryca, A. G. Butler, l. c. p. 163, Dorey.

Protogonius quadridentatus, Bolivia, fig. 1, *bogotanus*, p. 773, and *tithoreides*, Bogota, *ochraceus*, Cayenne, fig. 3, *lileps*, Venezuela, p. 774, *divisus*, E. Peru, *castaneus*, Ega, fig. 2, *albinotatus*, Bogota, fig. 4, p. 775; A. G. Butler, P. Z. S. 1873, pl. lxix.

MORPHIDÆ.

H. BURMEISTER, 'Description des Morphonides Brésiliens;' R. Z. (3) i. pp. 17-47, criticises the figures of Merian and Stoll. He specially notices *Morpho laertes*, p. 21, pl. iii. figs. 1-4 (larva and pupa), *epistrophis*, p. 24, pl. ii. larva, *perseus* (= *hercules*, p. 26, pl. iii. fig. 5 (pupa), *menelaus* (♀ = *nestor*), p. 27, *anaxibia* (*telemachus*, L.), p. 29, and *achilides*, p. 30.

Morpho metellus, Cram., *P. telemachus*, Cram. (*crameri*, Kirb.), *M. scipio*, Feld., and probably *P. perseus*, Cram., are forms of this species.

The larva is also noticed. The blue and yellow varieties of the imago occur in both sexes. Möschler, S. E. Z. xxxiv. pp. 197-199.

Morpho zephyritis, Butler, figured and re-described, Lep. Ex. p. 156, pl. lvi. figs. 1 & 2.

Morpho lympharis, sp. n., A. G. Butler, Ann. N. H. (4) xii. p. 225; Lep. Ex. p. 156, pl. lvi. figs. 3 & 4, Pucartambo, Peru.

BRASSOLIDÆ.

H. BURMEISTER, *l. c.*, includes *Opsiphanes* with *Pavonia*. He notices *P. eurylochus*, p. 36, pl. iv. (larva and pupa); *inachis* (*beltrao*, Hübn.), p. 38, pl. v. fig. 1 (larva); *ilioneus*, Cr. (= *teucer*, Hübn.), p. 39, pl. v. figs. 2 & 3 (larva and pupa); *idomeneus*, p. 41; *cassie*, p. 42, pl. vi. figs. 1 & 2 (larva); and *quinteria*, p. 42, pl. vi. fig. 4 (larva); *Dynastor darius*, p. 44, pl. vi. fig. 3 (larva), and *napoleon*, and the genus *Brassolis*.

Opsiphanes orgetoria, Hewitson, figured and re-described, Ex. Butt. v. (86), *Ops.* pl. i. figs. 1 & 2.

Dynastor stygianus, Butler, figured and re-described, Lep. Exot. p. 125, pl. xlvii. fig. 1.

Morpho reinwardtianus, Drap., = *M. inachis*, Godt.; Deyrolle, Pet. Nouv. 1873, p. 279. It probably also = *demosthenes*, Perry, and *beltrao*, Ill.; Kirby, *op. cit.* p. 283.

Dasyophthalma vertebralis, Butler, figured and re-described, *l. c.* fig. 2.

Palæontina, g. n., A. G. Butler, *l. c.* p. 126; Geol. Mag. x. p. 2. Allied to *Dasyophthalma*, *Caligo*, and *Brassolis*; type, *P. oolitica*, sp. n., *l. c.* pl. xlvi. figs. 1 & 2 (Geol. Mag. pl. i. figs. 1 & 2), Stonesfield Slate, Oxfordshire.

Opsiphanes zelotes, sp. n., Hewitson, Ex. Butt. v. (86) *Ops.* pl. i. figs. 3 & 4, New Granada.

SATYRIDÆ.

Antirrhæa phasiana, figs. 3 & 4, *scoparia*, figs. 1 & 2, figured and re-described by Butler, Lep. Ex. p. 137, pl. xlix.

Cyllo leda, from Yap, noticed by G. Semper, J. Mus. Godeffr. ii. p. 61.

Neorinopsis sepulta, Boisd., re-figured by Butler, Lep. Ex. pl. xlvi. fig. 3; Geol. Mag. x. pl. i. fig. 3. Undersides of *Neorina lowii* and *Antirrhæa philoetetes* figured for comparison (figs. 4 & 5).

Erebia melas and *dromus*. On their variation; Oberthur, Pet. Nouv. 1873, pp. 339 & 340.

E. ligea, *euryale*, *adyte*, and *embla*; J. G. Schilde, S. E. Z. xxxiv. pp. 179-181.

Eneis aello. Egg and young larva described and figured, with details by Scudder, Ann. Ent. Belg. xvi. pp. 145-148, pl. i.

Eneis norna emits an agreeable odour when squeezed. J. G. Schilde, *l. c.* pp. 181 & 182.

Chionobas uhleri, figured and re-described by Strecker, Lepidoptera, p. 28, pl. iv. fig. 5.

Pararga mæra. Vars. from N. Persia; H. Christoph, Hor. Ent. Ross. x. p. 29.

Pararga megera, var. ; Noel, Birchall, & Anderson, Ent. vi. pp. 485, 521, 545.

Pararga adrasta, and var. *maja*. Habits, transformations, &c. ; A. Fuchs, S. E. Z. xxxiv. pp. 98-107.

Epinephile janira, var. ; T. Barns, Ent. vi. p. 411.

Epinephile hispulla, Esp., is distinct from *janira*, L. ; Millière, Cat. rais. i. p. 29.

Epinephile hyperanthus and *tithonus*. Vars. described and figured by E. Newman, Ent. vi. pp. 417 & 441.

Satyrus semele, var. ; Lambrichs, Ann. Ent. Belg. xvi. p. 112.

Satyrus ridingsi and *sthenele*, Edw., figured and re-described by H. Strecker, Lepidoptera, pp. 29 & 30, pl. iv. figs. 6 & 7.

Periplysia leda, Gerstäcker, figured and re-described, V. d. Decken's Reisen, iii. pt. 2, pp. 370-372, pl. xv. figs. 3 & 3a.

Pedaliodes ereiba, Feld., Butler describes a var. *peruviana* from Huasampilla, Peru, Ann. N. H. (4) xii. p. 221.

Dedalma dorinda, var. ? or sp. n., ? from Huasampilla, Peru ; *id. l. c.* p. 223.

Drucina leonata, Butler, figured and re-described ; Lep. Ex. p. 137, pl. xlix. fig. 5.

Taygetis incerta, *umbracea*, and *leuctra* (p. 149), *xantippe* and *ophelia*, (p. 150), Butler, figured and re-described ; *l. c.* pl. liii. figs. 1-5.

Corades iduna. Butler notes a var. *marginalis* from Huasampilla, Peru ; and a var. *peruviana* from E. Peru ; Ann. N. H. (4) xii. p. 224.

New species :—

Leptoneura dingana, Trimen, Tr. E. Soc. 1873, p. 102, pl. i. fig. 1, Natal.

Erebia irrorata, *id. l. c.* p. 103, pl. 1. fig. 2, Cape Colony.

Satyrus hoffmani, Strecker, Lepidoptera, p. 31, pl. iv. fig. 8, Nevada ; *S. wheeleri*, Edwards, Tr. Am. Ent. Soc. iv. p. 343, Rocky Mountains.

Mycalesis medontius, Gaboon, figs. 56 & 57, *mareotis*, Philippines, fig. 58, *margites*, locality unknown, fig. 59, *macrones*, W. Africa, fig. 60, and *mandanes*, Angola, Gaboon, figs. 61 & 62, Hewitson, Ex. Butt. v. (88) *Myc.* pl. ix. ; *M. ibitina*, Ward, Ent. M. M. x. p. 60, Madagascar ; *M. perspicua*, Trimen, *l. c.* p. 104, pl. i. fig. 3, Natal and Santa Lucia Bay ; *M. amana*, Druce, P. Z. S. 1873, p. 339, pl. xxxii. fig. 1, Borneo.

Lymanopoda ocellifera and *rufescens*, p. 219 ; *eubagioides*, p. 220, A. G. Butler, Ann. N. H. (4) xii. Huasampilla, Peru.

Steroma umbracina, *id. l. c.* p. 221, Huasampilla.

Pedaliodes ferratilis, and *niveonota*, *id. l. c.* Huasampilla.

Oxeoschistus mirabilis, *id. l. c.* p. 222, Huasampilla.

Pronophila mirabilis and *venerata*, *id. l. c.* p. 223, Huasampilla.

Corades fuscipлага, *id. l. c.* p. 224, Huasampilla.

ERYCINIDÆ.

Mesosemia messala, Hewitson, figured ; Ex. Butt. v. *Mes.* pl. xii. figs. 122 & 123.

Pachythone erebia, Bates, figured ; Hewitson, *l. c.* *Pach.* and *Cremna*, fig. 5.

Mesosemia acuta, figs. 112 & 113, Brazil, *mæra*, figs. 114 & 115, Trinidad, *matatha*, figs. 116 & 117, hab. — ?, *mesora*, figs. 118 & 119, Ecuador, *metura*, figs. 120 & 121, hab. — ?; Hewitson, Ex. Butt. v. *Mesosemia*, pl. xii.: spp. nn.

Creuma cebrenia, sp. n., *id. l. c. Pachythone* and *Cremna*, figs. 1–3, Honduras.

Barbicornis dibaphina and *melanops*, spp. nn., A. G. Butler, Cist. Ent. vii. pp. 170 & 171, Brazil.

Zelotæa idothea, sp. n. (Doubl. MS.), *id. l. c.* p. 171, Rio Janeiro.

Pachythone palades, figs. 1 & 2, *pasicles*, figs. 6 & 7, Espirito Santo, Brazil, *philonis*, figs. 3 & 4, Santa Martha: Hewitson, Ex. Butt. v. *Pach.* and *Cremna*, spp. nn.

Lemonias cythera, sp. n., Edwards, Tr. Am. Ent. Soc. iv., p. 345, Arizona.

LYCÆNIDÆ.

Hewitson has published part 5 of his Illustrations of Diurnal Lepidoptera, Lycænidæ (London: 1873, 4to, pp. 137–151, pls. lv.–lix. and suppl. pl. vi.) chiefly containing hitherto unfigured species of *Thecla*.

Myrina. Hewitson (*l. c.* suppl. pl. vi.) figures *M. amasa*, figs. 89 & 90, *antipha*, figs. 91–93, and *acharia*, figs. 94 & 95.

Dipsas. Hewitson, *ibid.*, figures *D. duma*, fig. 15, *taxila*, figs. 16 & 17, and *grunus*, figs. 18 & 19.

Thecla. Hewitson, *l. c.*, re-describes and figures *T. verania*, pl. lv. figs. 322 & 323; *bagrada*, figs. 324 & 325; *fabulla*, figs. 326 & 327, p. 137; *picentia*, figs. 328 & 329, *ceglusa*, figs. 330 & 331, p. 138; *petilla*, figs. 332 & 333; *philinna*, figs. 334 & 335, p. 139; *celmus*, Cr., p. 140, pl. lvi. figs. 338 & 339; *phrutus*, Hübn. (= *fidentia*, Hew., *olim*), p. 141, figs. 340 & 342; *cleon*, F., p. 142, figs. 347–349; *telea*, pl. lvii. figs. 350 & 351; *asa*, figs. 353 & 354, p. 143; *alda*, p. 144, pl. 57, figs. 355 & 356; *calchinia*, pp. 359 & 360; *hyccara*, figs. 361 & 362, p. 145; *trebula*, figs. 363 & 364; *hygela*, pl. lviii. figs. 367 & 368, p. 146; *agra*, figs. 369 & 370, *davara*, fig. 371, *uzza*, figs. 372 & 373, p. 147; *buphonia*, fig. 374, *calatia*, fig. 375, *demonassa*, figs. 376–378, p. 148; *ophia* (*ornea*, Hew., *olim*, is the ♀), pl. lix. figs. 379–381, *lemuria*, figs. 382 & 383, p. 149; *biblia*, figs. 384 & 385, *gnosia*, figs. 386 & 387, *laconia*, figs. 388 & 389, p. 150; *beera*, p. 151, figs. 390 & 391.

Thecla w-album. Life-history by E. Newman, Ent. vi. pp. 419–421.

Bithys azurinus and *hesperitis*, Butler & Druce, figured and re-described, Lep. Ex. p. 159, pl. lvii. figs. 11 & 14.

Mithras angustinus, B. & Dr., figured and re-described, *ibid.* fig. 8.

Strymon pastor, p. 157, fig. 5, *agricolor*, fig. 4, and *cælicolor*, fig. 6, p. 158, B. & Dr., figured and re-described, *l. c.*

Tmolus crolinus, fig. 13, *invisus*, fig. 12, p. 160, *halciones*, fig. 9, *isobeaon*, fig. 2, *vespasianus*, fig. 7, p. 161, *charichlorus*, fig. 7, *renarius*, fig. 3, p. 162, B. & Dr., figured and re-described, *l. c.*

Lampides zachæina, B. & Dr., figured and re-described, *l. c.* p. 157, pl. lvii. fig. 1.

Polyommatus alciphron. On specimens forming a transition to *P. gordius*, cf. Christoph, Hor. Ent. Ross. x. p. 22.

Lycæna helloides, *castro*, and *ianthe*; Strecker, Lepidoptera, p. 15.

Lycæna alsus. Notes, and description of pupa; J. Hellins, Ent. M. M. x. pp. 43 & 44.

Lycæna amyntas, double-brooded; E. Lelièvre, Pet. Nouv. 1873, p. 331.

Lycæna ægon, var.; B. Lockyer, Ent. vi. p. 484.

Lycæna emolus, Godt., and *kersteni*, Gerst., figured and the latter re-described; Gerstäcker, V. d. Decken's Reisen, iii. pt. 2, p. 373, pl. xv. figs. 4 & 5.

Lycæna gamra, Led., = *jesous*, Guér.; *id. l. c.* p. 372.

Pentila abraxus, var.; Hewitson, Ex. Butt. v. *Pent.* and *Liptena*, pl. ii. fig. 10.

Liptena. Hewitson (*l. c.*, text, refers his *Pieris erastus* (olim) to this genus.

Callicista, n. g., Grote, Bull. Buff. Soc. i. p. 178, allied to *Strymon*; type, *C. ocellifera*, sp. n., *id. l. c.* Aurora, near Buffalo.

New species :—

Epitola ceraunia, W. Africa, p. 149, *cercene* and *hyetta*, Angola, *carcina*, Old Calabar, p. 150, *zelza*, Old Calabar. and *cephena*, Gaboon, p. 151, Hewitson, Ent. M. M. x.

Amblypodia alinda, Druce, P. Z. S. 1873, p. 354, pl. xxxiii. fig. 5, Borneo.

Iolaus carina, W. Africa, p. 122, *bolissus*, Congo, and *canissus*, S. Africa, p. 123, Hewitson, Ent. M. M. x.; *I. aphnæoides*, Trimen, Tr. E. Soc. 1873, p. 110, Grahamstown.

Hypolycæna aruma, Gaboon, *mera* and *naara*, Angola, Hewitson, *l. c.* p. 124.

Ilerda (?) *superba*, Druce, *l. c.* p. 350, pl. xxxii. fig. 11, Borneo.

☞ *Aphnæus frigidus*, Druce, *l. c.* p. 350, pl. xxxii. fig. 10, Borneo; *A. phanes*, p. 111, figs. 4 & 5, Griqualand, *pseudozeritis*, p. 113, fig. 6, Cape Colony, Trimen, *l. c.* pl. i.

Thecla una, p. 140, figs. 336 & 337, S. America, *zilda*, p. 141, figs. 343 & 344, Rio Janeiro, *adria* (= *megacles*, Cr. ?), p. 142, figs. 345 & 346, Amazon, pl. lvi. *carnica*, p. 143, fig. 352, Amazon, *azia*, p. 144, figs. 357 & 358, Mexico, pl. lvii. *badeta*, p. 146, pl. lviii. figs. 365 & 366, S. America, Hewitson, Ill. D. Lep. pt. v.; *T. crysalus*, Edwards, Tr. Am. Ent. Soc. iv. p. 344, Lake Paso.

Sithon aurea, *scopula*, *pallida*, and *valida*, Druce, *l. c.* p. 352, pl. xxxiii. figs. 1-4, Borneo.

Hypochrysois elegans, *id. l. c.* p. 350, pl. xxxii. fig. 12, Borneo.

Cupido cornuta, fig. 5, *cerulea*, fig. 6, *almora*, fig. 7, *adana*, *aluta*, fig. 8, *angusta*, fig. 9, p. 349, pl. xxxii. *akaba*, p. 350, *id. l. c.* Borneo.

Lampides pseudocassius, R. P. Murray, Ent. M. M. x. p. 126, Brisbane (= *cassioides*, Murray, *l. c.* p. 108, pre-occ.).

Lycæna arthurus, J. C. Melvill, Ent. M. M. ix. p. 263, Chamounix (= *L. arion*, var., Editors, *ibid.*, & Staudinger, *op. cit.* p. 290); *L. phæbe*, S. Australia, and *pryeri*, Japan, R. P. Murray, *op. cit.* x. pp. 107 & 126;

L. heathi and *acasta*, Cox, Ent. v. p. 402, S. Australia; *L. melissa*, Edwards, l. c. p. 346, Colorado, Nevada, Arizona; *L. sieversi*, p. 23, figs. 1 & 2, *agagrus*, p. 24, figs. 3 & 4, *staudingeri*, p. 26, figs. 5 & 6, all from N. Persia, Christoph, Hor. Ent. Ross. x. pl. i.; *L. modesta*, Maynard, Am. Nat. viii. p. 178, Florida (is a *Thecla*; Morrison, Bull. Buff. Soc. i. p. 188).

Zeritis argyraspis, Trimen, l. c. p. 114, pl. i. figs. 7 & 8, Cape Colony.

Miletus regina, pl. xxxii. fig. 4, and *nivalis*, p. 348, Borneo, Druce, l. c.

Liptena ilma, fig. 13, Angola, *isca*, figs. 14–16, Old Calabar, and *milca*, fig. 17, W. Africa, Hewitson, l. c.; *L. tera*, id. Ent. M. M. x. p. 125, Gaboon; *L. aslanga* [? *aslauga*], Trimen, l. c. p. 117, Natal.

Pentila tirza and *carruta*, Hewitson, Ent. M. M. x. p. 125, Gaboon; *P. amenaida*, figs. 4–7, Angola, *rotha*, figs. 8 & 9, Gaboon, *eleaza*, figs. 11 & 12, Old Calabar, id. Ex. Butt. v. *Pent.* and *Liptena*. pl. ii.

HESPERIIDÆ.

Eudamus. Hewitson (Ex. Butt. v. *Eud.* pl. i.) figures his *E. pherenice*, fig. 1, *bryaxis*, figs. 2 & 3, *eous*, figs. 5 & 6, *phœnice*, figs. 7 & 8.

Pyrrhopyga bixæ, Cram., nec L., is re-named *fluminis*; Butler, Cist. Ent. vii. p. 176.

Hewitson (l. c. *Pyrrhopyga*, pl. iv.) figures *P. santhilarius*, Latr. (= *Tamyris pardalina*, Feld.), figs. 24 & 25, *epimachia*, H. S., figs. 26 & 27, from Ecuador, *anystis*, Hew., figs. 28 & 29, and *phoronis*, Hew., figs. 30 & 31.

Ismene anchises, Gerstäcker, figured and re-described; V. d. Decken's Reisen, iii. pt. 2, p. 374, pl. xv. figs. 6 & 6a.

Hesperia. Hewitson (l. c. *Hesp.* pl. v.) figures and re-describes his *H. litana*, figs. 42 & 43, *physcella*, figs. 44 & 45, *ophiusa*, figs. 46–48, *himella*, figs. 49 & 50, *marsena*, figs. 51 & 52, and *lutetia* (with which *xarippe*, Butl., is synonymous), figs. 53 & 54; also (l. c., *Hesp.*, pl. vi.) his *H. marpesia*, figs. 55 & 56, *cæsina*, fig. 57, *liburnia*, figs. 58 & 59, *dolopia*, figs. 60 & 61, *latoia*, figs. 62 & 62, *calvina*, fig. 64, and *laurea*, figs. 65 & 66.

Hesperia acteon. Transformations described by W. Buckler, Ent. M. M. x. pp. 86–88; also by Newman, Ent. vi. pp. 421–423.

Pamphila zabulon. A specimen linking the typical form with vars. *pocahontas* and *quadaquina*: H. K. Morrison, Canad. Ent. v. p. 164.

Lerema accius and *patteni*. The ♂ has a single stemma in the middle of the forehead. It is triplicate in the ♀ of the former. Scudder, Bull. Soc. Ent. Fr. (5) iii. pp. lii. & liii. The ♀ of *L. patteni* has not yet been examined; there are no ocelli in either sex of *L. hianna*; id. Am. Nat. vii. p. 490.

Syrichthus. On the Belgian species, cf. P. Mabille & De Sélys Longchamps, Pet. Nouv. 1873, pp. 337 & 338.

Syrichthus andromedæ is only doubtfully distinct from *S. centaureæ*, Schilde, S. E. Z. xxxiv. pp. 182–184.

Quaedvlieg's *Syrichthus alveus*, var. *fritillum*, = *alveus*, var. *cirsii*.

and his ab. *a*, and probably also *b*, = *serratulae*; De Sélys Longchamps, CB. Ent. Belg. xvi. p. 74.

Pterygospidea. Hewitson (*l. c. Pter.*, pl. i. figs. 1–6) figures his *P. pteris*, *decoratus*, *pygela*, *leptogramma*, *phagesia*, and *punctata*.

New species :—

Eudamus zelotes, Hewitson, Ex. Butt. v. *Eud.*, pl. i. fig. 4, St. Paulo, Amazon.

Pyrrhopyga latifasciata, A. G. Butler, Cist. Ent. vii. p. 176, Bogota.

Carystus fulvimargo, id. *ibid.* Venezuela.

Hesperia chusca and *yuma*, Edwards, Tr. Am. Ent. Soc. iv. p. 346, Arizona.

Pamphila morantii, Trimen, Tr. E. Soc. 1873, p. 122, Natal; *P. flossites*, M. R. Butler, P. Z. S. 1873, p. 687, Ega.

Pyrgus chaca, Trimen, *l. c.* p. 118, pl. i. figs. 9 & 10, S. Africa.

Astictopterus armatus, Druce, P. Z. S. 1873, p. 359, pl. xxxiii. fig. 7, Borneo.

Plesioneura pria, p. 359, *signata*, p. 360, pl. xxxiii. fig. 8, Borneo, *id. l. c.*

Cyclopides barberæ, Cape Colony, and *meninx*, Transvaal, Trimen, *l. c.* pp. 120 & 121, pl. i. figs. 11 & 12.

Pterygospidea potiphora, Neilgherries, and *tabrica*, Darjeeling, Hewitson, *l. c. Pter.* pl. i. figs. 7 & 8.

Taractrocera celæno, Cox, Ent. vi. p. 402, S. Australia.

Tagiades striata, Druce, *l. c.* p. 360, Borneo.

Satarupa affinis, Druce, *l. c.* p. 360, pl. xxxiii. fig. 9, Borneo.

SPHINGIDÆ.

Catalogue of the North American species: Grote, Bull. Buff. Soc. i. pp. 17–28.

The horn of the larva is probably a protection for the urinary glands. Goossens, Ann. Soc. Ent. Fr. (5) iii. pp. 123–128.

G. Semper notices *Cheerocampa nessus*, *thyelia* and *celerio*, and *Sphinx convolvuli*, from Yap, and figures the larvæ of *C. celerio*. J. Mus. Godeffr. ii. pp. 62 & 63, pl. viii. figs. 8–10, 19 & 20.

A Brazilian *Sphinx* with proboscis (figured) from 10–11 inches in length; F. & H. Müller, Nature, viii. p. 223.

Hemaris thetis, Fab., *diffinis*, Boisd., and *axillaris*, Grote & Rob., re-described and figured by Grote, *l. c.* p. 6, pl. i. figs. 7–9.

Hæmorrhagia. Grote admits 8 North American species, of which he gives a table, *l. c.* pp. 7 & 8.

Macroglossa hirundo, Gerstäcker, figured and re-described; V. d. Decken's Reisen, iii. 2, p. 375, pl. xv. fig. 7.

Cheerocampa elpenor, var.; E. F. Bisshopp, Ent. vi. p. 485.

Deilephila. A species from N. Persia, perhaps *D. kotschyi*, Koll., noticed by H. Christoph, Hor. Ent. Ross. x. p. 31.

Deilephila porcellus, var., Millière, Ann. Soc. Lyon (2) xix. pp. 85 & 86, pl. cxvi. fig. 7, Caucasus.

Sphinx convolvuli. On the larva and its habits; W. Buckler, Ent. M. M. ix. pp. 286-289.

Sphinx atropos possesses a tuft of hairs on the first abdominal segment, which it can erect when uttering its cry; the cry seems to be produced by the contraction of the muscles at the base of this. There is a horny scale at the junction of the femur and tibia in the front legs of the ♂, which may assist in grasping the ♀. Laboulbène, Ann. Soc. Ent. Fr. (5) iii. pp. 537-541. Both sexes utter a cry: M. Girard, *op. cit.* Bull. p. ccxxi.

Smerinthus. Strecker (Lepidoptera, pt. vii. pp. 51-60, pl. vii.) monographs the N. American species, admitting 10, of which one is new. The others are *S. juglandis*, A. & S., p. 53, figs. 12 & 13, *excacata*, A. & S., p. 54, figs. 1 & 2, *myops*, A. & S., p. 55, fig. 9, *astylus*, p. 56, fig. 10, *geminatus*, Say, figs. 6 & 7 (and var. *jamaicensis*, Drury, p. 57, fig. 8, which [has priority, but] really occurs at New York and in Maryland), *ophthalmicus*, Boisd., p. 58, figs. 4 & 5, *cerisyi*, Kirb., p. 59, fig. 3, *modesta*, Harr., p. 60, fig. 11. A figure of a hybrid between *ocellatus* and *populi* (fig. 15) is added; also criticisms on Grote's remarks on the genus.

Smerinthus populeti, Bienert, is probably a southern var. of *S. populi*, H. Christoph, *l. c.*

Laothoe, Fab. Grote proposes to restrict this name to *Smerinthus populi* and allies, *l. c.* p. 24.

Ellema harrisi, Clem., probably = *Lapara bombycoides*, Walk.; *id. l. c.* p. 28.

Calasymbolus, g. n., *id. l. c.* p. 23. Allied to *Smerinthus*; type, *Sphinx astylus*, Drury.

Hemaris tenuis, p. 4, pl. i. fig. 6, Pennsylvania, *marginalis*, p. 6, pl. ii. fig. 10, Michigan, Grote, *l. c.* spp. nn.

Ambulyx constrictilis, sp. n., Walker, Tr. N. H. Soc. Glasg. i. p. 328, Congo.

Basiana suffusa, sp. n., *id. l. c.* p. 329, Congo.

Daphnusa miskini, sp. n., R. P. Murray, Cist. Ent. vii. p. 178, Queensland.

Smerinthus pallens, Strecker, Lepidoptera, p. 54, pl. vii. fig. 14, Texas; *S. subjectus*, Walker, *l. c.* p. 328, Congo.

ÆGERIIDÆ.

On the habits, &c., of the British species; E. G. Meek, Ent. M. M. x. pp. 160-162.

URANIIDÆ.

Urania fulgens. On its annual migration from east to west in August and September across the isthmus of Panama; Nature, viii. p. 536.

Urania rhipheus. On its transformations, cf. Sganzin & Boisduval, Bull. Soc. Ent. Fr. (5) iii. p. ccxx.

Thaliura cresus, Gerstäcker, figured and re-described; V. d. Decken's Reisen, iii. pt. 2, p. 383, pl. xvi. fig. 4.

CASTNIIDÆ.

Eusemia pardalina, sp. n., Walker, *l. c.* p. 329, pl. v. fig. 1, Congo.

ZYGENIDÆ.

Catalogue of the North American species; Grote, Bull. Buff. Soc. i. pp. 29-36.

Balacra belongs to this family and not to the *Arctiidæ*; Walker, Tr. N. H. Soc. Glasg. i. p. 331.

Alypia langtoni, Couper. On the confusion existing in authors about this species, cf. Grote, l. c. p. 31.

Zygæna meliloti. Transformations described by T. H. Briggs, Ent. M. M. x. pp. 116 & 117.

Zygæna trifolii and *loniceræ*. On their distinctive characters; H. Doubleday, Ent. vi. pp. 514 & 515.

Syntomis phegea. On its supposed occurrence in Yorkshire; H. Doubleday, Ent. M. M. ix. p. 195. On rearing in Belgium; Weinmann & Capronnier, CR. Ent. Belg. xvi. pp. 60-62, 68-70.

Cydosiinæ proposed as a new sub-family to include the genus *Cydosia*; Grote, l. c. p. 36.

Androloma, sect. n. of *Alypia*; type, *A. lorquini*, Grote. *Id. l. c.* p. 30.

Euctenucha, sect. n. of *Ctenucha*, to contain the Californian species; type, *Apistosis? multifaria*, Walk. *Id. l. c.* p. 33.

Triprocris, g. n., *id. l. c.* p. 35; type, *Procris (?) smithsonianus*, Clem.

Pæcilosoma vespens, sp. n., A. G. Butler, Ann. N. H. (4) xii. p. 227. Huasampilla, Peru.

Chrysocale florella, sp. n., *id. l. c.* Huasampilla.

Balacra ochracea, sp. n., Walker, Tr. N. H. Soc. Glasg. i. p. 331, Congo.

NYCTEOLIDÆ.

Hylophila prasinana. 2 varieties described and figured by Millière, Ann. Soc. Lyon (2) xix. pp. 81 & 82, pl. cxvi. figs. 1 & 2.

Earias siliquana. A. T. T. [Targioni-Tozzetti ?] notices its ravages in Egypt. Bull. Ent. Ital. v. pp. 130-132.

LITHOSIIDÆ.

Nyctemera hymenæa, Gerstäcker, figured and re-described; V. d. Decken's Reisen, iii. pt. 2, p. 377, pl. xvi. fig. 1.

Nyctemera integra, Walk., recorded from Yap, and larva and pupa figured; G. Semper, J. Mus. Godeffr. ii. pp. 63 & 64, pl. viii. figs. 11 & 12.

Asymbata roseiventris; genus and species re-described by Gerstäcker, l. c. pp. 377 & 378, pl. xv. fig. 8.

Lithosia complana. Habits; G. B. Corbin, Ent. v. pp. 427-429.

Lithosia mesomella, var.; *id. l. c.* p. 334.

Lithosia quadra. Larva described by B. Lockyer, *op. cit.* pp. 479-482.

Lithosia stramineola = *griseola*, var.; J. Hellins & A. B. Farn, Ent. M. M. x. pp. 69, 117 & 118.

Setina ramosa, var. *pallens*; larva and imago described by P. Millière, Ann. Soc. Lyon (2) xix. pp. 6-8, pl. cix. figs. 9-11. *S. ramosa* and *aurita* are distinct; *id. l. c.*

Nola chlamydulalis. Transformations described and figured by P. Millière, *l. c.* pp. 60–63, pl. cxiv. figs. 1–3. Var. (?) *lathonialis*, *id. l. c.* p. 62, fig. 4, from Barcelona.

Nola confusalis, H. S. Transformations described by A. Speyer, *S. E. Z.* xxxiv. pp. 357–360.

Nolaphana malana, Zell., *nec* Fitch, re-named *Asisyra zelleri*, being both generically and specifically distinct from Fitch's insect. Grote, *Bull. Buff. Soc.* i. p. 169.

New genera and species :—

Surina, Walker, *Tr. N. H. Soc. Glasg.* i. p. 333. Allied to *Hypsa*; type, *S. hypsoides*, *id. l. c.* Congo.

Zaracha, *id. l. c.* p. 335. Allied to *Hypsa*; type, *Z. extranea*, *id. ibid.*, Congo.

Leucopsumis cryptochroma, *id. l. c.* p. 331, pl. v. fig. 3, Congo.

Gyara clara, A. G. Butler, *Cist. Ent.* vi. p. 128, Espirito Santo.

Pericopis fantasma, p. 126, Bogota, *lucifer*, *ibid.*, *sibylla*, p. 127, Espirito Santo, *flora*, p. 127, Guatemala, *id. l. c.*

Aletis postica, Walker, *l. c.* p. 332, pl. v. fig. 4, Congo.

Phægorista similis, *id. ibid.* fig. 5, Congo.

Chrysauge (Flavinia) limbata, A. G. Butler, *Ann. N. H.* (4) xii. p. 228, Huasampilla, Peru.

Nyctemera simplex, p. 330, *decisa*, *ibid.*, pl. v. fig. 2; Walker, *l. c.*, Congo.

Hypsa dissociata, *id. l. c.* p. 334, Congo.

Gnophria (?) *ceramensis*, Vollenhoven, *Tijdschr. Ent.* (2) viii. p. 246. pl. xii. fig. 1, Ceram.

Crambomorpha (?) *aurora*, *id. l. c.* fig. 2, Salawatti.

Barsine indecisa, Walker, *l. c.* p. 336, Congo.

Soloe quadrigutta, *id. l. c.* Congo.

ARCTIIDÆ.

Arctia gelida, Möschl., = *A. quenseli*, Geyer; *A. borealis*, Möschl., = *A. parthenos*, Harr.; *A. americana*, Harr., = *A. caja*, L.: Strecker, *Lepidoptera*, p. 24.

Arctia mendica, var. figured and described by E. Newman, *Ent.* vi. p. 321.

Pyrharctia (Spilosoma) isabella popularly described, and transformations figured by Saunders, *Canad. Ent.* v. pp. 75–77. On its food and parasites; O. S. Westcott, *op. cit.* p. 137.

Chelonia hebe. On muscardine, &c., in the larva, *cf.* Fallou, Girard & Cornu, *Bull. Soc. Ent. Fr.* (5) iii. pp. cxxix.–cxxxii.

Chelonia villica, var., described and figured by E. Newman, *l. c.* pp. 297 & 298.

Callimorpha dominula. Vars. figured and described by E. Newman, *l. c.* pp. 321 & 322, and P. Millière, *Ann. Soc. Lyon* (2) xix. pp. 83 & 84, pl. cxvi. fig. 4.

Callimorpha hera in Guernsey and Sark; W. A. Luff, *Ent.* vi. p. 333.

- Callimorpha jacobææ*: var. described by G. B. Corbin, Ent. vi. p. 333.
Sciatta, g. n., Walker, Tr. N. H. Soc. Glasg. i. p. 337; type, *S. inconcisa*,
 sp. n., *id. l. c.* p. 338, Congo.
Spilosoma ramivitta, sp. n., *id. l. c.* p. 336, Congo.

LIPARIDÆ.

- Hyphantria textor*. A popular account, with figures of all stages;
 C. J. S. Bethune, Canad. Ent. v. pp. 141-143.
Jana rhodoptera, Gerstäcker, figured and re-described, V. d. Decken's
 Reisen, iii. pt. 2, p. 381, pl. xvi. fig. 3.
Zarfa, g. n., Walker, *l. c.* p. 338; type, *Z. lunifera*, sp. n., *id. l. c.* p. 339,
 Congo.
Sizalisca, g. n., *id. l. c.*; type, *S. graminosa*, sp. n., *id. l. c.* p. 340,
 Congo.
Viana, g. n., *id. l. c.*; type, *V. velutina*, sp. n., *id. l. c.* p. 341, Congo.
Artaxa squamiplaga, sp. n., *id. l. c.* p. 338, Congo.
Anaxita sannionis, sp. n., A. G. Butler, Ann. N. H. (4) xii. p. 228,
 Huasampilla, Peru.

PSYCHIDÆ.

- On cases from Calcutta; A. Müller, P. E. Soc. 1873, pp. iv. & xix.
 The reported parthenogenesis of *Psyche* is doubted by P. F. de Rouge-
 mont; Bull. Soc. Neuch. ix. p. 435.
Cochlophora (?) *valvata*. Gerstäcker figures snail shells which have
 been inhabited by this species, and describes the remains they contain.
 V. d. Decken's Reisen, iii. pt. 2, pp. 379-381.
Psyche hibernicella, C. S. Gregson, Ent. vi. p. 409, Howth; *P. qua-*
drangularis, H. Christoph, Hor. Ent. Ross. x. pp. 32-35 (described in all
 stages; imago and case figured, pl. i. figs. 7 & 8), North Persia: spp. nn.

NOTODONTIDÆ.

- Notodonta sieversi*, Motsch., figured by P. Millière, Ann. Soc. Lyon (2)
 xix. pl. cxi. fig. 10.
Clostera curtula and *reclusa*. Hybrid; F. Bond, P. E. Soc. 1873,
 p. xxviii.
Crinodes sommeri. Butler re-asserts the distinctness of his *Tarsolepis*
remicauda. Ann. N. H. (4) xi. pp. 78 & 79; Ent. M. M. ix. pp. 198
 & 199.
Phiala xanthosoma, Wallengr., is generically but not specifically iden-
 tical with *Heteromorpha costipuncta*, H. S.; Snellen, Tijdschr. Ent. viii.
 pp. 124 & 125.
Charadra propinquinelinea, sp. n., Grote, Tr. Am. Ent. Soc. iv. p. 293,
 pl. i. fig. 96, Rhode Island.

LIMACODIIDÆ.

- Limacodes asellus*. Larva described by Buckler, Ent. M. M. x.
 pp. 70 & 71.

Zinara, g. n., Walker, Tr. N. H. Soc. Glasg. i. p. 343. Type, *Z. nervosa*, sp. n., *id. l. c.* Congo.

Nyssia rudis, sp. n., *id. l. c.* p. 342, Congo.

SICULODIDÆ.

Væna, g. n., *id. l. c.* p. 341. Type, *V. eucleoides*, sp. n. *id. l. c.* Congo.

SATURNIIDÆ.

Maassen and Weymer have published part 3 of their "Beiträge zur Schmetterlingskunde," and figure the following known species:—*Attacus bolivari* (new name for *ethra*, Walk., *nec* Oliv.), fig. 27, *arethusa*, fig. 29, *betis*, figs. 30 & 31, *splendidus*, figs. 32 & 34, *lorquini*, figs. 46 & 47, *Actias mimosæ*, figs. 35 & 36, *isabellæ*, figs. 40 & 41, *Polythysana andromeda*, figs. 37 & 38, *cinerascens*, fig. 39, *Copaxa decrescens*, figs. 44 & 45, *Samia angulifera*, figs. 48 & 49, *Antheræa dione*, fig. 52, *suraka*, fig. 54, *Bunæa nictitans*, fig. 53, *Urota sinope*, fig. 55.

Attacus cynthia. Larva will eat *Datura stramonium*; Pet. Nouv. 1873, p. 279.

Samia cecropia. On its assembling, *cf.* C. J. S. Bethune, Canad. Ent. v. p. 139.

Antheræa queinzi, Stand., = *dione*, F.; *A. wahlbergi* is possibly distinct. Maassen, S. E. Z. xxxiv. p. 111.

Hyperchiria io is described and figured in all stages. Riley, Rep. Ins. Mo. v. pp. 133–136. On its eggs: *id.* Canad. Ent. v. p. 109.

Bombyx balamoal, Guér., and *Heniocha palæacea*, H. S., = *Aphelia apollinaris*, Boisd.; Gerstäcker, V. d. Decken's Reisen, iii. pt. 2, p. 379.

Hemileuca maia described and figured in all stages by Riley, Rep. Ins. Mo. v. pp. 127–133.

Syntherata, g. n. (uncharacterized), Maassen & Weymer, Beitr. z. Schmett. pt. 3; type, *S. weymeri*, sp. n., *id. l. c.* figs. 42 & 43, Australia.

Attacus speculum, Brazil, *belus*, S. America (? = *splendidus*, var.), Maassen & Weymer, *l. c.* figs. 28 & 33, spp. nn.

Samia securifera, sp. n. (? = *angulifera*, forma merid.), *id. l. c.* figs. 50 & 51, S. America.

Antheræa rhodophila, p. 343, *intermiscens*, p. 344, pl. vi. fig. 6, Congo, Walker, Tr. N. H. Soc. Glasg., spp. nn.

Tropæa madagascariensis, E. Bartlett, P. Z. S. 1873, p. 336, Madagascar (? = *T. cometes*).

BOMBYCIDÆ.

Bombyx quercifolia, var. *ulmifolia*, and var. gen. ii. *hægii*: *L. populi-folia*, var. gen. ii. *obscura*; W. Henäcker, S. E. Z. xxxiv. p. 244.

Lasiocampa quercifolia and *betulifolia*: a supposed hybrid described by Huguenin, MT. schw. ent. Ges. iv. pp. 30 & 31.

Lasiocampa otus. On its occurrence in Italy and Sicily; J. P. Marott & A. Kalchberg, Pet. Nouv. 1873, pp. 323, 324, & 341.

Bombyx callunæ, var.; G. T. Porritt, Ent. vi. p. 457.

Bombyx quercus and *Saturnia pernii*. On the larvæ drinking ; Lebéc & Deyrolle, Pet. Nouv. 1873, p. 325.

Bombyx rubi. On Botrytis, &c., in the larva ; Fallou, Girard, & Cornu, Bull. Soc. Ent. Fr. (5) iii. pp. cxxx. & cxxxii.

Bombyx processionea in Kent [?] ; T. Batchelor, Ent. vi. p. 487.

Bombyx castrensis, var. or sp. n. from N. Persia ; H. Christoph, Hor. Ent. Ross. x. p. 36.

Dryocampa (Anisota) rubicunda, Fab., described and figured in all stages by Riley, Rep. Ins. Mo. v. pp. 137-141.

Palustris, g. n., Bar, Ann. Soc. Ent. Fr. (5) iii. p. 300 ; type, *P. laboulbeni*, id. l. c. p. 301, pl. viii. No. 2, figs. 1-8. Allied to *Bombyx*, but aquatic habits of larva very interesting. Habits described by Bar, and anatomy by Laboulbène, l. c. pp. 297-306 ; cf. also Goossens, l. c. Bull. pp. xii. & xiii., and Guénée, *op. cit.* Ann. pp. 542-544 (apparently discrediting the accuracy of the statements made by Bar).

Brahmæa japonica, A. G. Butler, Ent. M. M. x. p. 56, Japan ; *B. ledereri*, Rogenhofer, Verh. z.-b. Wien, xxiii. p. 574, Cilicia (its transformations prove the genus to belong to the *Bombycidae*) : spp. nn.

Bombyx intermedia (probably sp. n., allied to *B. dorycnii*), Millière, Cat. p. 57, note, Nice, Lyon.

Pæcilocampa sublineata, sp. n., Walker, Tr. N. H. Soc. Glasg. i. p. 342, Congo.

Sericiculture.

Guerin-Ménéville publishes a review of the state of Sericiculture in 1873, and remarks on the gradual decline of silkworm disease ; pébrine is now being succeeded by diarrhœa (flaquerie) : C. R. lxxvi. pp. 1609-1612. On the latter complaint, cf. Girard, Bull. Soc. Ent. Fr. (5) iii. pp. cxliii. cxliv. cxlix. & clxxiii. It is much affected by the weather ; J. Raulin, C. R. lxxvi. pp. 471-473.

Pasteur, *op. cit.* pp. 461-463, reviews Cornalia's report on Sericiculture in Italy in 1872, and considers it to prove the success of his method.

Guérin-Ménéville disputes the value of Pasteur's method of contending with the silkworm disease, and is replied to by Guisquet ; *op. cit.* pp. 455-457, 783-785. He also quotes Duseigneur Kleber's " Monographie du cocon de soie," a recently published work not seen by the Recorder.

On a new method of reeling cocoons from which the moths have emerged ; Bull. Soc. Ent. Fr. (5) iii. pp. xxii.-xxv. ; Pet. Nouv. 1873, pp. 284 & 285.

On the specimens of silk and cocoons in the Indian Department of the Vienna Exhibition of 1873 ; J. Forbes Watson, Class and Descriptive Catalogue of the Ind. Dept. pp. 77-79.

Bombyx mori successfully reared at St. Petersburg ; W. Iversen, C. R. lxxvii. p. 900.

On its fecundation and parthenogenesis ; E. Cornalia & C. v. Siebold, Bull. Ent. Ital. v. pp. 58, 271-273.

Antheraea yama-mai. On rearing in France ; Pet. Nouv. 1873, p. 298. On disease in its larvæ ; C. Bureau, *op. cit.* p. 312. On its too early hatching in France ; Girard, Bull. Soc. Ent. Fr. (5) iii. pp. cc. & cci. On

successfully rearing it in the Baltic Provinces of Russia ; F. W. C. Berg, Bull. Mosc. 1873, i. pp. 96-114.

ZEUZERIDÆ.

Cossus sometimes forms its cocoon underground. H. F. Wilson & E. Newman, Ent. vi. p. 487.

HEPIALIDÆ.

Hepialus humuli, var. ; G. J. L. Eastham, Ent. vi. p. 427.

Porina mairi, sp. n., W. L. Buller, Tr. N. Z. Inst. v. p. 279, plate, New Zealand.

NOCTUIDÆ.

J. Wullschlegel has commenced a catalogue of the *Noctuæ* of Switzerland, to contain about 414 species, 25 varieties, and 23 aberrations. It is based on Staudinger's Catalogue ; and the remarks are chiefly of local interest. The portion already published extends to the genus *Calymnia*. MT. schw. ent. Ges. iv. pp. 32-96.

Grote has published a series of papers on American *Noctuidæ*, containing important notes on known species, and the descriptions of many new. Bull. Buff. Soc. i. pp. 95, 128, 129-155 (to the last paper remarks on the origin and general characters of the *Lepidoptera* are prefixed) ; Tr. Am. Ent. Soc. iv. pp. 293-310.

On the 'boll-worm' (*Anomis xyliua*) and cotton caterpillar (*Heliothis armigera*), with figures of the larvæ and perfect insects ; L. A. Dodge, Am. Nat. vii. pp. 213-216.

Ceropacha ridens, var. ; W. H. Harwood, Ent. vi. p. 387.

Diphthera orion. On breeding ; H. Miller, jun., Ent. vi. pp. 389 & 390.

Acronycta alni. Larva described by J. Chappell, Ent. M. M. ix. p. 195.

Acronycta myricæ and *euphrasiæ*. The larvæ do not differ, and *myricæ*, *euphrasiæ*, *euphorbiæ*, and *abscondita* appear to be only climatic varr. of one species. Berce & Goossens, Bull. Soc. Ent. Fr. (5) iii. pp. cxliv. & cxlv.

Acronycta tridens and *psi* ; F. Bond, P. E. Soc. 1873, p. iv.

Acronycta xylinoides. Larva described by Riley, Rep. Ins. Mo. v. pp. 126 & 127.

Leucania commoides. On its supposed occurrence in England ; Parry, Ent. vi. pp. 522 & 523.

Xylophasia polyodon, var. ; G. J. S. Eastham, Ent. vi. p. 485.

Apamea ophiogramma. On its occurrence in Ireland ; F. J. Battersby, Ent. vi. p. 517.

Miana literosa. Larva described by G. T. Porritt, Ent. M. M. x. pp. 86 & 87.

Celena haworthi. Larva described by W. Buckler, *op. cit.* pp. 195-197.

Agrotis. Millière, Ann. Soc. Lyon (2) xix., describes the transformations of *A. spinifera*, pp. 41 & 42, pl. cxii. figs. 1 & 2 (larva ; imago) ; *puta*, pp. 42 & 43, figs. 3 & 4 (larva ; imago) ; and *fatidica*, pp. 44-46, figs. 5-8 (larva, pupa, and imago).

Agrotis ashworthi. Larva described by C. S. Gregson, Ent. vi. pp. 423-425.

Agrotis depressus, Grote, is an *Amphipyra*; Grote, Bull. Buff. Soc. i. p. 143.

Agrotis. Habits of the 'cut-worm'; N. Coleman, Am. Nat. vii. p. 372.

Tæniocampa gothica and *stabilis* taken in *coitû*; R. E. Brameld, Ent. vi. p. 387.

Cosmia orina, Guén. Grote suggests its identity with *C. trapezina*, and Saunders describes the larva; Canad. Ent. v. pp. 205 & 206.

Eremobia ochroleuca flying by day; Ent. vi. p. 546.

Dianthæcia compta. On reputed British specimens; Ent. vi. p. 563.

Dianthæcia conspersa, var.; G. Norman, Ent. M. M. x. pp. 20 & 21.

Polia chi. Natural history, W. Buckler, Ent. M. M. ix. pp. 290 & 291.

Dasypolia templi. Life history; C. S. Gregson, Ent. vi. pp. 509-511.

Epunda lichenea. Larva feeds on *Silene nocturna*; Millière, Cat. p. 101.

Miselia oxyacanthæ, var. *capucina* from England, described and figured by P. Millière, Ann. Soc. Lyon (2) xix. p. 85, pl. cxvi. fig. 6.

Phlogophora empyrea. Larva noticed by Millière, who doubts whether that figured by Boisduval, Rambur, & Graslin really belongs to this species. Cat. p. 103.

Aplecta speciosa. Var. from France described and figured; P. Millière, Ann. Soc. Lyon (2) xix. p. 84, pl. cxvi. fig. 5.

Hadena turbulenta, Hübn., re-described by Grote, Bull. Buff. Soc. i. p. 180.

Chloantha ramosula, Guén., re-described and figured by Grote, *l. c.* p. 83, pl. ii. fig. 16.

Cucullia absinthii. On its occurrence in Ireland; F. J. Battersby, Ent. vi. p. 516.

Omia cymbalarie. Larva feeds on *Helianthemum*; Millière, Cat. p. 111.

Heliothis armigera, Hübn. (= *umbrosus*, Grote), is an introduced species in N. America. Grote, *l. c.* pp. 122 & 123.

Anthesia violacea, ♀, described and figured; Millière, Ann. Soc. Lyon (2) xix. pp. 58 & 59, pl. cxiii. fig. 15.

Anarta luteola, Grote & Rob., = *cordigera*; Strecker, Lepidoptera, p. 40.

Acontia albicollis is distinct from *solaris*, and the larva feeds on *Malope malacoides*; Millière, Cat. p. 115.

Erastria. Grote admits 8 N. American species. *Miana undulifera*, Walk., = *E. nigritula*, Guén.; *E. rubicunda*, Walk., is a *Callopietria*; *E. inscripta*, Walk., = *Bryophila teratophora*, H. S.; Grote, Tr. Am. Ent. Soc. iv. p. 297.

Thalpochares (Micra) paula, Hübn., new to Britain; C. G. Barrett, Ent. M. M. x. pp. 19 & 20.

Thalpochares (M.) parva. On its occurrence in Britain; Barrett & Jordan, *op. cit.* pp. 20 & 40. Larva feeds on *Inula dysenterica*; Millière, Cat. p. 118.

Thalpochares (M.) candidana. Larva feeds on *Helicryssum stachas*; id. *l. c.*

Plusia balluca. Larva described and moth figured by W. Saunders, Canad. Ent. v. pp. 10 & 11.

Hypogramma (?) *ambigua*, Gerstäcker, re-described; V. d. Decken's Reisen, iii. pt. 2, p. 382.

Catephia alchymista. On its pupa; Taschenberg, Z. ges. Nat. (2) vii. pp. 507 & 508.

Catocala. Strecker (Lepidoptera, pl. iii.) figures and re-describes *C. tristis*, Edw., p. 17, fig. 1; *viduata*, Guén., p. 17, fig. 2; *lacrymosa*, Guén., p. 18, fig. 3; *relicta*, Walk., p. 19, figs. 5 & 6; *briseis*, Walk., p. 20, fig. 7; *coccinata*, Grote, p. 21, fig. 9; *cerogama*, Guén., p. 22, fig. 10; *serena*, Edw., p. 23, fig. 11. Also (pl. v.) *C. insolabilis*, Guén., p. 33, fig. 1; *desperata*, Guén., p. 33, fig. 2; *subnata*, Grote, p. 34, fig. 3; *neogama*, Abb. & Sm. p. 35, figs. 4 & 5; *clintoni*, Gr., p. 35, fig. 6; *antenympa*, Hübn., p. 36, fig. 7; *fratercula*, Grote & Rob., p. 37, fig. 8; *unijuga*, Walk., p. 37, fig. 9; *porta*, Guén., p. 38, fig. 10; *concombens*, Walk., p. 39, fig. 12.

Catocala. Grote publishes additional notes on some N. American species, and describes 2 as new. Canad. Ent. v. pp. 160-164.

Erebus odora. Its occurrence at Montreal [doubtless imported] noticed by F. R. Caulfield; *op. cit.* p. 155.

Drasteria erichto, Guén., probably = *erichtea*, Hübn., var., of which new varieties are described under the names *ochrea*, *agricola*, and *munda*: Grote, Bull. Buff. Soc. i. pp. 154 & 155.

Phytometra anea. On egg and cocoon; J. Hellins, Ent. M. M. x. pp. 139 & 140.

Remigia latipes, Guén., probably = *repanda*, F. Gerstäcker, V. d. Decken's Reisen, iii. pt. 2, p. 383.

Aventia flexula. Life history by W. Buckler, who considers it to be a *Noctua*, allied to *Catocala*, *Toxocampa*, &c.: Ent. M. M. x. pp. 42 & 43.

New genera and species:—

Tachosa (*Bryophilide*), Walker, Tr. N. H. Soc. Glasg. i. p. 345. Types, *T. acronyctoides*, *ibid.*, and *metaphæaria*, p. 346, Congo.

Harrisimemna, Grote, Tr. Am. Ent. Soc. iv. p. 293. Allied to *Moma*; type, *Thyatira* (?) *sexguttata*, Harr., = *Grammophora trisignata*, Walk.

Tuerta (*Glottulide*), Walker, l. c. p. 346; type, *T. chrysochlora*, *id. l. c.* p. 347, pl. vi. fig. 7, Congo.

Petrinia (*Glottulide*), *id. l. c.* p. 347; type, *P. lignosa*, *id. l. c.* p. 348, Congo.

Admetovis, Grote, Bull. Buff. Soc. i. p. 133. Allied to *Brithya*; type, *A. oxymorus*, *id. l. c.* pl. iv. fig. 5, California, Colorado Territory.

Ablepharon, *id. l. c.* p. 111. Allied to *Leucania*; types, *L. henrici* and *evanida*, Grote.

Ommatostola, *id. l. c.* p. 112. Allied to *Tapinostola*; type, *O. lintneri*, *id. l. c.* New York.

Ufeus, *id. l. c.* p. 101. Allied to *Agrotis*; types, *U. satyricus*, *id. ibid.*, pl. iii. fig. 4, and *plicatus*, p. 102, Philadelphia.

Pleonectopoda, *id. l. c.* p. 136. Allied to *Ammoconia* (?); type, *P. lewisi*, *id. l. c.* p. 137, pl. iv. fig. 10, Colorado Territory.

Homohadena, id. l. c. p. 180 ; type, *Hadena badistriga*, Grote.

Eupsephopactes, id. l. c. Allied to *Hadena* ; type, *E. procinctus*, id. l. c. p. 138, pl. iv. fig. 6, California.

Anytus, id. l. c. p. 144. Allied to *Xylina* ; types, *X. sculpta*, Grote (figured, pl. iii. fig. 1), and *capax*, G. & R.

Annaphila, id. l. c. p. 149. Allied to *Omia* ; types, *A. diva*, fig. 14, and *depicta*, fig. 13, p. 150, *danistica*, p. 151, fig. 7, Nevada Territory, pl. iv.

Axenus, id. l. c. p. 152. Allied to *Omia* ; type, *A. arvalis*, id. *ibid.* pl. iv. fig. 8, California.

Ligranthæcia, Grote & Robinson, *op. cit.* p. 115. Allied to *Heliothis* ; types, *Pyralis marginatus*, Haw., and *Anthæcia thoreau*, G. & R.

Plagiomimicus, Grote, *op. cit.* p. 182. Allied to *Lygranthæcia* ; type, *P. pitychromus*, id. l. c. Alabama, Albany.

Heliolonche, id. l. c. p. 115. Allied to *Melicleptria* ; type, *H. modicella*, id. l. c. p. 116, pl. iii. fig. 12, California.

Tavila (*Acontiidae*), Walker, l. c. p. 349 ; type, *T. indeterminata*, id. l. c. p. 350, Congo.

Nedroma (*Hemiceridae*), id. l. c. p. 353 ; type, *N. ferruginea*, id. *ibid.* Congo.

Pteretholix, Grote, Tr. Am. Ent. Soc. iv. p. 298. Allied to *Anomis* ; type, *P. bullula*, id. l. c. p. 299, Central Alabama.

Adipsophanes, id. Bull. Buff. Soc. i. p. 181. Allied to *Stilbia* ; type, *A. miscellus*, id. *ibid.*, New York, Pennsylvania, Massachusetts.

Stridova (*Hypogrammidæ*), Walker, l. c. p. 353 ; type, *S. albigutta*, id. l. c. p. 354, Congo.

Spiloloma, Grote, l. c. p. 126. Allied to *Leucanitis* ; type, *S. lunilinea*, id. l. c. p. 127, West Virginia.

Tolna (*Erebidae*), Walker, l. c. p. 355. Allied to *Tavia* ; type, *T. versicolor*, id. *ibid.* pl. vii. fig. 10, Congo.

Obba (*Ophiuinae*), id. l. c. p. 362 ; type, *O. prompta*, id. *ibid.* Congo.

Spargaloma, Grote, Tr. Am. Ent. Soc. iv. p. 299. Allied to *Drasteria* ; types, *S. serpunctata*, *ibid.*, pl. i. fig. 90, Pennsylvania, and *umbrifascia* [*ta*], p. 301, Philadelphia, Texas.

Argillophora, id. Bull. Buff. Soc. i. p. 124. Allied to *Spargaloma* ; type, *A. furcilla*, id. *ibid.* Central Alabama.

Harveya, id. l. c. p. 125. Allied to *Argillophora* ; type, *H. auripennis*, id. l. c. p. 126, Florida, Kentucky.

Zirona (*Poaphilidae*), Walker, l. c. p. 363 ; type, *Z. marginata*, id. *ibid.* Congo.

Ricla (*Thermesiidae*), id. l. c. p. 365 ; type, *R. expandens*, id. *ibid.* Congo.

Raclia (*Thermesiidae*), id. l. c. p. 366 ; type, *R. cervina*, id. l. c. p. 367, Congo.

Acronycta connecta, New York, p. 79, note, *ovata*, Pennsylvania, p. 80, note, pl. ii. fig. 14, *sperata*, New York, Pennsylvania, p. 81, note, pl. ii. fig. 1, and *insolita*, Pennsylvania, p. 82, Grote, l. c.

Leucania harveyi (? = *albilinea*, Guén., nec Hübn.), p. 9, fig. 14, Buffalo, *henrici*, fig. 15, New York State, *evanida*, fig. 16, Putnam Co., New York, p. 10 : id. l. c. pl. i.

- Arzama vulnifica*, id. Tr. Am. Ent. Soc. iv. p. 294, Pennsylvania.
- Xylomiges curialis*, p. 143, and *patalis*, p. 144, pl. iv. fig. 11, California, id. Bull. Buff. Soc. i.
- Aporophylla catalaunensis*, Millière, R. Z. (3) i. p. 4, Spain.
- Mamestra farnhami*, p. 103, pl. iii. fig. 2, Colorado Territory; *chartaria*, p. 138, pl. iv. fig. 12, *canente*, p. 138, fig. 9, *niveiguttata*, p. 140, fig. 16, *M.* (? *Dianthecia*) *leucogramma* and *quadrilineata* (fig. 15), *ibid.* California. id. l. c.
- Caradrina miranda*, id. l. c. p. 11, New York State.
- Agrotis hemileuca* and *catenifera*, Walker, l. c. pp. 348 & 349, Congo; *A. engadinensis*, Millière, l. c. p. 3, Sils, *A. pitychrous*, p. 82, pl. ii. fig. 11, Long Island, New York, *auxiliaris*, Colorado, and *repentis*, Atlantic District, Colorado, p. 96, *balanitis*, pl. iii. fig. 14, and *atrifrons*, Colorado Territory, p. 97, *mimallonis* and *fumalis*, New York, p. 98, *herilis* (= *jaculifera*, Guén., varr. A & B), Atlantic District, *saxaivilis*, New York, Colorado Territory, p. 100, *vancouverensis*, p. 134, pl. iv. fig. 4, Vancouver's Island, *wilsoni*, p. 135, pl. iv. fig. 3, California; Grote, l. c.
- Ammoconia badicollis*, Grote, l. c. p. 136, pl. iv. fig. 18, Albany, New York.
- Dianthecia medidata*, id. l. c. p. 104, New York State.
- Oncocnemis dayi*, p. 105, fig. 8, *hayesi*, p. 106, fig. 13, *chandleri*, p. 107, fig. 9, pl. iii., *glennii*, p. 141, pl. iv. fig. 17; id. l. c. Colorado Territory.
- Hadena auranticolor*, id. l. c. p. 109, Colorado Territory.
- Cloantha evicta*, fig. 18, and *vomerina*, fig. 17, id. l. c. p. 84, pl. ii.
- Xylina sculpta*, id. l. c. p. 114, pl. iii. fig. 1, Philadelphia.
- Cucullia yosemitæ*, id. l. c. pp. 113 & 145, pl. iii. fig. 3, California.
- Heliothis mitis*, p. 316, fig. 7, Alabama (may be placed in the sub-genus *Melicleptria*, Hübn., the type of which is *Noct. cardui*, Esp.), *H. suetus*, fig. 10), and *persimilis*, fig. 11, p. 117, *pauxillus*, p. 118, fig. 6, *meadi*, p. 121, fig. 5, all from Colorado Territory, pl. iii., *H. (Melicleptria) celerio* and *diminutivus*, p. 148, *californicus*, p. 149, California, Grote, l. c.; *H. pruruptus*, id. Tr. Am. Ent. Soc. iv. p. 294, California.
- Agrophila truncatula*, Zeller, Verh. z.-b. Wien, xxiii. p. 203, pl. iii. fig. 1, Texas.
- Tarache terminimaculata*, Albany, and *flavipennis*, California, Sierra Nevada; Grote, Bull. Buff. Soc. i. p. 153.
- Erastria decora*, Walker, l. c. p. 350, Congo; *E. mitographa*, Alabama, *malaca*, Philadelphia, Grote, Tr. Am. Ent. Soc. iv. p. 296.
- Metaponia obtusula*, Zeller, l. c. pl. iii. fig. 2, Texas.
- Hydrelia terminata*, Walker, l. c. p. 351, Congo.
- Xanthoptera coccinifascia*, Texas, p. 294, fig. 89, *rosalba*, Pennsylvania, Massachusetts, fig. 88, *fax*, Georgia, p. 295, Grote, l. c. pl. i.
- Micra convergens* and *intricata*, Walker, l. c. pp. 351 & 352, Congo; *M. barcinonensis*, Millière, Ann. Soc. Lyon (2) xix. pp. 56 & 57, pl. cxiii. figs. 10 & 11, Barcelona.
- Thalpochares pyranni* and *fumicollis*, Rogenhofer, Verh. z.-b. Wien, xxiii. pp. 570 & 571, Cilicia.
- Eutelia quadriliturata*, Walker, l. c. p. 352, Congo.
- Marasmalus histrio*, Grote, l. c. p. 297, Texas, New York.

Plusia emichi (Haberhauer, MS.), Rogenhofer, Verh. z.-b. Wien, xxiii. p. 569, Giaur Dagh; *P. pasiphæia*, p. 146, pl. iv. fig. 1, California, *putnami*, pp. 146, 192 & 193, pl. iv. fig. 2, Albany, Grote, Bull. Buff. Soc. i.

Briarda conturbata, Walker, *l. c.* p. 354, Congo.

Catocala obscura, New York, p. 19, pl. iii. fig. 4, *faustina*, Arizona, p. 21, fig. 8, *perplexa* (= *parta*, var. ?), Brooklyn, p. 38, pl. v. fig. 11, Strecker, Lepidoptera, *C. meskii*, New York, p. 161, and *arizonæ*, Arizona and New Mexico, p. 163, Grote, Canad. Ent. v.

Ophideres divitiosa, Walker, *l. c.* p. 356, pl. vii. fig. 11, Congo.

Achæa ophismoides, p. 357, *partita*, p. 358, pl. vi. fig. 8, Congo, *id. l. c.*

Hypetra atriplaga, p. 358, *biangulata*, p. 359, *H. (?) nana*, p. 360, Congo, *id. l. c.*

Athyra albicincta, *id. l. c.* p. 360, Congo.

Ophiusa subænescens, *id. l. c.* p. 361, pl. vi. fig. 9, Congo.

Grammodes curvilinea, *id. l. c.* p. 361, Congo.

Drasteria cærulea, Grote, Bull. Buff. Soc. i. p. 155, California.

Amphigonia fumosa, Walker, *l. c.* p. 363, Congo.

Thermesia (?) sejuncta, *id. l. c.* p. 364, Congo.

Capnodes (?) trinotata, *id. l. c.* p. 365, Congo.

DELTOIDÆ.*

Grote publishes a list of the North American Deltoidous *Noctuidæ*; Tr. Am. Ent. Soc. iv. pp. 309 & 310.

Hypena and *Herminia*. Grote (Bull. Buff. Soc. i. pp. 37-40) discusses the North American species, and proposes several new genera. To *Bomolocha*, Hübn., Led., he refers *Hypena baltimoralis*, Guén., *abalienalis*, *manalis*, and *bijugalis*, Walk., and *madefactalis*, Guén. To *Zunclopnatha*, Led., he refers *Herminia lævigata*, Grote, *cruralis*, Guén., *marcidilinea*, *obscuripennis*, and *ochreipennis*, Grote.

Hypena cranidialis figured; *id.* Tr. Am. Ent. Soc. iv. pl. i. fig. 87.

Bomolocha bijugalis figured; *id. l. c.* fig. 93.

Herminia barbalis, *tarsipennis*, *derivalis*, and *cribalis*. Transformations described by Buckler & Hellins, Ent. M. M. x. pp. 100-104.

Helia, Guén., is restricted to *phæalis*, Guén. (re-described); Grote, *l. c.* p. 308.

Epizeuxis æmulalis, Hübn. ? = *Microphysa (?) mollifera*, Walk., and *E. americanalis*, Guén., = *M. (?) scriptipennis*, Walk., re-described; *id. l. c.* p. 307.

Renia, Guén., characters reviewed; *R. pastoralis*, Grote, = faded *R. belfragii*; *id. l. c.* pp. 303 & 304; *R. brevirostralis*, figs. 91 & 92, *restric-talis*, fig. 94, and *belfragii*, fig. 95, figured; *id. l. c.* pl. i.

Plat[y]hypena, g. n., *id.* Bull. Buff. Soc. i. p. 38; type, *Hyblæa scabra*, F., the ♀ of which is *Hypena erectalis*, Guén. (*cf.* also J. A. Lintner, Canad. Ent. v. p. 81).

Macr[o]hypena, Grote, *l. c.*: types, *Hypena deceptalis*, Walk., and *profecta*, Grote.

* Discussed separately by the Recorder, to avoid confusion, as the group is now classed as often with the *Noctuidæ* as with the *Pyrallidæ*.

Meg[a]hypena, g. n., *id. l. c.* p. 86. Allied to *Macrohypena*; types, *M. velifera*, pl. ii. figs. 7, and *lentiginosa*, p. 87, New York State, spp. nn.

Lomanaltes, g. n., *id. l. c.* pp. 13 & 38; type, *L. letulus*, sp. n., p. 14, pl. i. fig. 12, Philadelphia, Albany.

Eur[y]hypena, g. n., *id. l. c.*; types, *Hypena toreuta* and *sordidata*, Grote.

Orixa, g. n., Walker, Tr. N. H. Soc. Glasg. i. p. 367; (*Herminiidæ*) type, *O. filifera*, sp. n., *id. ibid.*, Congo.

Chytolita, g. n., Grote, Tr. Am. Ent. Soc. iv. p. 308, and Bull. Buff. Soc. i. p. 39; type, *Herminia morbidalis*, Guén.

Pityolita, g. n., Grote, *l. c.*; type, *Herminia pedipillalis*, Guén.

Philometra, g. n., *id. l. c.*; types, *Herminia longilabris* and *serraticornis*, Grote.

Phalænostola, g. n., *id. Tr. Am. Ent. Soc. iv.* p. 302. Allied to *Philometra*; types, *P. larentioides*, *id. l. c.* New York, Pennsylvania, and *citrina*, p. 303, Virginia, spp. nn.

Cleptomita, g. n., *id. l. c.* p. 301. Allied to *Zanclognatha*; type, *C. atrilineella*, sp. n., *id. l. c.* Texas.

Litognatha, g. n., *id. Bull. Buff. Soc. i.* p. 85; types, *L. nubilifascia*, *ibid.* pl. ii. figs. 2 & 3, Philadelphia, New York State, and *litophora*, p. 86, Philadelphia, Albany, spp. nn.,

Megachyta, g. n., *id. Tr. Am. Ent. Soc. iv.* p. 306. Allied to *Chytolita*; type, *M. lituralis*, Hübn. (re-described, *l. c.*).

Phalænophana, g. n., *id. l. c.* p. 304. Allied to *Renia*; type, *P. ruri-gena*, sp. n., *id. l. c.* p. 305, New York, Pennsylvania.

Tetanolita, g. n., *id. l. c.* p. 305. Allied to *Renia*; type, *P. lizalis*, sp. n., *id. l. c.* p. 306, Alabama, Texas.

GEOMETRIDÆ.

A. S. PACKARD publishes a Catalogue of the *Phalænidæ* of California P. Bost. Soc. xiii. pp. 381-405. [The new species were quoted in Zool. Rec. ix. from Rec. Am. Ent.; but the pagination was not there given.]

H. K. MORRISON [not without good reason] protests against the repetition of the same specific name in numerous genera of American *Geometridæ*. Canad. Ent. v. pp. 204 & 205 [*cf.* also Zool. Rec. viii. p. 378].

Chærodes (*Tetracis*, Guén.) *ægrotata* re-described; Packard, *l. c.* p. 382.

Rumia crategata, var.; J. E. Robson, Ent. vi. p. 516.

Selenia illustraria, var., bred by Doubleday; Millière, Ann. Soc. L. Lyon, (2) xix. pp. 82 & 83, pl. cxvi. fig. 3.

Ennomos angularia. Larva described; B. Lockyer, Ent. vi. pp. 406 & 407.

Amphidasys betularia: 3 varr. from England described and figured; one named *doubledayaria*: Millière, *l. c.* pp. 37 & 38, pl. cxi. figs. 1-3.

Boarmia roboraria and *Tephrosia biundularia*. Larvæ described; G. T. Porritt, Ent. vi. pp. 281 & 282, 385 & 386.

Gnophos glaucinaria, var. *plumbearia*, Staud. Transformations, &c. fully described; A. Fuchs, S. E. Z. xxxiv. pp. 107-110.

Pygmæna venatoria. Larva and imago figured and described; P. Millière, *l. c.* pp. 4-6, pl. cix. figs. 5-8.

Pseudopterpnæ cytisaria, Mill. (Ic. ii. pl. xci. fig. 10), var., = *coronillaria*, ♀; Millière, Cat. p. 161.

Iodis vernaria, var.; W. A. Forbes, Ent. vi. p. 363.

Phorodesma bajularia. Larva described; P. H. Jennings, Ent. vi. pp. 413 & 414.

Ephyra pendularia. Larva described; G. T. Porritt, Ent. M. M. x. p. 71.

Acidalia. On rearing various larvæ; A. H. Jones, Ent. M. M. ix. pp. 197 & 198.

Acidalia belemiata. Transformations; P. Millière, Ann. Soc. L. Lyon (2) xix. pp. 57 & 58, pl. cxiii. figs. 12-14 (larva and imago figured).

Acidalia incanaria. Natural history; W. Buckler, Ent. M. M. ix. pp. 246-248.

Tephрина peltaria, Mill. (Ic. i. pl. xxxix.), = *binævata*, Mab., and not *peltaria*, var., as supposed by Staudinger; Millière, Cat. p. 184.

Selidosema juturnaria. Guén., var.; Packard, l. c. p. 382.

Fidonia atomaria. Larva described; B. Lockyer, Ent. vi. pp. 407 & 408.

Fidonia conspicuata. Habits; E. F. Bisshopp, Ent. vi. p. 317.

Fidonia piniaria, hermaphrodite; J. A. Lilly, Ent. vi. p. 430.

Aspilates strigilaria, var.; G. B. Corbin, Ent. vi. p. 334.

Anisopteryx æscularia. Larva described; G. T. Porritt, Ent. M. M. ix. p. 272.

Chimatobia brumata and *boreata*; P. C. Zeller, S. E. Z. xxxiv. pp. 121-124.

Emmelesia unifasciata, Haw. (= *bifasciata*, Haw., = *scitularia*, Ramb., = *aquilaria*, H. S.). Transformations described and larva and imago figured; Millière, Ann. Soc. L. Lyon (2) xix. pp. 66-68, pl. cxiv. figs. 10-13 (fig. 13 is var. ? *euphrasiata*, Millière).

Eupithecia. Millière, l. c. pp. 12-35, 63-69, reviews this genus and describes and figures (pl. cix.) the transformations of *E. oxycedrata*, Ramb., pp. 14 & 15, figs. 1-3 (larva and imago), *pheniceata*, Ramb., pp. 15 & 16, figs. 6-9 (larva and imago), *sectiata*, Dard. & Mill., pp. 16-18, figs. 14-17, (larva and imago), *semigrapharia*, Bruand, pp. 18 & 19, figs. 10-13 (larva, pupa, and imago), *ericearia*, Ramb., pp. 20 & 21, figs. 4 & 5 (larva and imago) *expressaria*, H. S., pp. 21 & 22, figs. 18 & 19 (larva and imago), *helviticaria*, Boisd., var. *anglicata*, Mill. pp. 22-24, figs. 20-22 (larva and imago), *sobrinata*, Hübn., pp. 24 & 25, fig. 23 (larva); also (pl. cxiv.; larvæ and perfect insects figured): *E. constrictata*, Guén. (= *distinctaria*, H. S., = *libanotidata*, Schl.), pp. 63 & 64, figs. 5-7, *merinata*, Guén. (= *perfidata*, Mann.), pp. 65 & 66, figs. 8 & 9, and *alliaria*, Staud., pp. 68 & 69, figs. 14 & 15.

Eupithecia venosata. An English var. probably = *E. silenicolata*, Mab., p. 26, note; *E. ligusticata*, Donz., probably = *succenturiata* (var. *oxydata*, Tr.); *E. subfulvata* and *succenturiata* are probably distinct, p. 27; *E. quinardaria*, Boisd., = *multiflorata*, Mill., = *scopariata*, Ramb., and probably also = *tenebrosaria*, H. S., p. 28; *E. tamarisciata*, Frey, is distinct from *innotata*; *E. fraxinata*, Crewe, may not be entitled to specific rank, pp. 30 & 31; *E. globulariata*, Mill., *pauvil-*

lata, Boisd., and probably *parvularia*, H. S., = *pumiliata*. varr., p. 35, Millière, l. c.

Eupithecia expallidata bred from golden-rod, and *succenturiata* from wild chamomile; J. B. Hodgkinson, Ent. M. M. x. p. 118.

Eupithecia pusillata, var. *laricis*, and *E. lariciata*. Transformations, &c., described by A. Speyer, S. E. Z. xxxiv. pp. 361-365. The former ? = *E. tantillaria*, Boisdual & Guénéé.

Cidaria albulata, var., from N. Persia; H. Christoph, Hor. Ent. Ross. x. p. 40.

Cidaria immanata, Haw. Millière figures 3 varr.; l. c. p. 40, pl. cxi. figs. 7-9 (the last named *pythonissata*).

Eubolia lineolata and *mensuraria*. Larvæ described; G. T. Porritt, Ent. M. M. ix. p. 197; Ent. vi. p. 362.

Anaitis plagiata. Large and small forms; T. H. Briggs, P. E. Soc. 1873, pp. iv. & v.

New genera and species:—

Hesperumia, Packard, Rep. Peab. Ac. v. p. 79 (uncharacterized); type, *H. sulphuraria*, id. *ibid.* Maine.

Eriplatymetra, Grote, Canad. Ent. v. p. 145. To include *Eugonia coloradaria* and the European *E. angularia*.

Eunemoria, Packard, l. c. p. 76. Allied to *Rhacheospila*: type, *E. gracilaria*, id. l. c. p. 77, Massachusetts.

Traina (Palyidæ), Walker, Tr. N. H. Soc. Glasg. i. p. 372; type, *T. stramineata*, id. *ibid.* pl. vii. fig. 12, Congo.

Timana (Palyidæ), id. l. c. p. 373; type, *T. costalis*, id. *ibid.* fig. 13, Congo.

Euephyra, Packard, l. c. p. 73. Allied to *Ephyra*; type, *E. serrulata*, id. *ibid.*, Texas.

Goniacidalia, id. l. c. p. 68. Allied to *Acidalia*; type, *G. fusciferata*, id. *ibid.*, Texas.

Euacidalia, id. l. c. p. 69; type, *E. sericearia*, id. *ibid.*, Texas.

Chionoptyx, Snellen, Tijdschr. Ent. (2) viii. pp. 72-74, pl. iv. figs. 1-4. Intermediate between *Acidalia* and *Macrosoma*; type, *C. alucitaria*, id. *ibid.*, Prince's Island, Gulf of Guinea.

Nebessa (Acidaliidæ), Walker, l. c. p. 375; type, *N. chalybeata*, id. l. c. p. 376, Congo.

Eumacaria, Packard, l. c. p. 67. Allied to *Macaria*; type, *E. brunneata*, id. *ibid.*, Maine, Massachusetts, Texas.

Mellella, Grote, Bull. Buff. Soc. i. p. 12. Allied to *Fidonia*; type, *M. chamæchrysarica*, p. 13, pl. i. fig. 1, Atlantic States.

Tomopteryx, Philippi, S. E. Z. xxxiv. p. 313. ? Allied to *Lobophora*; types, *T. amæna*, p. 313, pl. ii. fig. 5a, *læta*, p. 314, fig. 6a, *virescens*, p. 315, pl. iii. fig. 7, Valdivia.

Heterochocha sulphuraria, Packard, l. c. p. 79, New York, Middle States.

Caberodes carnaria, Michigan, p. 80; *cervinaria*, Texas, p. 81, id. l. c.

Nychiodes phasidaria, Rogenhofer, Verh. z.-b. Wien, xxiii. p. 572, Caucasus.

Cleora pellucidaria. Packard, l. c. p. 78, Maine, Albany.

- Tephrosia diffusa*, Walker, *l. c.* p. 374, Congo.
Boarmia abruptaria, id. *ibid.*, Congo.
Gnophos corneliata (? = *variegata*, var.), Millière, Cat. p. 156, Alpes Maritimes.
Mniophila fmgalata, id. *l. c.* p. 159, Alpes Maritimes.
Geometra congrua, Walker, *l. c.* p. 371, Congo.
Rhacheospila rubrifrontaria, Packard, *l. c.* p. 76, Massachusetts.
Synchlora albilineata, Maine, Massachusetts, *rubrifrontaria*, New York, p. 75, *excurvaria*, Texas, p. 76, *id. l. c.*
Aplodes approximaria, p. 73, Albany, ? *rubrilinearia*, Philadelphia, and *latiaria*, Albany, p. 74, *id. l. c.*
Eupistheria sulphurea, p. 77, Massachusetts, *ferruginaria*, p. 78, Maine, *id. l. c.*
Acidalia eugeniata, Dardouin & Millière, Ann. Soc. L. Lyon (2) xix. pp. 38 & 39, pl. cxi. figs. 4-6, Marseilles; *A. helianthemata*, Millière, *l. c.* pp. 54-56, pl. cxiii. figs. 6-9 (larva and imago figured), Cannes; *A. vesubiata*, id. R. Z. (3) i. p. 6, Lantosque; *A. latifera*, Walker, *l. c.* p. 375, Congo; *A. peralbata* and *punctifimbriata*, p. 70, *longipennata* and *perirrorata*, p. 71, Texas, *candidaria* [1], p. 72, Georgia, Packard, *l. c.*
Micronia tenella, Walker, *l. c.* p. 377, Congo.
Corycia biseriata, Packard, *l. c.* p. 68, locality unknown.
Macaria 8-signata, p. 63, *punctilineata* and *pallidata*, p. 64, Texas, *multilineata*, Massachusetts, *duplicata*, Maine, Massachusetts, Illinois, Alabama, p. 65, *minorata*, p. 66, Massachusetts, *id. l. c.*
Phasiane mellistrigata, Grote, Bull. Buff. Soc. i. p. 12, pl. i. fig. 11, Buffalo.
Scodiona cephalotes, Walker, *l. c.* p. 376, pl. vii. fig. 14, Congo.
Aspilates parvaria, Texas, *quadrifasciaria*, Kansas, Packard, *l. c.* p. 62.
Abraxas lassulata, Rogenhofer, Verh. z.-b. Wien, xxiii. p. 571, Cilicia.
Pachyrenemia psi, Packard, *l. c.* p. 61, Massachusetts.
Eupithecia lantoscata, Millière, Cat. p. 201, Valley of Lantosque; *E. magnata*, id. R. Z. (3) i. p. 2, Celerina; *E. vernata*, p. 57, Massachusetts, Maine, N. York, *geminata*, Maine, Massachusetts, *palpata*, New York State, Brunswick, p. 58, *interruptifasciata*, p. 59, Eastern States, *stratonata*, p. 60, Massachusetts, Packard, *l. c.*
Lobophora viridata, Packard, *l. c.* p. 56, Brunswick, Maine.
Melanippe gentianata, Millière, R. Z. (3) i. p. 1, Engadine.
Scotosia albisignata, Packard, *l. c.* p. 61, Southern States.
Cidaria lascinata, Zeller, Verh. z.-b. Wien, xxiii. p. 205, Texas, Massachusetts; *C. disjunctaria*, p. 53, *triangulata*, p. 54, White Mountains, *albilineata*, White Mountains and Maine, *montanata*, Mount Washington, p. 55, *C. (Thera) contractata*, p. 56, Maine, Packard, *l. c.*
Carsia alpinata and *boreata*, Packard, *l. c.* p. 52, Mount Washington.
Erateina latipennis, *cometaris*, and *discalis*, Butler, Ann. N. H. (4) xii. p. 229, Huasampilla, Peru.

PYRALIDÆ.

- Aglossa pingualis*, var. n. *aldidalis* from North Persia described by H. Christoph, Hor. Ent. Ross. x. p. 41.

Acentropus. C. Ritsema publishes a summary of the literature of this genus, Tijdschr. Ent. (2) viii. pp. 16-25.

Acentropus niveus. On its habits; G. B. Corbin, Scot. Nat. ii. pp. 119 & 120.

Acentropus niveus and *latipennis*, noticed and figured; Millière, Ann. Soc. L. Lyon (2) xix. pp. 80 & 81, pl. cxv. figs. 20 & 21.

Botys multilinealis, Guén., noticed from Yap, and larva and pupa figured; G. Semper, J. Mus. Godeffr. ii. p. 64, pl. viii. figs. 13 & 14.

Botys terrealis and *Aphomia sociella*. American specimens compared with European; Zeller, Verh. z.-b. Wien, xxiii. pp. 210-212.

Scopula certzenialis, H. S., probably = *S. pallidalis*, var.; Millière, Cat. p. 246.

Cledeobia angustalis. Transformations described, and larva and imago figured; *id.* Ann. Soc. Lyon (2) xix. pp. 1-4, pl. cix. figs. 1-4.

Nymphula impunctalis, Dup., perhaps = *interpunctalis*, Hübn.; *id.* Cat. p. 243.

Hellula undalis, F. Larva described; *id.* l. c. p. 244, note.

Eudorea lineotalis. Larva described; C. S. Gregson, Ent. vi. pp. 408 & 409.

Scoparia coarctalis, Zell., described and figured in all stages; Millière, Ann. Soc. L. Lyon (2) xix. pp. 8-11, pl. cix. figs. 12-17 (var. n. n[e]apolitalis, p. 10, fig. 17).

Myelois legatella. Transformations figured and described: *id.* l. c. pp. 72-74, pl. cxv. figs. 6-9. *M.* (?) *transversella*, Dup.: transformations; *id.* l. c. pp. 74-76, pl. cxv. figs. 10 & 11 (larva and imago figured). Var. ? *bituminella*, from Cannes; Peyerimhoff & Millière, l. c. p. 75, note.

Phycis (?) *davisellus*. Larva described; W. Buckler, Ent. M. M. x. pp. 89 & 90.

Pempelia gallicola, Staud. Transformations described; Millière, l. c. pp. 76 & 77, pl. cxv. figs. 12-14 (larva and imago figured).

Ancylosis cinnamomella, Dup. (= *dilatella*, Tr.). Transformations described and figured; Millière, l. c. pp. 78 & 79, pl. cxv. figs. 15-19.

Crambus pinetellus. Natural History; W. Buckler, Ent. M. M. x. pp. 162 & 163.

New genera and species:—

Pseudasopia, Grote, Bull. Buff. Soc. i. p. 172. Between *Asopia* and *Endotricha*; type, *P. squamulalis*, *id.* *ibid.*, New York.

Cordylolomia, *id.* l. c. p. 176, pl. v. figs. 4 & 5 (neurulation). Allied to *Duponchelia*; type, *C. participialis*, *id.* l. c. p. 177, Pennsylvania.

Argyrophyes, *id.* l. c. p. 175, pl. v. figs. 1-3 (neurulation). Intermediate between the *Pyrales* and *Geometra* (? near *Homophysa*); type, *A. cilioides*, *id.* *ibid.*, New Jersey.

Vatica, Walker, Tr. N. H. Soc. Glasg. i. p. 389. Allied to *Botys*; type, *V. rutilabis*, *id.* *ibid.*, Congo.

Xasca (*Botididæ*), *id.* l. c. p. 370; type, *X. trigonalis*, *id.* *ibid.*, Congo.

Opula (*Botididæ*), *id.* l. c. p. 371; type, *O. impletalis*, *id.* *ibid.*, Congo.

Cordylopeza, Zeller, Verh. z.-b. Wien, xxiii. p. 306. Allied to *Amblycera*, Led.; type, *C. nigrinodis*, *id.* *ibid.*, pl. iii. figs. 3 a-e, Massachusetts.

- Deuterollyta borealis*, Grote, l. c. p. 177, Massachusetts.
Pyralis pulchellalis, Millière, Cat. p. 221, Berthemont; *P. (?) crassalis*, Walker, l. c. p. 368, Congo.
Hypotia tamaricalis, Mann, Verh. z.-b. Wien, xxiii. p. 124, Tuscany.
Samea figuralis, Walker, l. c. p. 368, Congo.
Botys interficalis, id. l. c. p. 370, Congo; *B. ribicalis*, p. 208, fig. 4, *sesquialteralis* and *nasonialis*, p. 209, fig. 5 & 6, Zeller, l. c. pl. iii. Texas; *B. fractilinealis* and *tesserulalis*, H. Christoph, Hor. Ent. Ross. x. pp. 42 & 44, North Persia; *B. badipennis*, p. 88, pl. ii. fig. 12, Maine, New Hampshire, *gentilis* (= *thesealis*, Zell., nec Led.), *magistralis*, Massachusetts, and *subdentalis*, locality unknown, p. 173, Grote, l. c.
Eurycreon cortalis, Grote, l. c. p. 89, pl. ii. fig. 13, Albany, Massachusetts, Alabama.
Orobena octonalis, Zeller, l. c. p. 211, pl. iii. fig. 7, Texas.
Scoparia gallica, Peyerimhoff, Pet. Nouv. 1873, p. 332, France.
Melissoblyptes furellus, Albany, New York, *latro*, Adelaide, New Holland, Zeller, l. c. pp. 212 & 213.
Ephestia roxburghi, Gregson, Ent. vi. p. 318, Britain (precise locality not stated); *E. egeriella*, Millière, Pet. Nouv. 1873, p. 310, Cannes.
Rhodophaea romanella, Millière, Ann. Soc. L. Lyon (2) xix. pp. 70 & 72, pl. cxv. fig. 115 (larva and imago), Rome.
Myelois bituminella and *astericella*, id., R. Z. (3) i. pp. 8 & 9, Valley of Cannel.
Nephoptyryx saturniella, id. l. c. p. 7, Cannes.
Eucarphia effertella, Mann, l. c. p. 130, Palermo.
Subrita luctuosa, Walker, l. c. p. 377, Congo.

TORTRICIDÆ.

C. G. BARRETT has continued his "Notes on British Tortrices," Ent. M. M. ix. pp. 212-215 (*Tortrix* and *Lozotania*), pp. 266 & 267 (*Ditula*, *Ptycholoma*, *Spilonota*, *Lithographa*, and *Phleodes*), op. cit. x. pp. 2-9 (*Pædisca* and *Catoptria*, synonymy discussed at length), pp. 34-38 (*Halonota*), pp. 65-67 (*Coccyx* to *Steganoptycha*), pp. 95 & 96 (*Anchylopera*), pp. 97-100 (*Bactra* to *Peronea*), pp. 143-149 (*Peronea* to *Stigmonota*).

Remarks on various Scottish *Tortrices*, and on continental species which may be expected to occur in Scotland, with instructions for collecting: id. Scot. Nat. ii. pp. 58-61.

C. S. Gregson, Ent. M. M. ix. pp. 176-178, remarks on *Amphysa gerningana* (larva described), *A. prodromana*, *Hypermercia augustana* (variation), *Antithesia prælongana*, Guén. (= *sororculana*, Zett.), *A. cynosbatella*, *dimidiana*, and *marginana*, *Sideria achatana* and *Dichelia grotiana*.

Penthina pyrolana and *roseimaculana*, H. S. Transformations, &c.; Zeller, S. E. Z. xxxiv. pp. 127-129.

Tortrix cerasana, Hübn., = *ribeana*, Hübn., var.; Barrett, Ent. M. M. ix. p. 213.

T. pilleriana. On its destructiveness to the vine in the Department of Herault in 1872; Lichtenstein, Bull. Soc. Ent. Fr. (5) iii. p. xiv.

Lozotania piceana, L., re-described; Barrett, l. c. ix. p. 215.

Spilonota roborana, Tr., is perhaps not *cynobana*, F.; *S. rosicolana* is distinct from *suffusana*; Barrett, *l. c.* ix. p. 266.

Lithographia cinerana, Haw., = *nisella*, Cl., var.; *id. l. c.* p. 267.

Catoptria scopoliana, Wilk., = *cana*, Haw.; *C. howenwarthiana*, Wilk. (*nec* Tr.), = *scopoliana*, Haw.; *C. aspidiscana*, Haw., and *conterminana*, H. S., are re-described; *Grapholitha modestana*, H. S., is a *Catoptria*: *id. l. c.* x. pp. 4-9.

Halonota scutulana, Wilk. (*nec* Tr.), = *pfugiana*, Haw. (? Fab.); the true *scutulana* is not British: *id. l. c.* x. pp. 35-37.

Halonota grandævana, Zell., new to Britain, has occurred at South Shields, and is re-described; *id. l. c.* ix. p. 272.

Dicrorhampha herbosana, Barrett, recorded as new to Scotland; J. Dunsmore, Scot. Nat. ii. p. 63.

Hedya lariciana, Zell., re-described; Barrett, *l. c.* x. p. 66.

Anchylopera subarcuana, Wilk. (*nec* Dougl.), is a good species, and = *inornatana*, H. S.; *id. l. c.* pp. 95 & 96.

Peronea proteana, H. S. (re-described), and *potentillana*, Cooke, = *comariana*, Zell., varr.; *id. l. c.* pp. 99 & 100.

Paramesia caledoniana, Steph., is a good species; *P. selasana*, H. S., = *ferrugana*, var.; *id. l. c.*, p. 143.

Teras ferrugana, *selasana*, and *quercinana*, compared; Pet. Nouv. 1873, p. 346.

Semasia obscurana, Wilk. (*nec* Steph.), = *gallicolana*, Zell.; *S. obscurana*, Steph., also noticed; Barrett, *l. c.* pp. 144 & 145.

Ephippiphora vernana, Knaggs, perhaps = *argyrana*, var.; *id. l. c.* p. 146.

Stigmonota weirana, Dougl., perhaps = *nitidana*, var.; *S. orobana*, Tr., re-described; *id. l. c.* pp. 146 & 147.

Endopisa nigricana. On breeding; J. B. Fletcher, Ent. M. M. ix. p. 198.

Grapholitha. On an uncertain Dutch species, perhaps *obscurifasciana*, Hein.; Graaf & Snellen, Tijdschr. Ent. (2) viii. p. 28.

Grapholitha (Tmetocera) ocellana, and var. (?) *lariciana*. Larva, &c.; Zeller, S. E. Z. xxxiv. pp. 129 & 130.

Grapholitha (Pædisca) roborana and *incarnatana* compared; *id. l. c.* pp. 130-132.

Grapholitha mercuriana, Hübn. Transformations described; F. Epelsheim, S. E. Z. xxxiv. p. 92.

Grapholitha nisana. Larva described; C. S. Gregson, Ent. vi. p. 410.

Sciaphila penziana and *Euchromia purpurana*. Larvæ described; *id. l. c.* pp. 360 & 410.

Conchylis smeathmanniana and *dipolitella*. Larva described; P. C. Zeller, *l. c.* pp. 124-127.

Phæcasiophora, g. n., Grote, Bull. Buff. Soc. i. p. 90; type, *mutabilana*, Clem. (figured, pl. ii. figs. 4-6, with details); also *P. (?) niveiguttana*, sp. n., Grote, *l. c.* p. 91, pl. ii. fig. 15, Pennsylvania.

Penthina blakeana (Robinson, MS.), p. 91, Pennsylvania, *matutina*, p. 92, Texas, *toreuta*, p. 92, Pennsylvania, *id. l. c.* pl. ii. figs. 8-10, spp. nn.

Tortrix lintneriana, *id.* Tr. Am. Ent. Soc. iv. p. 424, New York, T.

georgiana, Philadelphia, and *houstonana*, Texas, *id.* Bull. Buff. Soc. i. p. 15, pl. i. figs. 4 & 5, spp. nn.

Teras mucidana, sp. n., Peyerimhoff, Pet. Nouv. 1873, p. 346, Alsace.

Grapholitha fessana, Mann, Verh. z.-b. Wien, xxiii. p. 573, Cilicia; *G. distema*, Grote, Bull. Buff. Soc. i. p. 92, New York, Pennsylvania: spp. nn.

Conchylis straminoides, sp. n., Grote, *l. c.* p. 16, locality unknown.

TINEIDÆ.

H. T. STANTON has published vol. xiii. of the "Natural History of the Tineina" (London: 1873, 8vo, pp. viii. & 377, 8 col. plates), containing notices of 24 species belonging to 12 genera, in their various stages.

V. T. Chambers, Canad. Ent. v., has continued his papers on North American *Tineina*, describing many new genera and species.

Zeller (Verh. z.-b. Wien, xxiii.) notices the following North American known genera and species, many of which he re-characterizes:—*Anaphora*, Clem., pp. 214 & 215; *Xylesthia*, Clem., pp. 217 & 218; *Amydria effrenatella*, Clem., pp. 219 & 220 (*Amydria* is a good genus); *Tinea* (*Blabophanes*) *dorsistrigella* and *rusticella*, Zell., p. 220; *Tinea nigralbella*, Zell.; *spretella*, W. V.; *misella*, Zell., and *biselliella*, Humm., pp. 221–223; *Hyponomeuta multipunctella*, Clem., p. 228; *Æta punctella*, Cram. (= *pustulella*, F., = *Paciloptera compta*, Clem., and *Æta compta*, auctt.; Walker's genus *Atteva* has priority over *Æta*), *ibid.*; *Plutella cruciferarum*, Zell., p. 223; *Depressaria atridorsella*, Clem., p. 233; *D. heracliana*, Deg., p. 235; *Machinia* and *Psilocorsis*, Clem., = *Cryptolechia*, p. 239; *Cryptolechia tentoriferella*, Clem., p. 238; *quercicella*, Clem., p. 240; *C. schlageri*, Zell., p. 246; *Gelechia* (*Teleia*) *sequax*, Haw., p. 265; *G. (Ergatis) roseisuffusella*, Clem., p. 272, pl. iv. p. 24; *G. (Anacamptis) agrimoniella*, Clem., p. 275; *G. (Trichotaphe) flavicostella*, Clem., and *ochripalpella*, Zell., p. 279; *alacella*, Clem. (? = *Acanthophila alacella*) is re-named *ochripalpella*; *Hypsolophus pauciguttellus*, Clem., p. 283 (*H. flaviguttellus*, Clem., and *Chatochilus malifoliellus* and *contubernatellus*, Fitch, are probably varr. of *C. pometellus*, Fitch); *H. punctidiscellus*, Clem., p. 285; *unicipunctellus*, Clem., p. 286; *Dasycera newmanella*, Clem., p. 289; *D. borkhauseni*, Zell., p. 290; *Butalis fuscicomella*, Clem., is not *eboracensis*, Zell., pp. 292 & 294; *Argyresthia andereggiella*, F. R., p. 304, and *abdominalis*, Zell., p. 306; *Gracilaria falconipennella*, Hübn., p. 307; *G. desmodifoliella*, Clem., p. 308, pl. iv. fig. 40; *Coleophora fabriciella*, Vill. (= *coruscipennella*, Clem.), p. 311; and *Phyllocnistis vitigenella*, Clem., p. 314.

Solenobia walshella (?), Clem. Larva described; Chambers, Canad. Ent. v. pp. 74 & 75.

Ochsenheimeria birdella described and figured in all stages; Stainton, Nat. Hist. Tin. xiii. pp. 14–27, pl. i. fig. 1.

Tinea arenatella, Staint. (= *picarella*, H.). Transformations described; Zeller, S. E. Z. xxxiv. pp. 132 & 133.

Tinea lapella, H. (= *ganomella*, Tr.) ; Zeller, *l. c.* pp. 133–135.

Phylloporia bistrigella described and figured in all stages; Stainton, *l. c.* pp. 32-41, pl. i. fig. 2.

Myrmecozela ochraceella described and figured in all stages; *id. l. c.* pp. 44-53, pl. i. fig. 3 (*M. danubiella*, Mann, scarcely belongs to this genus).

Incurvaria musculella, pp. 62-73, fig. 1, *pectinea*, pp. 74-83, fig. 2, and *kærneriella*, pp. 84-93, fig. 3; described and figured in all stages, *id. l. c.* pl. ii.

Adela fibulella, pp. 160-171, fig. 1, *rufimitrella*, pp. 172-181, fig. 2, *violella*, pp. 182-191, fig. 3, described and figured in all stages; *id. l. c.* pl. iv.

Nemotois scabiosellus, pp. 200-213, fig. 1, *fasciellus*, pp. 214-227, fig. 2, and *minimellus*, pp. 228-238, fig. 3, described and figured in all stages; *id. l. c.* pl. v.

Micropteryx subpurpurella, pp. 108-117, fig. 1, *unimaculella*, pp. 118-129, fig. 2, and *salopiella*, pp. 130-139, fig. 3; described and figured; *id. l. c.* pl. iii. *M. aruncella* and *seppella* are hardly distinct.

Hyponomeuta. On the habits and synonymy of various species, *cf.* Laboulbène, Ragonot, &c., Bull. Soc. Ent. Fr. (5) iii. pp. cxii. & cxiii., cxxiii. & cxxiv.; also E. Perris, Pet. Nouv. 1873, pp. 331 & 332.

Hyponomeuta mahalebella; H. Delemain, Bull. Soc. Ent. Fr. (5) iii. pp. cxxviii. & cxxix.

Hyponomeuta malinella. On its habits, and the best means of destroying it; Guénée, Bull. Soc. Dunoise. On its parasites; Ragonot, *l. c.* pp. cxlv. & cxlvi.

Hyponomeuta orbimaculella, Chambers, probably = *evonymella* of European authors; Chambers, Canad. Ent. v. p. 12.

Eidophasia messingiella. Habits of larva; Stainton, *l. c.* p. 163.

Plutella annulatella. Larva described; C. S. Gregson, Ent. vi. p. 360.

Cerostoma. H. Christoph refers his *Anursia seniculella* to this genus, and describes the ♀; Hor. Ent. Ross. x. p. 51.

Enicostoma lobella figured and described in all stages; Stainton, *l. c.* pp. 310-319, pl. vii. fig. 2.

Phibalocera quercana figured and described in all stages; *id. l. c.* pp. 296-307, pl. vii. fig. 1.

Psecadia funerella, pp. 252-267, fig. 1. *bipunctella*, pp. 268-279, fig. 2, *decemguttella*, pp. 280-291, fig. 3, described and figured in all stages; *id. l. c.* pl. vi. *P. luctuosella* is a form of *funerella*; *P. lardutella* hardly belongs to this genus, *id. l. c.* p. 242.

Exeretia allisella figured and described in all stages; *id. l. c.* pp. 322-331, pl. vii. fig. 3.

Depressaria ontariella, Bethune, = *heracliana*, auctt.; Zeller & Lintner, Canad. Ent. v. p. 82.

Depressaria rotundella, *douglasella*, *yeatiana*, and *capreolella*. Larvæ described; C. S. Gregson, Ent. vi. pp. 426, 453, 454, 482, 566.

Depressaria senecionis, Staud. (= ? *saracenella*, Rössl.). Transformations described; Eppelsheim, S. E. Z. xxxiv. pp. 92 & 93.

Adrastia quercifoliella, Chambers, ? = *Psoricoptera gibbosella*, Staint.; Chambers, *l. c.* pp. 72, 174, 175.

Gelechia morosa. The larva feeds on *Lysimachia vulgaris*, not on *Lythrum salicaria*. Stainton, Ent. M. M. x. p. 44.

Gelechia similiella, Chambers, is re-named by him *laniella*, "because *similiella* is a bad name for anything, and he has discovered the larva" (!) which he describes, *l. c.* p. 125.

Venilia, Chambers [*nec* Duponchel], is re-named by him *Eido*; *l. c.* p. 72.

Hypsolophus ustulellus, pp. 344-353, fig. 1, *fasciellus*, pp. 354-363, fig. 2, and *limosellus*, pp. 364-373, fig. 3, described and figured in all stages; Stainton, Nat. Hist. Tin. xiii. pl. viii.

Æcophora angustella and *luctuosella*. Ragonot points out their distinctive characters; Bull. Soc. Ent. Fr. (5) iii. pp. lxxxiv. & lxxxv.

Æcophora pseudospretella. Larva described; C. S. Gregson, Ent. vi. pp. 511 & 512.

Gracilaria superbifrontella, Clem., re-described; Frey, S. E. Z. xxxiv. p. 202.

Gracilaria eupatoriella, Chambers (? = *venustella*, Clem.), re-described in full by Chambers, *l. c.* pp. 44-47, with notices of the habits of the larvæ of other species.

Coriscium cuculipennellum, Hübn. Transformations described; Ragonot, *l. c.* pp. clxvi.-clxviii.

Coleophora. Notes on 44 species found near Paris; *id. l. c.* pp. cix.-cxi.

Batrachedra præangusta. Pupa noticed by R. McLachlan; further notes by Healy & Sang; Ent. M. M. x. pp. 90, 118, 140.

Tischeria zellerella, *quercitella*, and *malifoliella*, Clem., re-described; Frey, S. E. Z. xxxiv. pp. 220-222.

Lithocolletis alniella, Z. (?), p. 210, *argentinetella*, Clem. (= *ulmella*, Chamb.), *trifasciella*, Haw., p. 215, *ornatella*, Chamb., p. 217; *id. l. c.*

Cemiosoma albella. On this and the allied species, *cf.* Chambers, Am. Nat. vii. pp. 47-49.

Nepticula platanella, Clem.; Chambers, Canad. Ent. v. p. 125.

New genera and species :—

Dicte, Chambers, *l. c.* p. 73. Allied to *Tinea*; type, *D. corruscifasciella*, *id. l. c.* p. 74, Kentucky.

Pityis [Beck, *mollusca*, 1837], *id. l. c.* p. 110. Allied to *Tinea*; to contain *P. auricristatella*, p. 110, *fuscicristatella*, *fasciella*, and *miscicristatella*, p. 111, *id. l. c.* Kentucky.

Cyane [Felder, *Lepidoptera*, 1861], *id. l. c.* p. 112. Allied to *Tinea*; type, *C. visaliella*, *id. l. c.* p. 113, Kentucky.

Clymene [Savigny, *Vermes*, 1817] *id. l. c.* p. 114. Placed after *Cyane*; affinities not stated. Type, *C. æger* [!], *fasciella*, *id. ibid.*, Kentucky.

Cyllene [Newman, *Coleoptera*, and Gray, *Mollusca*, 1840], *id. l. c.* p. 124. Allied to *Clymene*; type, *C. minutissima*, *id. l. c.* p. 125, Kentucky (*Clymene* and *Cyllene* are considered by the author, pp. 147-149, to be allied to *Hydroptila*, which he thinks is Lepidopterous).

Pronuba, Riley, Tr. Ac. St. Louis, iii. p. 55, fig. 1 (details). Allied to *Anaphora* and *Amydria*; type, *P. yuccasella*, *id. l. c.* p. 56, fig. 2, Southern States (transformations and habits described in detail, pp. 55-64,

178-180). Cf. also Riley, Rep. Ins. Mo. v. pp. 151-160, and Am. Nat. vii. pp. 619-623.

Argiope [*Argyopes*, Savigny, *Arachnida*], Chambers, *l. c.* p. 13. Allied to *Hyponomeuta*; type, *Heribeia* (?) *incertella*, Chamb. (? = *Acrolepia*, id. *l. c.* p. 174).

Tegeticula, Zeller, Verh. z.-b. Wien, xxiii. p. 232. Allied to *Psecadia*, *Enematia*, and *Trichostibas*; type, *T. alba*, id. *ibid.*, Texas.

Enchrysa, id. *l. c.* p. 282. Allied to *Gelechia*, sect. *Nannonia*, but resembling *Tinagma* in pattern, and *Chrysoclista* in antennæ. Type, *E. dissectella*, id. *l. c.* p. 283, pl. iii. figs. 29 *a, b*, Ohio.

Evippe, Chambers, *l. c.* p. 185. Allied to *Trypanisma* and *Agnippe*; type, *E. prunifoliella*, id. *l. c.* p. 186, Kentucky.

Eidothoa, id. *ibid.* Allied to *Evippe*; type, *E. vagatisella*, id. *l. c.* p. 187, Kentucky.

Helice [De Haan, *Crustacea*, 1835], id. *ibid.* Allied to *Trypanisma*; type, *H. pallidochrella*, id. *l. c.* p. 188, Kentucky.

Epicorthylis, Zeller, *l. c.* p. 248. Allied to *Hypsolophus* and *Tachypetilia*; type, *E. inversella*, id. *ibid.* pl. iii. figs. 13 *a, b*, Texas.

Atychia radiata, Christoph, Hor. Ent. Ross. x. p. 49, pl. i. fig. 9. North Persia.

Psilothrix latiorella, Mann, Verh. z.-b. Wien, xxiii. p. 131, Palermo.

Anaphora scardiana, Texas (? = *popeanella*, Clem.), and *bombycina*, Buenos Ayres ?, or Massachusetts ?, Zeller, *l. c.* pp. 216 & 217.

Xylesthia congeminatella, id. *l. c.* p. 218, Massachusetts; *X. clemensella*, Chambers, *l. c.* p. 174, Kentucky.

Tinea sexguttella, Mann, *l. c.* p. 127, Tuscany; *T. defectella*, p. 220, pl. iii. fig. 8, San Francisco, *grunella*, p. 221, Massachusetts, Zeller, *l. c.*; *T. cunituriæella*, Kentucky, Gulf States, *orleansella*, New Orleans, p. 85, *auristrigella* and *straminiella*, Kentucky, *iridella*, locality unknown, *misciella*, p. 86, *costotristrigella* [!], *bimaculella*, and *aurisuffusella*, p. 87, *griseella*, *marginistrigella*, *trimaculella*, and *fuscimaculella*, p. 88, *argentistrigella*, p. 89, *T.* (?) *auripulvella*, *fuscipulvella*, and *maculabella* [!], p. 90, Kentucky, Chambers, *l. c.*

Tineola gigantea (Staud. MS.), Christoph, *l. c.* p. 49, pl. i. fig. 10, North Persia.

Setomorpha operosella, *inamænella*, and *runderella*, Zeller, *l. c.* pp. 223-225, Texas.

Adela chalybeis, p. 225, Texas, *biviella*, p. 226, pl. iii. fig. 10, Massachusetts ?, and *schlageri*, p. 227, fig. 11, Ohio, id. *l. c.*; *A. bella*, Chambers, *l. c.* p. 73, Kentucky.

Eta albiguttata, Queensland, and *fulviguttata*, New Holland, Zeller, *l. c.* pp. 230 & 231; *Æ. gemmata*, Grote, Bull. Buff. Soc. i. p. 93, Cuba.

Anesychia trifurcella, Chambers, *l. c.* p. 12, Kentucky.

Cerostoma ephedrella, Christoph, *l. c.* p. 51, pl. i. fig. 11, North Persia.

Plutella incarnatella, Steudel, S. E. Z. xxxiv. p. 340, Grisons.

Depressaria hilarella, p. 234, Massachusetts, *scabella*, p. 236, Ohio, and *nebulosa*, p. 237, Massachusetts, Zeller, *l. c.*; *D. rutilicola*, Christoph, *l. c.* p. 52, pl. i. fig. 12, North Persia.

Cryptolechia piperatella, p. 239, Texas, *obsoletella*, p. 242, Ohio, *fer-*

ruginosa, Ohio, and *cretacea*, Texas, p. 243, *lithosina*, p. 244, *nubeculosa*, p. 245, pl. iii. fig. 12, and *vestalis*, p. 247, all from Texas: Zeller, *l. c.*

Gelechia (Tachyptilia) innocuella, p. 249, Texas, *consonella*, p. 251, Missouri, Texas, *cacella*, p. 252, Massachusetts, *versutella*, p. 253, Texas, *lynceella*, *mundinella*, *unctulella*, *violaceifusca*, pp. 255–258, *olympiadella*, p. 259, fig. 15, *quinella*, p. 260, fig. 14, *albilorella*, p. 261, fig. 16, *G.* (? *Bryotropha*) *operculella*, p. 262, fig. 17, *glochinnella*, p. 263, fig. 18, *G.* (? *Lita*) *ternariella*, p. 264, fig. 19, *G.* (*L.*) *liturosella*, p. 265, *G.* (*Teleia* ?) *gilviscopella*, p. 266, *G.* (*T.* ?) *dorsivittella*, p. 267, fig. 20, *G.* (*T.* ?) *leuconata*, p. 268, fig. 21; *G.* (*Pæcilia* ?) *basifasciella*, p. 269, fig. 22, pl. iii.; *G.* (*P.* ?) *basistrigella*, p. 270, fig. 23, *fragmentella*, p. 271, *G.* (*Ergatis* ?) *pubibundella*, p. 273, *molestella*, p. 274, *G.* (*Anacamptis*) *glandiferella*, p. 275, fig. 25, *G.* (*Ceratophora* ?) *fullonella*, p. 276, *G.* (*Doryphora*) *piscipellis*, p. 277, *G.* (*Trichotaphe* ?) *serrativittella*, p. 280, fig. 27, all from Texas, *G.* (*Malacotricha*, new section, characterized, p. 282) *bilobella*, p. 280, fig. 28, Washington, Ohio, pl. iv.; Zeller, *l. c.*

Gelechia benedeni, Weyenbergh, Ent. M. M. x. p. 122, Cape Verde; *G. kiesenwetteri*, W. Henäcker, S. E. Z. xxxiv. pp. 94 & 245, Osterwieck, Harz; *G. scutellariacella*, p. 175, and *unistrigella*, p. 176, Kentucky, Chambers, *l. c.*

Nothris dolabella, Zeller, *l. c.* p. 288, pl. iv. fig. 30, Texas.

Pleurota amaniella, Mann, *l. c.* p. 573, Cilicia.

Ecophora determinatella and *constrictella*, Zeller, *l. c.* pp. 289 & 291, pl. iv. figs. 31 & 32, Texas; *Æ.* (?) *boreasella*, Chambers, *l. c.* p. 189, locality unknown (notice of its generic characters, pp. 188 & 189).

Butalis asmodella, Millière, Pet. Nouv. 1873, p. 310, Cannes; *B. trincintella*, p. 292, pl. iv. figs. 33a, b, Texas, *pilosella*, p. 293, Massachusetts, Zeller, *l. c.*

Acrolepis citri, Millière, *l. c.* p. 310, Corsica.

Blastobasis sciaphilella, p. 295, fig. 29, Texas, *sequella*, p. 296, Sarepta, *nubilella* and *retectella*, p. 297, *fractilinea*, p. 298, fig. 37, *quisquiliella*, *livorella*, *B.* (?) *aufugella* and *B.* (?) *fluxella*, pp. 298–301, all from Texas: Zeller, *l. c.* pl. iv.

Hypatima subsenella and *confectella*, id. *l. c.* pp. 302 & 303, Texas.

Argyresthia quadristrigella, p. 304, *delectella*, p. 305, and *austerella*, *ibid.*, pl. iv. fig. 38, *id. l. c.* Texas.

Gracilaria elegantella, *mirabilis*, and *astericola*, Frey, *l. c.* pp. 202–204, N. America; *G. burgessiella*, p. 307, pl. iv. fig. 39, Massachusetts, *atomo-sella*, p. 309, Texas, *occidentis* (? = *nigricella*, Haw.), p. 309, United States, Zeller, *l. c.*; *G. juglandivorella* (? = *blandella*, Clem.), Chambers, *l. c.* p. 13, Kentucky.

Coriscium paradoxum, Frey, *l. c.* p. 205, N. America.

Ornix inusitatumella, p. 47, *prunivorella*, p. 50, Kentucky, Chambers, *l. c.*

Coleophora helianthemella, Millière, Ann. Soc. Lyon (2) xix. pp. 51–54, pl. cxiii. figs. 1–5, Cannes.

Laverna definitella and *circumscripella*, Zeller, *l. c.* pp. 311 & 312, pl. iv. figs. 41 & 42, Texas.

Batrachedra striolata, id. *l. c.* p. 313, Texas.

Heliozela gracilis, id. *l. c.* p. 314, Texas.

Tischeria œnea and *roseticola*, Frey, *l. c.* pp. 222 & 223, Massachusetts.
Lithocolletis quercetorum, p. 207, Texas, Massachusetts, *hageni*, p. 208;
longistriata, p. 209 (? = *argentifimbriella*, Clem.), *intermedia*, p. 210,
obsoleta, p. 211, *mirifica* and *scudderella*, p. 212. *consimilella*, p. 214,
ignota, p. 215, *bostonica* and *auronitens*, p. 216, *gemmea*, p. 218 (? =
Parectopa robinella, Clem.), *œnigmatella*, p. 219, all from Massachusetts,
 Frey, *l. c.*

Phyllocnistis magnatella, Zeller, *l. c.* p. 315, pl. iv. fig. 43, Massachusetts.

Bucculatrix capitellata [!] and *obscurifasciella*, p. 150, *luteella* and
packardella, p. 151, Chambers, *l. c.* Kentucky.

Nepticula clemensella, p. 125, Kentucky, Pennsylvania, *maximella* and
serotinæella (? = *bifasciella*, Clem.), p. 126, *apicalbella* [!], *minimella*,
thoraceabella [!], and *quercicastanella*, p. 127, *fuscicapitella*, *ochrei-*
fasciella, *ciliifascella* (? = *fuscitibiella*, Clem.), p. 128, Kentucky:
id. l. c.

Trifurcula obrutella, Zeller, *l. c.* p. 316, Texas.

PTEROPHORIDÆ.

Zeller, *l. c.*, notices the following N. American species: *Platyptilia*
bischoffi, Zell., and *cardui* (= *carduidactylus*, Riley), *Oxyptilus perisceli-*
dactylus, Fitch, and *Pterophorus monodactylus*, L.; Verh. z.-b. Wien, xxiii.
 pp. 317, 318, 319, & 326.

Platyptilia ochrodactyla, *bertrami*, and *graafi*; transformations, &c.,
 noticed by Zeller, S. E. Z. xxxiv. pp. 135-140.

Platyptilus gonodactylus and *Lioptilus lienigianus*. Larvæ described;
 C. S. Gregson, Ent. vi. pp. 426, 427, 512.

Pterophorus periscelidactylus. A popular account, with figures of all
 stages; W. Saunders, Canad. Ent. v. pp. 99 & 100.

Scoptonoma, g. n., Zeller, Verh. z.-b. Wien, xxiii. p. 328. Allied to
Agdistes and *Stenoptycha*, but with longer antennæ. Types, *S. integra*,
id. l. c. pl. iv. fig. 44, and *interrupta*, p. 329, both from Texas: spp. nn.

Oxyptilus delawaricus (? = *tenuidactylus*, Fitch) and *nigriciliatus*, *id. l. c.*
 pp. 320 & 322, both from Delaware: spp. nn.

Mimeseoptilus semicostatus and *pumilio*, spp. nn. *id. l. c.* pp. 323 & 324,
 Texas.

Ædematophorus inquinatus, sp. n., *id. l. c.* p. 325, Texas.

Lioptilus paleaceus, sp. n., *id. l. c.* p. 326, Ohio, Texas.

ALUCITIDÆ.

Alucita polydactyla. Larva described; C. S. Gregson, Ent. vi. p. 361.

DIPTERA.

BY

E. C. RYE, F.Z.S.

THE GENERAL SUBJECT.

GRZEGORZEK, ADALBERT. Uebersicht der bis jetzt in der sandezer Gegend West-Galiziens gesammelten Dipteren. Verh. z.-b. Wien, xxiii. pp. 25-36.

A list of names of species of all families but *Cecidomyiidae*, *Sciaridae*, *Psychodidae*, and *Culicidae*.

KOCH, L. Beitrag zur Dipteren-Fauna Tirols. Z. Ferd. (3) xvii. (1872) pp. 329-344.

Supplementary to Palm's similar work.

KOWARZ, F. Beitrag zur Dipteren-Fauna Ungarns. Verh. z.-b. Wien, xxiii. pp. 453-464.

A list of species, with occasional notes on habits and localities, found near Herkulesbad and Orsova, Hungary.

LOEW, HERMANN. Beschreibungen europäischer Dipteren. Band ii. (pt. 10 of Meigen's System. Beschr. der bek. eur. zweifl. Ins.). Halle: 1873, 8vo, pp. 320.

213 species are described, nearly all treated as new (and the greater part of which were taken by the late A. Fedtschenko in Eastern Turkestan); many species, from various parts of Hungary (see KOWARZ, *suprà*), have also been very curtly described as new by the author in B. E. Z. xvii. pp. 33-52, to which prior publication no reference is made by him. Various observations are given on the affinities, &c., of the genera and species discussed, and there is an index for the whole three volumes of the Beschr. eur. Dipt.

——. Monographs of the Diptera of N. America. Part iii. Sm. misc. Coll. No. 256; 8vo, Washington, December, 1873, pp. 1-351 & i.-vi., pls. viii.-xi.

Relates to the *Ortalides* (discussing also the European species) and *Trypetides*. The first part, referring to the *Trypetides*, *Sciomyzides*, *Ephydrinides*, and *Cecidomyiidae*, appeared in 1862; the second part, in 1864, chiefly referred to the *Dolichopodidae*; and the fourth part, in 1869 (irregularly issued), comprised part of the *Tipulidae*. The present part (included in vol. xi. of Sm. misc. Coll., bearing date 1874 on title) enters at excessive length upon the characters and affinities of the species

and genera discussed; and it will be impossible to reproduce the numerous observations scattered throughout its pages, especially as in many instances they are merely incidental suppositions. Many new genera and species are characterized; and additions and corrections are made, referring to former parts. The figures on the plates represent, with one exception, a wing only of each species.

OSTEN-SACKEN, C. R. Sm. misc. Coll. No. 256. Appendix. pp. vii.-xiii.

Additions to vol. iv. of the above-mentioned monographs of North American Diptera, referring to the *Ptychopteridæ* and *Limnobiidæ*.

RONDANI, CAMILLO. *Muscaria exotica* Musei Civici Januensis observata et distincta. Ann. Mus. Genov. iv. pp. 282-300, woodcuts.

Comprises descriptions of new genera and species: the first part referring to the captures of Dr. Beccari and the Marquis Antinori in Abyssinia, and the second to those of the Marquis Doria in various Eastern localities.

Velzen: captures by Everts, Tidjschr. Ent. (2) viii. Versl. p. xxx.

Altwater Mountains: notice of species observed by J. P. E. F. Stein: S. E. Z. xxxiv. p. 241.

Amurland species mentioned by F. Walker, Ent. vi. p. 328. Turkestan species: *id. op. cit.* p. 388.

F. Walker, Ent. vi. p. 327, refers 3 species of blood-sucking flies mentioned by Stanley as occurring in Central Africa to *Tabanus*, *Stomoxys*, and *Glossina longipalpis*, Walk.

Flies hibernating in Russian bath-houses, revive with artificial elevation of temperature. D. Goubareff, C. R. lxxvi. 785.

On diffusion of germs of disease by flies: Das Ausland, xlv. (1872), p. 624.

CECIDOMYIIDÆ.

The "Hessian-fly" in Canada has either died out, or is so reduced in numbers as to give no trouble: J. J. Murphy, Nature, viii. p. 202.

Asphondylia ulicis. J. W. H. Traill, Scot. Nat. ii. p. 172, proposes this name for an (undescribed) new species reared from galls on *Ulex europæus*.

Asphondylia ononidis, Loew, Verh. z.-b. Wien, xxiii. p. 138, pl. ii. c, figs. 1-6, Pressbaum (all stages: gall on *Ononis spinosa*); *A. cytisi*, Frauenfeld, *op. cit.* p. 186, on *Cytisus austriacus*, Neusiedl: spp. nn.

Cecidomyia (Diplosis) buxi, sp. n., Laboulbène, Ann. Soc. Ent. Fr. (5) iii. p. 32. All stages fully described and figured, *l. c.* pp. 313-326, pl. ix. The species was apparently first observed by Audouin: *op. cit.* Bull. p. ccxxxiv.

Diplosis schineri, sp. n., Frauenfeld, *l. c.* p. 184, Miramar [? = *buxi*, Lab.].

MYCETOPHILIDÆ.

Dynatosoma nobilis [-le], sp. n., H. Loew, B. E. Z. xviii. p. 35, Hungary.

Sciophila pallens, *ibid.*, *nigriceps*, p. 36, spp. nn., *id. l. c.* Hungary.

Sciara egregia, p. 550, *concolor*, p. 552, *tremulae*, p. 553, *hortulana*, p. 555 (all stages), spp. nn., Beling, Verh. z.-b. Wien, xxiii. Harz district.

BIBIONIDÆ.

Biblio clavipes, Mg., and *lepidus*, Lw., in Scotland; F. B. White, Scot. Nat. ii. p. 23.

Biblio marci. Bazin, Bull. Soc. Yonne, xxvi. p. 165.

Biblio macer, sp. n., Loew, B. E. Z. xvii. p. 36, Eur. Dipt. iii. p. 70, Orsova.

CHIRONOMIDÆ.

Weyenbergh, S. E. Z. xxxiv. p. 452 *et seq.*, describes and figures a larva of *Chironomus* found in the River Primero, Cordova, La Plata, which had 2 heads, and the 5 following segments gradually merging together, the one next the head being free. On the antepenultimate segment was a smaller development of the usual respiratory processes existing at the apex.

CULICIDÆ.

Culex. Observations by Lalanne, Mém. Soc. Cannes, iii. p. 45.

Culex leucacanthus, sp. n., Loew, B. E. Z. xvii. p. 33, Eur. Dipt. iii. p. 1, Kasan.

LIMNOBIIDÆ.

Epiphragma picta, F., *Limnobia annulus*, Meig., *L. 3-punctata*, F., and *Rhipidia maculata*, Meig.; early stages described, from the Harz district. T. Beling, Verh. z.-b. Wien, xxiii. pp. 589-592.

Limnophila pallida, sp. n., *id. l. c.* p. 556 (all stages), Harz district.

Limnobia decemmaculata, Loew, B. E. Z. xvii. p. 35, Eur. Dipt. iii. p. 39, Germany, Kasan, Galizia; *L. obscuricornis*, Beling, *l. c.* p. 559, Harz district: spp. nn.

Rhypholophus bivittatus, p. 41, Harz, Silesia, &c., *tephronotus*, p. 43, Galizia, Switzerland, *helveticus*, p. 45, Switzerland, Loew, Eur. Dipt. iii.; *R. pentagonalis*, *id.* B. E. Z. xvii. p. 35, and *l. c.* p. 46, Posen, Silesia: spp. nn.

Erioptera limbata, sp. n., *id.* Eur. Dipt. iii. p. 47, Galizia.

Acyphona melampodia, p. 48, Harz, Posen, *pallens*, p. 50, Rhineland, *id. l. c.* spp. nn.

Mesocyphona fossarum, sp. n., *id. l. c.* p. 51, Meseritz.

Symplecta grata, sp. n., *id. l. c.* p. 53, Nieusiedler Lake.

Gonomyia jucunda, p. 54, Galizia, *connexa*, p. 55, Switzerland, Vienna, *abbreviata*, p. 58, *leta*, p. 60, *turida*, p. 62, Reichenhall, *id. l. c.* spp. nn.

Cladura fuscata, sp. n., *id.* B. E. Z. xvii. p. 35 [12 words only], Eur. Dipt. iii. p. 64, Vienna, Bavaria, &c.

Lipsothrix nobilis, sp. n., *id.* Eur. Dipt. iii. p. 67, Asch.

Trichocera limpidipennis, sp. n., *id. l. c.* p. 69, Galizia.

Sigmatomera flavipennis, sp. n., Osten-Sacken, Sm. mis. Col. No. 256, Appendix, p. ix. Mexico.

TIPULIDÆ.

Ctenophora bimaculata, L.; *Tipula nubeculosa*, *scripta*, *hortensis*, *pabulina*, *varipennis*, *flavilineata*, *ochracea*, and *paludosa*, Meig., *T. winnertzi* and *irrorata*, Mcq.; observations on economy, and larva and pupæ described, from the Harz district: T. Beling, Verh. z.-b. Wien, xxiii. pp. 575-589.

Ctenophora vittata, Meig., p. 289, pl. ix. figs. 4 & 4a, *C. amœna*, Loew, p. 290, var. a, figs. 5 & 5a, var. b, fig. 6, Irkoutsk; J. Portschesky, Hor. Ent. Ross. ix.

Ctenophora macra, Loew, Eur. Dipt. iii. p. 2, Kultuk; *C. sibirica*, p. 287, pl. ix. figs. 1 & 1a, *minuta*, p. 288, figs. 2 & 2a, *gracilis*, p. 289, fig. 3, Portschesky, *l. c.* Irkoutsk: spp. nn.

Tipula helvola, Loew, B. E. Z. xvii. p. 34, Eur. Dipt. iii. pp. 3-9, Ragusa, Tarvis, Mehadia, *pannonia* [? -iæ], *id. ll. cc.* p. 33, and pp. 9-13, Herkulesbad, *truncata*, *id. ll. cc.* p. 34, and pp. 13-17, Trieste, *bispina*, *id. ll. cc.* pp. 34 & 17, Herkulesbad; *T. bifasciculata*, p. 18, Istria, Dalmatia, *pachyprocta*, p. 21, Laibach, *tergestina*, p. 24, Trieste, *bullata*, p. 25, Carinthia, *alpina*, p. 28, Carinthian Alps, *dedecor*, p. 31, Corfu, *præcox*, p. 33, *cinerascens*, p. 35, Trieste, *selenis*, p. 37, Rhodes, *id.* Eur. Dipt. iii.: spp. nn.

STRATIOMYIIDÆ.

Metoponia vagans, sp. n., Loew, Eur. Dipt. iii. p. 71, North Russia.

Clitellaria obscuripennis, p. 72, Jagnob, *ruficornis*, Alai, *cinerascens*, Kisilkum, p. 74, *id. l. c.* spp. nn.

Oxycera tricolor, p. 76, Ssary-Kul, *atra*, p. 77, *rufifrons*, p. 78, Obburden, *melanodactyla*, p. 80, Fan, *œmula*, p. 81, Sarawschan-Kul, *nana*, p. 83, Pjandschikent, Gulscha, *proxima*, p. 85, Frankfort-on-the-Maine, *fasciventris*, p. 86, *bipunctata*, p. 88, Peischambe, Schagimardan, *hybrida*, p. 89, Turcomania, *nigriventris*, p. 91, *notata*, p. 92, Iskander, *fraterna*, p. 95, Sarawschan, &c., *hirticeps*, p. 96, Fan, *id. l. c.* spp. nn.

Odontomyia periscelis, sp. n., *id.* B. E. Z. xvii. p. 36, Eur. Dipt. iii. p. 98, Orsova.

TABANIDÆ.

Glossina fusca, Walk., = *longipalpis*, Walk. (1830: the 'Tsetse' fly); *Prosenia* and *Glossina* may be united to *Stomoxyz*. F. Walker, Ent. vi. p. 328.

Hæmophila, g. n., J. Kriechbaumer, Verh. z.-b. Wien, xxiii. p. 69. Between *Hæmatopota* and *Tabanus*: antennæ 5-jointed, joints 1 & 5

elongate, 2-4 very short; palpi of ♀ obliquely distant from rostrum; wings hyaline. *H. fallottii*, sp. n., *id. l. c.* p. 70, Pinerolo.

Tabanus ispahanicus, sp. n., Rondani, Ann. Mus. Genov. iv. p. 300, N. Persia.

LEPTIDÆ.

Chrysopila obscuripennis, Loew, Eur. Dipt. iii. p. 99, Hadschyabad, *merrens*, *id. B. E. Z.* xvii. p. 36, and *l. c.* p. 100, Herkulesbad; *C. nigricauda*, T. Beling, Verh. z.-b. Wien, xxiii. pp. 547-549 (all stages described), Harz: spp. nn.

THEREVIDÆ.

Thereva sybarita, sp. n., Loew, Eur. Dipt. iii. p. 144, Calabria.

SCENOPINIDÆ.

Scenopinus opaculus, p. 145, Sarepta, Samarcand, *brevicornis*, p. 146, Warsaminor, *varipes*, p. 148, Usunata, *nitidulus*, p. 149, Balfrusch, *clausus*, p. 150, Samarcand, *id. l. c.* spp. nn.

ACROCERIDÆ.

Oncodes formosus, sp. n., *id. l. c.* p. 101, Scharud.

BOMBYLIIDÆ.

Dimorphophora, Walk., = *Antonia*, Lw.; *D. syrphoides*, W., = *A. suavissima*, Lw.; Loew, Eur. Dipt. iii. p. 180. *Popsia*, Costa, = *Platypygus*, Lw.; *id. l. c.* p. 206.

Anthrax athiops, F., parasitic on *Heriades truncorum* (Hymenoptera); A. Laboulbène, Ann. Soc. Ent. Fr. (5) iii. pp. 57-60, pl. v. No. iii. figs. 1-3.

Glabella, g. n., Loew, *l. c.* p. 210. Facies of *Simulium*: ? = *Sphaerogaster*, Zett. (1842; *nec* Dej., *Coleoptera*, 1821). *G. femorata*, sp. n., Loew, *l. c.* p. 208, Utinata.

Lomatia tibialis, p. 152, *bella*, p. 153, spp. nn. *id. l. c.* Jagnob.

Exoprosopa latiuscula, p. 154, *occlusa*, p. 158, Kisilkum, *completa*, p. 161, Karak, *fallaciosa*, p. 162, Krasnowodsk, *id. l. c.* spp. nn.

Mulio lugubris, p. 164, Taschkent, *melaleucus*, p. 167, Turkestan, *albifrons*, p. 168, *dispar*, p. 169, Kisilkum, *fenestratus*, p. 170, Jagnob, *fenestrulatus*, p. 172, Tschardara, *farinosus*, p. 173, Karak, *id. l. c.* spp. nn.

Callostoma soror, p. 175, Sarawschanthal, *desertorum*, p. 176, Turkestan, *id. l. c.* spp. nn.

Amictus latifrons, sp. n., *id. l. c.* p. 177, Keles.

Antonia fedtschenkoi, sp. n., *id. l. c.* p. 178, Turkestan.

Heterotropus albidipennis, sp. n., *id. l. c.* p. 180, Usunata.

Ploas decipiens, Iskander, *nobilis*, Elbrus, p. 183, *bombylifformis*, p. 184 (= *adunca*, Lw., pt.), Turkestan, *id. l. c.* spp. nn.

Bombylius dorsalis, p. 187, Kossaral, *pericaustus*, p. 188, Keles, *mobilis*,

p. 190, *similis*, p. 196, Taschkent, *hololeucus*, p. 191, Kisilkum, *modestus*, p. 192, Naxos, *argentifrons*, p. 194, Andalusia, *id. l. c.* spp. nn.

Phthiria atriceps, p. 197, Warsaminor, *quadrinotata*, p. 198, Samarcand, *id. l. c.* spp. nn.

Apolysis eremophila, sp. n., *id. l. c.* p. 199, Kisilkum.

Oligrodranes modestus, sp. n., *id. l. c.* p. 200, Kisilkum.

Usia notata, E. Turkestan, *unicolor*, Samarcand, *id. l. c.* p. 201, spp. nn.

Platypygus lativentris, p. 202, *melinoproctus*, p. 203, *pumilio*, p. 204, spp. nn., *id. l. c.* E. Turkestan.

Cyrtosia pusilla, p. 206, Kisilkum, *cinerascens*, p. 207, Jagnob, *id. l. c.* spp. nn.

Anthrax plumipes, Philippi, S. E. Z. xxxiv. p. 307, Mendoza; *A. erythrostroma*, Rondani, Ann. Mus. Genov. iv. p. 299, N. Persia: spp. nn.

NEMESTRINIDÆ.

Hirnoneura villosa, sp. n., Loew, Eur. Dipt. iii. p. 103, Samarcand.

Nemestrina melaleuca, p. 103, Bairakum, Syr Daria, *naso*, p. 104, Turcomania, *simplex*, p. 105, Samarcand, *fraudatrix*, p. 108 (= *innotata*, Lw., pt.), Sarawschan, *eristalis*, p. 110, *dedecor*, p. 115, Turcomania, *rubriventris*, p. 112, *capito*, p. 116, *marginata*, p. 117, Kisilkum, *leta*, p. 113, Astrabad, *id. l. c.* spp. nn.

ASILIDÆ.

Ceraturgus fasciatus, Walk., = *cruciatus*, Say, ♂; Loew, *l. c.* p. 124.

Laphria flava, L., new to Britain: W. A. Vice, Scot. Nat. ii. p. 120.

Alcimus rubiginosus, Gerst., figured in V. d. Decken's Reisen, iii. pt. 2, pl. xvi. fig. 5.

Promacus (Alcimus) limbatus, Mcq.: ♂ characters added by Rondani, Ann. Mus. Genov. iv. p. 291.

Halictosoma, g. n., *id. l. c.* p. 298, woodcut. *Laphriides*: differs from *Andrenosoma* in its sub-horizontal proboscis, the obovate-elongate last joint of its antennæ, its 7th longitudinal nervure being obliterated beyond the outer transverse one, and its shorter and less thick pubescence. *H. puella*, sp. n., *id. ibid.* N. Persia.

Codionus, g. n., *id. l. c.* p. 299, woodcut [no differential characters given]. *C. chlorizans*, sp. n., *id. ibid.* Caucasus.

Dioctria lugens, p. 120, Hadschyabad, *liturata*, p. 121, Losonz, spp. nn., Loew, Eur. Dipt. iii.

Ceraturgus dispar, sp. n., *id. l. c.* p. 122, Europe.

Habropogon doriæ, sp. n., Rondani, *l. c.* p. 297, N. Persia.

Protacanthus shah, sp. n., *id. ibid.* N. Persia.

Saropogon pittoproctus, p. 124, *alternatus*, p. 127, spp. nn., Loew, *l. c.* Samarcand.

Scleropogon rufipilus, p. 129, *sciron*, p. 130, Schahkuh, *theseus*, p. 132, Astracan, *id. l. c.*; *S. superbus*, Portschinsky, Hor. Ent. Ross. ix. p. 292, pl. ix. figs. 7 & 8, Astrabad: spp. nn.

Anarolius fronto, sp. n., Loew, *l. c.* p. 133, Taschkent.

Ctenota molitrix, sp. n., *id. l. c.* p. 135, Bairakum.

Pogonosoma unicolor, p. 137, Lenkoran, *lugens*, p. 139, Samarcand, *id. l. c. spp. nn.*

Promacus (Alcimus) teniopus, sp. n., Rondani, *l. c. p. 292*, Keren.

Apoclea trivialis, p. 140, *helvipes*, p. 141, Kisilkum, &c., Loew, *l. c. spp. nn.*

Polysarca neptis, sp. n., *id. l. c. p. 142*, Karak.

EMPIDÆ.

Leptopeza sphenoptera, sp. n., Loew, Eur. Dipt. iii. p. 215, Partenkirchen.

Teaphila italica, sp. n., *id. l. c. p. 216*, Lucca.

Pachymeria obscuripes, p. 218, Smyrna, *subclavata*, p. 220, Parnassus, *ptilocnemis*, p. 222, Kurusch, *id. l. c. spp. nn.*

Empis basalis, p. 223, *candidata*, p. 226, Kurusch, *præputiata*, p. 225, *depilis*, p. 231, Sarepta, *eversmanni*, p. 227, Russia, *æmula*, p. 228, Galizia, *pittoprocta*, p. 229, Kultuk, *id. l. c.*; *E. procera*, *alampra*, p. 37, *nitidiventris*, *tanyssphyra*, *plebeia*, p. 38, *melanotricha*, *filata*, p. 39, *levis*, *leucopiza*, p. 40, *id. B. E. Z. xvii. Hungary: spp. nn.*

Rhamphomyia sphenoptera, *id. B. E. Z. xvii. p. 40*, Eur. Dipt. iii. p. 232, Mehadia, *eupterota*, *leptopus*, *id. B. E. Z. xvii. p. 41*, Hungary: *spp. nn.*

Hilara scrobiculata, p. 41, *cornicula*, *platyura*, p. 42, *eumera*, *tetragramma*, *pubipes*, *cuneata*, p. 43, *spp. nn.*, *id. B. E. Z. xvii. Hungary.*

Clinocera fallaciosa, sp. n., *id. l. c. p. 44*, Hungary.

DOLICHOPODIDÆ.

Systemus adpropinquans, Lw.: economy described and all stages figured in detail. A. Laboulbène, Ann. Soc. Ent. Fr. (5) iii. pp. 49-56, pl. v. figs. 1-11.

Campsicnemus pictipennis, Boh., ♂ & ♀ described; *Raphium fulvipes*, Walk., *nec Meig.*, = *Porphyrops consobrinus*, Zett., and *P. subnudipes*, Zett., ? = *obscuripes*, Zett., ♂, both species occurring at Mecklenburg; *Medeterus albipes*, Zett., ♂ & ♀ described; *Achalcus flavicollis*, Meig., *A. cinereus*, Hal., *Thripticus bellus*, Loew, and *T. smaragdinus*, Gerst., differentiated; Raddatz, S. E. Z. xxxiv. pp. 323-334.

Dolichopus afer, sp. n., Rondani, Ann. Mus. Genov. iv. p. 291, Sciotel.

Dolichopus lonchophorus, sp. n., Loew, Eur. Dipt. iii. p. 234, Kultuk.

Gymnopternus placidus, sp. n., *id. l. c. p. 236*, Sarepta.

Sybstroma merens, sp. n., *id. B. E. Z. xvii. p. 44*, Hungary.

Oncopygius magnificus, sp. n., *id. ibid. Hungary.*

Porphyrops patulus, sp. n., Raddatz, *l. c. p. 229*, Mecklenburg.

Sympycynus tumidulus, sp. n., *id. l. c. p. 326*, Mecklenburg.

Campsicnemus perforatus, sp. n., *id. l. c. p. 324*, Mecklenburg.

Psilopus vialis, *id. l. c. p. 331*, Mecklenburg; *P. bellus* and *ludens*, Loew, B. E. Z. xvii. p. 44, Hungary: *spp. nn.*

SYRPHIDÆ.

Ascia 4-punctata, Meig., = *floralis*, Mg., var.; *Syrphus confusus*, Egger, = *albistriatus*, Fall.; *S. obscurus*, Zett., *nec Say*, is re-named *nigricornis*,

and occurs in Scotland; *S. annulatus*, Zett., is described from both sexes, and queried as conspecific with *S. vittiger*, both being British; *S. abbreviatus*, Zett., = *latifasciatus*, Meq.; *Platychirus longimanus*, Whlb., re-described from Britain; *Chilosia olivacea*, Zett., *Chrysochlamys ruficornis*, *Xylota confinis*, Zett., and *Paragus albifrons*, Fall., recorded from England. G. H. Verrall, Ent. M. M. ix. pp. 251-256, 283-286.

Eristalis tenax. Structure of antennæ noted by J. S. Bowerbank, Ent. vi. p. 547. There is no evidence of their being auditory organs.

A. W. Bennett, J. Hort. Soc. (n. s.) iv. pt. 13, pp. 30-33, states that the stomachs of *Eristalis tenax* and *Syrphus clypeatus* have been found by him to contain large quantities of pollen grains, especially of composite plants. He quotes E. Müller's belief that the transverse denticulations in the terminal valves of the proboscis are specially adapted for disintegrating these grains (cf. also Nature, vii. pp. 132 & 133). Observations on *Syrphidæ* seen feeding on pollen, by W. E. Hart, Nature, vii. p. 161; cf. also A. W. Bennett, l. c. p. 202; E. Newman, Ent. vii. pp. 291 & 336.

Sericomyia nigra, sp. n., Portschinsky, Hor. Ent. Ross. ix. p. 291, Irkoutsk.

Syrphus punctulatus and *compositarum*, p. 254, *flavifrons*, p. 256, spp. nn., G. H. Verrall, l. c. Gt. Britain.

Melanostoma 4-maculatum, sp. n., id. l. c. p. 281, Scotland.

Syritta abyssinica, sp. n., Rondani, Ann. Mus. Genov. iv. p. 282, Keren.

Microdon æthiopicus, sp. n., id. *ibid.*, Sciotel.

Ceria tridens [pre-occupied by the author himself, B. E. Z. xvi. (1871), p. 86, for a Californian species], sp. n., Loew, B. E. Z. xvii. p. 37, Eur. Dipt. iii. p. 210, Turn-Severin.

Xylota rufipes, sp. n., id. *l. c.* pp. 36 & 212, Herkulesbad.

Brachypalpus eunotus, sp. n., id. *l. c.* pp. 37 & 213, Orsowa.

Orthoneura tumescens, sp. n., id. Eur. Dipt. iii. p. 214, Saratoff.

PIPUNCULIDÆ.

Chalarus basalis, sp. n., Loew, Eur. Dipt. iii. p. 215, Galizia.

CONOPIDÆ.

Sphixosoma africanum, sp. n., Rondani, l. c. p. 283, Ansaba.

MUSCIDÆ.

Phasides.

Bogusia, g. n., Rondani, l. c. p. 284, woodcut [no differential characters given]. *B. antinorii*, sp. n., id. *ibid.* Bogos.

Tachinides.

General observations: G. Colin, Feuil. Nat. iii. pp. 93-95.

Tachina (Belvosia) bifasciata, F. (? : also provisionally named *auricincta*, p. 141), parasitic on *Amisota* (Lep.), described, ♂, and figured: C. V. Riley, Rep. Ins. Mo. v. pp. 140 & 141, fig. 68.

Echinomyia persica, Portschinsky, Hor. Ent. Ross. ix. p. 293, pl. ix. fig. 9, Astrabad; *E. brunneri*, Loew, B. E. Z. xvii. p. 45, Hungary: spp. nn.

Devides.

Phorostoma adelpha and *macrophthalmum*, spp. nn., Loew, B. E. Z. xvii. p. 45, Hungary.

Dinera pallicornis, sp. n., *id.* Eur. Dipt. iii. p. 237, Sarawschan.

Sarcophagides.

Sarcophaga carnaria. Chief stages figured, and economy described by S. Lockwood, Am. Nat. vii. pp. 193-197.

Sarcophaga distinguenda, p. 284, *sejungenda*, p. 285, spp. nn., Rondani, l. c. Keren.

Muscides.

Musca domestica with *Chelifer panzeri*, Koch, attached parasitically, recorded by P. de Borre, SB. z.-b. Wien, xxiii. p. 36. Note on parasites: Nature, viii. p. 263.

Musca domestica and *lateralis* occur in Abyssinia; and the ♂ of *Somomyia albiceps*, Wied., ?, is also described from that country: Rondani, l. c. p. 286.

Beccarimyia, g. n., *id.* l. c. p. 287, woodcut [no differential characters given]. *B. glossina*, sp. n., *id. ibid.*, Keren.

Stomoxys sitiens, sp. n., *id.* l. c. p. 288, Keren.

Somomyia cuprinitens, sp. n., *id.* l. c. p. 285, Keren.

Mesembrina decipiens, sp. n., Loew, Eur. Dipt. iii. p. 239, Kultuk.

Anthomyiides.

Anthomyia floralis, Fall., described and figured in detail, with particulars of economy, by H. Weyenbergh, Jr., Tijdschr. Ent. (2) viii. pp. 131-135, pl. viii. figs. 1-12.

Anthomyia mitis, Meig., var. n. *rumicis* (p. 68); habits in connection with *Rumex obtusifolius* in Scotland: J. Hardy, Scot. Nat. ii. pp. 63-68.

Hydrotea irritans, Fall.; pupa described and figured. F. Loew, Verh. z.-b. Wien, xxii. p. 143, pl. ii. figs. 9 & 10.

Anthomyia luteiventris, Rondani, l. c. p. 288, Keren; *A. triplex* and *corvina*, H. Loew, B. E. Z. xvii. p. 46, Hungary: spp. nn.

Homalomyia cothurnata, *coracina*, *fasciculata*, *obesa*, spp. nn., H. Loew, l. c. p. 47, Hungary.

Aricia pura and *aculeata*, spp. nn., *id.* l. c. p. 48, Hungary.

Hydrotea amœna, *id. ibid.* Hungary; *H. impeza*, *id.* Eur. Dipt. iii. p. 243, Bavaria: spp. nn.

Cœnosia inornata, sp. n., *id.* B. E. Z. xvii. p. 49, Hungary.

Lispe nubilipennis, sp. n., *id.* Eur. Dipt. iii. p. 244, Sarepta.

Spilogaster ulmicola, sp. n., Laboulbène, Ann. Soc. Ent. Fr. (5) iii. p. 310, Paris. The three chief stages described and figured, pp. 307-312, pl. viii. figs. 1-8.

Cordylurides.

Cordylura flavipes: economy in connection with *Phleum pratense*, noted by Konopka, Ber. Krak. Landwirthschaftsges (SB. z.-b. Wien, xxiii. p. 9).

Cordylura melaleuca, p. 245, Greece, *umbrosa*, p. 246, Hungary, *melanacra*, p. 247, Silesia, *breviventris*, p. 250, Sarepta, *nigricans*, p. 251, Lake Baikal; Loew, Eur. Dipt. iii. spp. nn.

Agromyzides.

Agromyza trivittata, sp. n., *id.* B. E. Z. xvii. p. 52, Hungary.

Ortalides.

H. LOEW, Sm. misc. Coll. No. 256, re-characterizes this group (pp. 2 & 3, 28-31), pointing out species improperly introduced into it, and dividing the European forms into sections. Extra-European species are then discussed by him, under the heads of various authors; and the affinities, &c., of the whole of the known genera are analyzed. The following divisions are proposed:—i. *Ortalidæ* with a bristly or hairy first longitudinal vein; Section 1, *Pyrgotina* (*Pyrgota*), Wied., and other genera, pp. 35 & 36), 2, *Platystomina* (*Platystoma*, Meig., and allies), 3, *Cephal[i]na* (*Cephalia*, Meig., &c.), 4, *Ortalina* (*Ortalis*, Fall., and other genera named at p. 54 *et seq.*), 5, *Pterocalina* (*Pterocalla*, Rond., and allies): ii. *Ortalidæ* having the first longitudinal vein bare; Section 1, *Ulidi[i]na* (*Ulidia*, &c., p. 65), 2, *Richard[i]na* (*Richardia*, Desv., &c., p. 66 *et seq.*). The following observations occur:—*Elaphomyia*, Saund., = *Phytalmia*, Gerst.; *E. wallacii* and *cervicornis*, S., respectively = *megalotis* and *cervicornis*, G.; p. 27. *Heterogaster*, Macq. [*nec* Schill., *Hemiptera*, 1829], is re-named *Sphenoprosopa*, p. 34. *Chromatomyia*, Walk., = *Lamprogaster*, Meq.; [*H*]eniconeura, Macq., 1843, *nec* 1840, is re-named *Clitodoca*, p. 42; *Oxycephala*, Macq., = *Pyrgota*, Wied.; *Ortalis ortoeda* and *4-fasciata*, Walk., = *Rivellia viridulans*, Desv.; *Tephronota ruficeps*, *nec* F., is re-named *humilis*, p. 123; *Notogramma cimiciforme*, Lw., = *stigma*, F., var.

The following new genera and species are characterized:—

Bromophila, p. 35. Incidentally 'established' for *Dichromyia caffra*, Macq., provisionally located near *Pyrgota*.

Scholastes, p. 38, for *Platystoma cinctum*, Guér., and *P. nepticula*, Lw.

Euchalcota, p. 40, next *Lamprogaster*, for *Senopterina decora*, Macq.

Celetor, p. 41, for *Tephritis cærulea* and *strigipennis*, Meq.

Engistoneura, p. 43, for *Ortalis mærens*, F., *parallela*, Wied., *lugens*, F., & ? *Trypeta albivaria*, Walk.

Scotinosoma, p. 45, allied to *Rivellia*, for unnamed species from South East Asia.

Ardelio, p. 46, for [? *Rivellia*] *longipennis* and *brevicornis*, Lw., from Africa.

Epicausta, *ibid.*, allied to *Stenopterina*; for 2 unnamed African species.

Piara, *ibid.*, for an unnamed African species.

Traphera, p. 51, allied to *Piara*; for *Ortalis chalybea*, Wied.

Cormocariss, p. 54, for *Ortalis bucephala*, Meig.

Amphicnephes, p. 83. Allied to *Platystoma*: *A. pertusus*, p. 84, pl. viii. fig. 1, Carolina, Washington.

Himeroessa, p. 85. *H. pretiosa*, *ibid.* fig. 2, Cuba.

Tritoxa, p. 102. *Trypeta arcuata*, Walk., = *flexa*, Wied., and *Tritoxa incurva*, p. 104, fig. 12, Illinois, *cuneata*, p. 107, fig. 11, Nebraska.

Idana, p. 115. Type, *Ortalis marginata*, Say.

Automola, p. 118, for *O. atomaria* and *3-fasciata*, Wied.

Apospasmica, p. 131. Type, *O. fasciata*, Wied., = *Tephritis 5-fasciata*, Mcq.

Stictocephala, p. 134, *S. cribellum*, *ibid.* fig. 26, Nebraska, (? =) *cribrum*, p. 135, fig. 25, Middle States, *corticalis*, p. 136, fig. 28, New York.

Callopistria, p. 140. Type, *Platystoma annulipes*, Mcq.

Coniceps, p. 177. Allied to *Eumetopia*. *C. niger*, p. 178, Texas.

Cyrtometopa, p. 179. *Odontomera ferruginea* (& ? *maculipennis*), Mcq.

Stenomacra, p. 180. *Sepsis guerini*, Bigot.

Syntaces, p. 182. *Setellia apicalis*, Mcq.

Evolena, p. 183. *Michogaster egregius*, Gerst.

Idiotypa, *ibid.* *I. appendiculata*, *ibid.* pl. ix. fig. 26, Cuba.

Steneretma, p. 186. *S. laticauda*, p. 187, Texas.

Hemixantha, p. 190. *H. spinipes*, *ibid.* fig. 28, Brazil.

Melanoloma, p. 192. *M. affinis*, *ibid.* fig. 29, Brazil, and *Trypeta cyanogaster*, Wied. (type).

Rivellia conjuncta, p. 88, pl. viii. fig. 3, Maryland, *variabilis*, p. 91, fig. 6, Columbia, *flavimana*, p. 92, fig. 7, Nebraska, *micans*, p. 94, Texas, *pallida*, p. 95, fig. 8, Washington.

Stenopterina cerulescens, p. 97, Texas.

Diacrita amula, p. 114, fig. 15, California.

Tetanops luridipennis, p. 119, fig. 17, Nebraska, *integra*, p. 121, fig. 18, Illinois.

Ceroxys obscuricornis, fig. 20, Nebraska, *ochricornis*, fig. 21, Wisconsin, p. 126, *similis*, p. 127, fig. 23, Connecticut.

Anacampta latiuscula, p. 130, fig. 19, California.

Pterocalla strigula, p. 133, fig. 30, Georgia.

Euxesta nitidiventris, p. 157, Texas.

Celometopia bimaculata, p. 189, pl. ix. fig. 27, Cuba.

Tetanops pictipennis, sp. n., Loew, Eur. Dipt. iii. p. 265, Kultuk.

Ortalis laticornis, l. c. p. 269, Kultuk, *levigata*, B. E. Z. xvii. p. 49, Eur. Dipt. iii. p. 271, Kasan, *kowarzi*, B. E. Z. xvii. p. 49, Eur. Dipt. iii. p. 272, Herkulesbad, *id.* spp. nn.

Ceroxys nanus, p. 275, Spain, *obscuripes*, p. 276, Sarawschan, *id.* Eur. Dipt. iii. spp. nn.

Anacampta morosa, p. 278, Sarepta, *robusta*, p. 279, Sarawschan, *id.* l. c. spp. nn.

Coniceps (re-characterized, p. 292) *carbonarius*, sp. n., *id.* l. c. p. 290, Sarepta.

Platystomides.

Platystoma suavis [-ve], p. 281, Sarawschan, *rufimana* [!], p. 284, Caucasus, Loew, Eur. Dipt. iii. spp. nn.

Ulidiides.

Myiodella, g. n., Rondani, Ann. Mus. Genov. iv. p. 290, woodcut. Differs from *Myiodina* (details figured) in structure of antennæ and wings. *M. brachialis*, sp. n., *id. ibid.*, Keren.

Ulidia melampodia, sp. n., Loew, Eur. Dipt. iii. p. 287, Sarawshan.

Empylocera abstersa, sp. n., *id. l. c.* p. 289, Sarawshan.

Sapromyzides.

Lonchæa sylvatica, Beling, Verh. z.-b. Wien, xxiii. p. 549 (all stages), Harz; *L. inæqualis*, Loew, B. E. Z. xvii. p. 50, Hungary, *splendida*, *id.* Eur. Dipt. iii. p. 292, Sicily: spp. nn.

Palloptera lætabilis, p. 293, Reichenhall, *costalis*, p. 295, Silesia, Bavaria, *pallens*, p. 296, Kultuk (? = *ephippium*, Zett.), Loew, Eur. Dipt. iii. spp. nn.

Sapromyza tetrachæta, *id.* B. E. Z. xvii. p. 50; Eur. Dipt. iii. p. 297, Hungary; *S. dedecor*, p. 298, ? Austria, *adumbrata*, p. 299, Spain, *pœcilotera*, p. 300, Langenau, Altvater, Galizia, *id.* Eur. Dipt. iii. : spp. nn.

Trypetides.

H. LOEW, Sm. misc. Coll. No. 256, pp. 211-344, pls. x. & xi., supplements his paper on this group, published in 1860, by a "Review of the North American *Trypetina*." Various observations are made on the affinities of species and genera, and some synonymy is given. New genera are proposed and named in such a manner as to lead to the conviction that the author himself only became aware of their real or supposed value when describing the species on which they are founded, and the old generic names of which he has indeed left standing in many cases. In the tables, these new genera are referred to as "smaller genera,"—a new scheme of grouping, probably intended to represent sub-genera. A comparison is made between the European and American species; with a critical examination of all the N. American species described by other authors, some of the descriptions of which are reproduced. Varieties of *Trypeta longipennis*, Wied., are described and named *perfecta*, *typica*, *longitudinalis*, *vittigera*, *intermedia*, *confluens*, and *arculata*, and *T. cornigera* and *cornifera*, Walk., are referred to it. *Tephritis segregata*, Frauentf., = *Trypeta angustipennis*, Lw.

The following new genera and species are characterized:—

Acrotoxa, p. 227. Resembles *Hexachæta*: 4th longitudinal vein curved forwards towards its end, reaching the margin at a very acute angle. *Trypeta suspensa*, Lw., *fraterculus* and *serpentina*, Wied., *obliqua*, Mcq., &c., and *ludens*, p. 223, pl. xi. fig. 19, Mexico, and *tricincta*, p. 225, Hayti.

Epochra, p. 238. Allied to *Acidia*, but differing in the ovipositor and venation. Type [described 3 pages before as a *Trypeta*!] *canadensis*, p. 235, Canada.

Acrotænia, p. 274. *Trypeta latipennis*, Wied., and [a new species described at p. 272 as a *Trypeta*!] *testudinea*, fig. 13, Cuba.

Eutreta, p. 276. *Trypeta sparsa*, Wied., and *rotundipennis*, Lw.

Acidogona, p. 285: incidentally mentioned at the end of description

of a new *Trypeta*. *T. melanura*, p. 283, fig. 6, from Columbia, on which it is founded.

Aspilota, p. 286, for *Trypeta alba* and *albipennis*, Lw.

Ictericæ, p. 287, for *Trypeta seriata*, Lw.

Evaresta, p. 296, for these species of *Tephritis*, the picture of the wings of which forms distinctly developed rays at the apex [!].

Trypeta amabilis, p. 219, Mexico, *hamata*, p. 229, fig. 22, *integra*, fig. 23, *consobrina*, fig. 21, *pseudoparallela*, fig. 24, p. 230, Brazil, *vulnerata*, p. 232, Massachusetts, *tetanops*, p. 245, fig. 15, Mexico, *biseriata*, p. 252, Brazil, *gibba*, p. 260, Texas, *phanicura*, p. 269, fig. 12, Brazil, *pæcilogastra*, p. 271, *circinata*, p. 288, New York, *peregrina*, p. 292, Brazil, *albiceps*, p. 302, fig. 5, Canada, Maine, *euryptera*, p. 304, New York, *platyptera*, p. 306, Connecticut, *spectabilis*, p. 309, pl. x. fig. 27, *obscuriventris*, p. 313, fig. 26, *tenuis*, p. 316, fig. 29, Brazil, *pura*, p. 320, Massachusetts, *polyclona*, p. 324, Cuba, *actinobia*, p. 326, Texas.

Trypeta alternata, Fall.: habits in connection with *Rosa villosa* described. J. Hardy, Scot. Nat. ii. pp. 21-23.

Percnoptera, g. n., Philippi, S. E. Z. xxxiv. p. 307. Type, *P. angustipennis*, sp. n., *id. l. c.* p. 306, pl. ii. figs. 1*a-i*, bred from salivary galls on *Baccharis rosmarinifolia*, Chili.

Diopsides.

Diopsis aethiopica and *beccarii*, spp. nn., Rondani, Ann. Mus. Genov. iv. p. 289, Sciotel.

Tanypezides.

Calobata latifrons, p. 253, *stylifera*, p. 255, *nitens*, p. 256, Kultuk, *longiceps*, p. 257, *adusta*, p. 259, Bavaria, Loew, Eur. Dipt. iii.: spp. nn.

Sepsides.

Sepsis pilipes, sp. n., Loew, Eur. Dipt. iii. p. 304, Hungary.

Nemopoda pectinulata, sp. n., *id. l. c.* p. 305, Posen.

Psilides.

Dipterous larvæ (? of *Psila rosæ*) discharged with phlegm by human subject; they survived immersion in spirit for 3 or 4 days. J. O. Westwood, P. E. Soc. 1873, p. iv.

"*Psgomya*" *flavicollis*, sp. n., E. C. Reed, An. Univ. Chil. xli. p. 355 [described in eleven words !], presumably from Chili.

Chloropides.

Dicræus, g. n., Loew, B. E. Z. xvii. p. 51. With no posterior transverse vein. Nearest *Elliponeura*, but differing in the 2nd and 3rd longitudinal veins being straight, the 3rd and 4th parallel, &c. *D. obscurus*, sp. n., *id. ibid.*, Hungary.

Oscinis (*Siphonella*) *quinquangula* [!], sp. n., *id. ibid.*, Hungary.

Ephydrides.

Athyroglossa nudiuscula, sp. n., *id. l. c.* p. 50, Eur. Dipt. iii. p. 307, Kasan.

Pelina nitens, p. 309, Calabria, *ventruosa*, p. 310, Silesia, *id.* Eur. Dipt. iii. spp. nn.

Drosophilides.

Drosophila rufifrons, sp. n., *id.* B. E. Z. xvii. p. 50, Hungary.

Geomyzides.

Scyphella latifrons, sp. n., *id. ibid.*, Hungary.

Anthomyza ungulata, sp. n., *id.* Eur. Dipt. iii. p. 301, Lake Baikal.

Balioptera divergens, p. 302, *adusta*, p. 303, *id. l. c.*, Bavaria, spp. nn.

Helomyzides.

Blepharoptera brachypterna, sp. n., *id.* B. E. Z. xvii. p. 49, Hungary.

Scatophagides.

Strongylogaster pannoniensis, sp. n., *id. l. c.* p. 45, Hungary.

Chirosia fallax, sp. n., *id. l. c.* p. 46, Hungary.

CESTRIDÆ.

Æstrus sp. (? *ovis*) : larva taken out of an ulcer on the shoulder of a boy in Texas. S. J. Stroop, Am. Nat. vii. p. 437.

NYCTERIBIIDÆ.

Nycteribia frauenfeldi, Kol. (? = *pedicularia*, Westw.), re-described and figured : it occurs in Belgium, but the species of bat infested by it is not known. F. Plateau, Bull. Ac. Belg. (2) xxxvi. pp. 332-335.

(APHANOPTERA.)

PULICIDÆ.

A list of 17 species occurring in the Netherlands, with the animals on which they are parasitic, and localities, is given by C. Ritsema, Tijdschr. Ent. (2) viii. Versl. pp. lxxxiv. & lxxxv.

Pulex felis, Bouché, and *P. fasciatus*, Bosc. Observations on the larvæ of these species, and on the *Pulicidæ* generally, by J. Künckel, Ann. Soc. Ent. Fr. (5) iii. pp. 129-142, pl. vi. figs. 1-11. The larva before hatching has a frontal point, used in breaking the shell of the egg. *Cf.* also *l. c.* Bull. pp. vi. & vii.

Pulex irritans. W. H. Furlonge, J. Quek. Club, iii. pp. 12-25, pls. i. & ii. describes the alimentary and digestive, respiratory, and reproductive systems, figuring in detail various organs. The copulative operation is also described.

Rhynchoprion penetrans, Oken ; observations on economy of this species, known as the "Nigua" or "Earth-flea" in South America, by Franz Engell, Das Ausland, xlii. (1869), pp. 1088-1091, figs. 1-4 (♀ well figured).

NEUROPTERA.

BY

R. McLACHLAN, F.L.S.

THE GENERAL SUBJECT.

COSTA, A. Fauna del Regno di Napoli, Neurotteri.

A concluding fasciculus (and pl. xiii.) of this Order appeared in 1871. There are two separate portions; viz., 'Aggiunte alle precedenti famiglie,' pp. 1-8, dated 7th January; and 'Famiglia de Friganeidei,' pp. 1-6, dated 1st February, 1871; and a title-page and index,—the former dated 1860-70.

GERSTÄCKER, A. Zur Morphologie der Orthoptera Amphibiotica. Festschrift nat. Fr. 1873, pp. 39-74, pl.

Concerns *Odonata* and *Perlida*.

HAGEN, H. A. Report on the *Pseudoneuroptera* and *Neuroptera* of North America in the collection of the late Th. W. Harris. P. Bost. Soc. xv. pp. 263-301.

Valuable notes on species described by Harris and Say.

McLACHLAN, R. Instructions for the Collection and Preservation of Neuropterous Insects. London: 1873, 8vo, pp. 1-23.

Reprinted from Ent. M. M. ix. pp. 99-104, 168-176, & 225-232.

———. A Catalogue of the Neuropterous Insects of New Zealand, with notes and descriptions of new forms. Ann. N. H. (4) xii. pp. 30-42.

Enumerates 44 spp. of the Order in the Linnean sense, with comparative notes of the fauna with that of Australia.

ROSTOCK, M. Neuropterologische Mittheilungen. SB. Ges. Isis, 1873, pp. 9-17.

A useful analysis of Wallengren's Skandinaviens Neuroptera, pt. i. (*cf.* Zool. Rec. viii. p. 401), with some of the descriptions translated into German.

———. Neuroptera Saxonica, *l. c.* pp. 17-25.

A list of 272 known species occurring in the kingdom of Saxony, with localities.

Altwater mountains: J. P. E. F. Stein, S. E. Z. xxxiv. pp. 233-243, gives notes of an excursion, chiefly relating to *Neuroptera*, and in some degree supplementary to Kolenati's paper on the fauna of this district.

TRICHOPTERA.

HAGEN, H. A. Beiträge zur Kenntniss der Phryganiden. Verh. z.-b. Wien, xxiii. pp. 377-452.

McLACHLAN, R. Supplément aux Notes additionnelles sur les Phryganides décrites par M. le Dr. Rambur. Ann. Ent. Belg. xvi. pp. 149-153.

The most important determinations are the following:—*Lepidostoma villosum* and *sericeum* = *Mormonia hirta*, F., ♀; *Sericostoma festivum* is referred doubtfully to the genus *Notidobia*, and its remarkable characters pointed out; *Rhyacophila irrorella* is a *Polycentropus (dubius, ♀, ?)*; *Philopotamus urbanus* is a *Cyrnus*; *Mystacida rufa* is a *Setodes*.

McLACHLAN, Ent. M. M. x. pp. 163-165, also gives additional notes on the species described by Zetterstedt, according to information furnished by Wallengren, who has examined the types. The most important determinations are the following:—*Phryganea borealis* = *Limnophilus pavidus*, Hagen, but Zetterstedt's name has priority, and the species called *borealis* by authors is re-named *xanthodes*; *P. atomaria* = *L. marmoratus*, Curtis; *P. notata* = *L. affinis*, Curtis; *P. nigriceps* = *L. striola*, Kol., the former name having priority; *P. lævis* is an *Anabolia*; *P. testacea* is a *Stenophylax*; *P. stigmatella* = *Apatania frigida*, McLach., the former having priority; *P. fusca* = *L. fumigatus*, Germ.; *P. discoidea* = *L. bipunctatus*, Curtis.

Phryganeidæ.

HAGEN, Verh. z.-b. Wien, xxiii. pp. 377-441, gives a very elaborate monographic sketch of the known species, with detailed descriptions of the appendages, &c., and notes on larvæ and cases. He restricts the family to three genera, *Neuronia*, *Phryganea*, and *Agrypnia*, and describes 34 species, of which the following are new:—*Neuronia stygipes* (Harris MS.), p. 388, Maine, N. Hampshire, and Massachusetts; *angustipennis*, p. 400, North Illinois, Michigan, and Massachusetts; *Phryganea improba*, p. 417, Hudson's Bay and New York; *Agrypnia colorata*, p. 424, Hudson's Bay; *straminea*, p. 425, Hudson's Bay; *glacialis*, p. 426, Bear Lake and Labrador; *islandica*, p. 429, Iceland. Notes on the American species are given by the author in P. Bost. Soc. xv. pp. 384, 385.

Phryganea nattereri, sp. n., Brauer, Verh. z.-b. Wien, xxiii. p. 408, Spain.

Limnophilidæ.

HAGEN, l. c. pp. 442-452, treats on the species of the genera *Glyphotælius* and *Grammotælius* in the same manner as followed by him in the fam. *Phryganeidæ*. He describes as spp. nn. *Glyphotælius hostilis*, p. 444, Hudson's Bay and Great Slave Lake, and a form (distinct species?) of *G. punctatolineatus* under the name of *frigidus* (p. 443); *Grammotælius præcox*, p. 451, Great Slave Lake; indicating also (p. 449) a sp. n. of this genus from Iceland.

Halesus auricollis, Pict., occurs abundantly in Wharfedale, Yorkshire, McLachlan, Ent. M. M. x. p. 140.

Encocyta pusilla, Burm. Ritsema (CB. Ver. Regensb. 1873, pp. 92-95) gives further notes on this species, with additional localities.

Limnophilus maculatus re-described and figured by Costa, Faun. Reg. Nap., Frig., p. 3, pl. xii. fig. 8.

Limnophilus fuliginosus, id. l. c. p. 4, fig. 9.

Sericostomatidæ.

Costa, l. c. re-describes and figures *Lasiocephala taurus*, p. 2, pl. xiii. fig. 6.

Leptoceridæ.

Setores eremita, sp. n., Stein, S. E. Z. xxxiv. p. 239, Altvater.

Hydroptilidæ.

EATON, A. E. On the *Hydroptilidæ*, a family of the *Trichoptera*. Tr. E. Soc. 1873, pp. 125-151, pls. ii. & iii.

An important work on this obscure family. The maxillary palpi are declared to be 5-jointed in both sexes, hence the group is removed to the neighbourhood of the *Rhyacophilidæ*. The bibliography is critically examined, and the synonymy worked out as far as possible. The true genus *Hydroptila* of Dalman is considered to represent a form practically unknown to modern entomologists, and of the six genera described all but two are new. *Hydroptila* is distinguished from all the other genera in having 1, 3, 4 spurs. *Agraylea* is tolerably distinct and well known. His other genera are as follows:—

Phricocoma (p. 132). Ocelli absent. Spurs 0.2.4. Wings acuminate. Includes *P. sparsa*, Curt., *pulchricornis*, Pict., *forcipata*, sp. n. (p. 135), England (and Italy ?), *occulta*, sp. n. (l. c.), England, *femoralis*, sp. n. (p. 135), England and Lago di Como, *fuscicornis*, Schneider, *albicornis*, Hagen.

Ithytrichia (p. 139). Ocelli present. Spurs 0.3.4. Wings acuminate, the anterior inner edge with an appendage. *I. lamellaris*, sp. n. (p. 140), England.

Orthotrichia (p. 141). Ocelli absent. Spurs 0.3.4. Wings acuminate. *O. angustella*, McLachlan, and *atra*, Hagen.

Oxyethira (p. 143). Ocelli present. Spurs 0.3.4. Wings acuminate; the anterior inner edge entire. Includes *O. costalis*, Curtis, and *albiceps*, McLachlan.

Agraylea pallicornis, sp. n., Eaton, l. c. p. 148, Turin.

Cyllene minutissimella, sp. n., Chambers, Canad. Ent. v. pp. 124-125, Canada (described as Lepidopterous, but doubtless pertaining to this family).

NEUROPTERA-PLANIPENNIA.

HAGEN, H. A. On the larvæ of the *Hemerobina*. P. Bost. Soc. xv. pp. 243-248.

A sketch of the peculiar distinctions of the various groups, giving good

condensed accounts, especially for *Myrmeleonidæ* and *Ascalaphidæ*. A new feature is the separation of *Sisyra* as a distinct sub-family—termed *Sisyrina*—on account of larval peculiarities.

Sialidæ.

Corydalis cornuta; habits and transformations described and figured by RILEY in Rep. Ins. Mo. 1873, pp. 142–145.

Ascalaphidæ.

HAGEN, H. A. Die Larven von *Ascalaphus*. S. E. Z. xxxiv. pp. 33–62.

Exhibits in a collected form all that has been written concerning the earlier stages, with very many original observations. Much is necessarily left doubtful, owing to the perfect insects not having been bred. Descriptions, more or less complete, or notes, are given concerning the following:—*Ascalaphus macaronius*, *coccajus*, and *longicornis*, *Puer maculatus*, *Theleproctophylla barbara*, *Hybris subjacens*, *Suphalasca* sp., *Helicomitus* (?) sp., *Glyptobasis* (?) sp., *Ulula macleayana*, *U. senex*, and another doubtful, *Haploglenius* several doubtful. The paper concludes with a tabulated and condensed summary of the whole subject.

Myrmeleonidæ.

McLACHLAN, R. Notes sur les Myrméleonides décrites par M. le Dr. Rambur. Ann. Ent. Belg. xvi. pp. 127–141.

The determinations are, for the most part, identical with those previously given by Hagen, but much is left doubtful owing to the confused state of the group.

H. A. HAGEN, S. E. Z. xxxiv. pp. 249–295, 377–398, gives an exhaustive account of the present state of our knowledge of the earlier stages of this family, with detailed descriptions, and differentiated summarized sketches. He describes, more or less confidently, the larvæ of 21 species, belonging to the genera *Palpares*, *Acanthaclisis*, *Dendroleon*, *Formicaleo*, *Myrmecalurus*, *Glenurus*, *Macronemurus*, *Gymnocnemis*, and *Myrmeleon*.

McLACHLAN, 'Neuropterologisches,' S. E. Z. xxxiv. pp. 444–451, follows with descriptions of the larvæ of *Palpares hispanus* and *P. latipennis* (?); and he replies to objections raised by Hagen to Wallengren's, and his determination of the Linnean *Myrmeleon formicarius* as equivalent to the *M. formicalynx* of modern authors. He proposes to re-name the *formicarius* of modern authors as *M. europæus*. Cf. also Ann. Ent. Belg. xvi. p. 137, footnote.

Myrmeleon immaculatus: habits described by H. L. Moody, Canad. Ent. v. pp. 63–65.

Notes on the larva of an American species are given by E. A. Birge in Am. Nat. vii. p. 432.

Echthromyrmex orientalis, sp. n., McLach., Ann. Ent. Belg. xvi. p. 143, Moluccas.

Myrmeleon diversus, sp. n., Hagen, Hayden's 6th Report, p. 729, Yellowstone River.

Costa, l. c. p. 1, pl. xiii. fig. 5, describes and figures *Dendroleon pantherinus*, F., under the name of *Myrmeleon nigricinctus*, Rbr.

Osmylidæ.

Stenosmylus citrinus, sp. n., McLachlan, Ann. N. H. (4) xii. p. 38, New Zealand.

Isoclipteron fulvum re-described and figured by Costa, l. c. p. 6, fig. 4.

Mantispidæ.

Mantispa brunnea. Hagen, P. Bost. Soc. xv. p. 300, states that the 'lobes' on the tarsi of this species, noticed in his American Synopsis, p. 208, are in reality the pollinia of an Orchid.

Hemerobiidæ.

Megalomus hirtus, L., has occurred near Aberdeen, McLachlan, Ent. M. M. x. p. 90.

PSEUDO-NEUROPTERA.

THYSANURA.

LUBBOCK, SIR JOHN. Monograph of the *Collembola* and *Thysanura*. London: 1873, 8vo, pp. 1-265, pls. i.-lxxviii.

This Ray Society volume is the most important work on these animals that has ever appeared. The author's views as to the position of the group as scarcely within the pale of the true *Insecta* have been pretty generally made known by papers published in former years in Tr. L. S. (cf. especially Zool. Rec. vii. pp. 446 & 447), and these are reproduced in the present work, which consists first of a copious and exhaustive introductory portion treating on the bibliography of the subject; secondly, an examination of the classification adopted by previous writers; thirdly, the relations of the group with regard to the evolution of the *Insecta*, the author regarding *Campodea* as the living representative of a primæval type from which all insects have derived their origin; and fourthly, a systematic description and revision of the known species with copious synonymic and other notes. Appended, there is also an essay on the structure of the scales according to the observations of Joseph Beck and his brother, the late Richard Beck. The 78 plates are occupied by magnified figures of very many species (mostly coloured), anatomical structure, and delineation of scales. The *Collembola* correspond pretty well to the old group *Poduridæ*, and are divided by the author into six families, *Papiridæ*, *Smynthuridæ*, *Degeeriidæ*, *Poduridæ*, *Liparidæ*, and *Anuridæ*. The *Thysanura* (equalling the old *Lepismidæ*) comprise 3 families, *Japygidæ*, *Campodeidæ*, and *Lepismidæ*, and in all there are 22 genera, 16 of *Collembola* and 6 of *Thysanura*. The new forms, &c., are noted below.

PACKARD, A. S., JR. Synopsis of the *Thysanura* of Essex County, Mass., with descriptions of a few extralimital forms. Rep. Peab. Ac. v. pp. 23-51.

A descriptive synopsis, mostly consisting of new species, with a sketch of the literature of the American forms, and comparison of the fauna

with that of Europe, apparently printed before the author had seen Lubbock's Monograph, but not clashing with that work in nomenclature.

PACKARD, Rep. Peab. Ac. v., describes the following new species from N. America :—

Anura gibbosa, p. 27, Maine.

Achorutes boletivorus and *marmoratus*, p. 30, Maine; *texensis*, p. 30, Texas; *prætorum*, p. 31, Maine.

Isotoma nivalis, p. 31, and *albella*, p. 32, Maine; *leonina*, p. 32, and *glauca*, p. 33, Massachusetts; *belfragii*, p. 33, Texas; *tricolor*, p. 34, Massachusetts; *purpurascens*, p. 34, Texas.

Lepidocyrtus marmoratus, p. 36, Massachusetts; *metallicus*, Massachusetts and Maine; *albus*, p. 37, Maine and Tennessee; *bipunctatus*, Texas.

Degeeria perpulchra, p. 38, Texas; *griseo-olivata*, p. 39, Massachusetts; *10-fasciata*, p. 40, Massachusetts, Texas, &c.

Orchesella carneiceps, p. 40, Tennessee; *flavipicta*, p. 41, Massachusetts.

Papirius marmoratus, p. 42, Maine and Massachusetts; *texensis*, Texas.

Smynthurus roseus, p. 43, Massachusetts; *4-signatus*, p. 44, Maine.

Lepisma quadriseriata, p. 47, Maine, Massachusetts, &c.; *domestica*, p. 48, Massachusetts; *spinulata*, p. 48, Texas; *mucronata*, p. 49, Nicaragua.

Machilis brevicornis, p. 49, Texas; *orbitalis*, p. 50, Idaho.

LUBBOCK, l. c., describes the following new species :—

Seira nigrimaculata, p. 146, England.

Lepidocyrtus purpureus, p. 155, pl. xxx. England.

Stein, S. E. Z. xxxiv. p. 242, points out that the species from the Altvater, that Kolenati thought to be *Heterotoma viatica*, L., is most probably not that species, but *Achorutes bielaniensis*, Waga.

Structure of scales of *Lepisma*. G. W. Morehouse, Am. Nat. vii. pp. 666-669, agrees with Beck that the appearance of coarse beading is owing to two sets of uninterrupted lines on different surfaces.

MALLOPHAGA.

A. S. Packard, in Hayden's 6th Annual Report of the Geological Survey of the Territories, pp. 731-734, describes the following new species collected by C. H. Merriam when employed upon the Government Survey of the Rocky Mountains :—

Menopon picicola, p. 731, fig. 58, on *Picoides arcticus* and *dorsalis*.

Goniodes merriamanus, p. 731, fig. 59, on *Tetrao richardsoni*; *G. mephitidis*, p. 732, fig. 60, on *Mephitis*.

Nirmus buteonivorus, p. 733, fig. 61, on *Buteo swainsoni*.

Docophorus syrni, p. 733, fig. 62, on *Syrnium nebulosum*.

TERMITIDÆ.

MÜLLER, FRITZ. Beiträge zur Kenntniss der Termiten. Jen. Z. Nat. vii. pp. 337-357, 451-463, pls. xix. & xx.

An exceedingly valuable contribution to the natural history of White-ants, showing (from personal observation in the province of Santa 1873. [VOL. X.]

Catharina, Brazil) that many of the popular and scientific ideas on important points are pure misconceptions, and, in the main, upholding the assertions of Lespès, many of which had been called in question. Taking as a type a colony of a species of *Termes*, he arrives at the following conclusions:—from very young larvæ, the future states of which are not determinable, there are produced two main larval conditions; first, larval forms not fitted for reproduction, developing respectively into soldiers and workers; secondly, larvæ of forms fitted for reproduction in different degrees. These larvæ develop into nymphs of two forms; from the first are produced winged individuals, the greater part of which appear to die without performing the sexual function, but some of which become 'Kings' and 'Queens'; from the second form there proceed nymphs that in turn become 'surrogate' or 'complementary' males and females that never leave the termitarium, but are nevertheless capable of reproduction, the abdomen of the female never swelling to the enormous size of that of the queen, and the ovaries containing but few eggs. One small nest opened by the author contained a large chamber, but in it, instead of a queen, he found 31 complementary females and a single true fully developed king, the females depositing eggs, and thus, as he expresses it, instead of a royal palace with queen of royal birth, he had before him simply a harem, in which was the king with a multitude of paramours. The popular idea of pairing taking place in the air he also doubts. According to observations on several species of *Calotermes*, he found that the worker-form did not exist with them, and he proves that the soldiers are apparently arrested developmental forms, for even the external sexual characteristics were present, and dissection proved that the testes of the males existed, although in an aborted condition, and that the female internal organs were developed, with the exception of the seminal receptacles. Several new species are indicated, but diagnostic characters of the perfect insects are only given in two instances, viz.:—*Calotermes canella* (p. 334) and *Termes lespesii* (p. 349). A new genus—*Anoplotermes* (p. 347)—differs from all others in a point of internal structure, and includes a species indicated as *A. pacificus*, and probably also *Termes ater*, Hagen, and *T. cingulatus*, Burm. The papers are illustrated by many woodcuts showing the structure of the nests; the plates are devoted to matters of internal anatomy.

Termes flavipes. Hagen, P. Bost. Soc. xv. p. 277, notices damage occasioned by this insect to vines, books, &c.

PSOCIDÆ.

SELYS-LONGCHAMPS, E. DE. Révision des Psocides décrites par Rambur, suivie de la Liste des espèces de cette famille observées jusqu'ici en Belgique. Ann. Ent. Belg. xvi. pp. 1-9.

The determinations agree in the main with those previously given by Hagen in his 'Psocinorum synopsis synonymica'; the exceptions are as

follows:—*Psocus subfasciatus* = *Peripsocus albiguttatus*, Dalm.; *Ps. obscurus* is a *Peripsocus*; *Ps. conspurcatus* = *Ps. 4-maculatus*, Lat.; *Ps. lucifugus* is probably the larva or nymph of a *Psocus* or *Cecilius*; *Ps. pedicularius* = *Psyllipsocus ramburi*, Selys. Twenty-one species are enumerated as found in Belgium.

PERLIDÆ.

GERSTÄCKER, Festschr. nat. Fr. 1873, pp. 60-74, pl., figs. 17-33, minutely details the characters of the genus *Pteronarcys*, especially with regard to the exceptional external respiratory organs, and describes a new species under the name of *P. frigidu* (p. 65, figs. 28 & 29) from Labrador. He also describes and figures a second genus from Chili (*Diamphipnoa*, p. 62) with an analogous respiratory system (the species is named *D. lichenalis*, p. 64, fig. 17). In *Pteronarcys*, according to Newport, and his observations are confirmed by Gerstäcker, there are 13 pairs of external breathing organs, viz., 5 pairs on the prosternum, 3 on the mesosternum and metasternum respectively, and 2 on the basal ventral abdominal segments; whereas, in *Diamphipnoa* the thoracic pairs are absent, but there are 4 abdominal pairs. The two genera are also abundantly distinct in neuration, &c. [*D. lichenalis* is apparently identical with the previously described *Stenoperla annulata*, Brauer (cf. Zool. Rec. vi. p. 452), but the genus *Diamphipnoa* should stand.]

HAGEN, P. Bost. Soc. xv. pp. 281-288, gives a monographic sketch of the species of *Pteronarcys*. The species called *proteus* by Pictet is considered distinct from Newman's species of that name, and is renamed *picteti* (p. 286).

EPHEMERIDÆ.

A. E. Eaton, Tr. E. Soc. 1873, pp. 381-406, has published critical notes on his 'Monograph of the *Ephemeridæ*' (Zool. Rec. viii. p. 405) communicated to him by H. A. Hagen in a series of letters, accompanied by remarks of his own. These are principally connected with the bibliography and synonymy of the subject, and are too intricate for analysis here.

Oniscigaster, g. n., McLachlan, Ent. M. M. x. p. 109: differs from all known genera by the terminal abdominal segments being dilated laterally into broad wing-like lobes. *O. wakefieldi*, sp. n., *id. l. c.* p. 110 (with figure), New Zealand.

A swarm of Ephemerids passing through the town of Lewisburg on the Susquehanna River, Aug. 22nd, estimated at a mile in length and nearly half a mile in width, and so dense as to obscure sight across the streets, is noted by Gentry, P. Ac. Philad. 1873, p. 350.

ODONATA.

Hagen reports on S. H. Scudder's *Odonata* from the White Mountains after an examination of his types: P. Bost. Soc. xv. pp. 376 & 377.

Spagnolini gives a list of 20 species occurring in Modena; Bull. Ent. Ital. v. pp. 166-169.

Tacchetti records 23 species from Padua, *l. c.* pp. 257-263.

Gerstacker (Festschr. nat. Fr., 1873, pp. 39-59, figs. 1-16) gives an exhaustive analysis of the composition of the parts of the mouth in the *Odonata*, detailing the variations in different groups, and comparing his own ideas with the varied and often antagonistic theories propounded by previous authors.

Notes on the destruction of Dragon-flies by birds: Canad. Ent. v. pp. 159 & 160.

Gerstacker, in Von der Decken's Reisen in Ost-Afrika, iii. pt. 2 (*ante* p. 216), describes in full the species previously diagnosed by him (*cf.* Zool. Rec. vi. pp. 455 & 456).

Libellulina.

Libellula quadrimaculata. Notes concerning a great migratory swarm observed in Prussia in May, 1872, by A. Kuwert, S. E. Z. xxxiv. pp. 374 & 375.

Mesothemis composita, sp. n., Hagen, Hayden's 6th Report, p. 728, Yellowstone River.

Libellula julia, Uhler, = *L. exusta*, Say; Hagen, P. Bost. Soc. xv. p. 265.

Æschnina.

Æschna brevistyla, Ramb., occurs in New Zealand; McLachlan, Ann. N. H. (4) xii. p. 34.

Gomphina.

SELYS-LONGCHAMPS, E. DE. Troisièmes additions au Synopsis des Gomphines, pp. 1-46, et appendices, pp. 47-87. Also published subsequently in Bull. Ac. Belg. (2) xxxv. pp. 732-774, & xxxvi. pp. 492-531.

The number of species is stated to be 188 (raised in the appendix to 200); and descriptions are completed of many species of which only one sex was previously known, or of which the types were before imperfect. In the appendices the 'sub-genera' of the great group *Gomphus* are remodelled, and there is a general index to the Synopsis and all the 'additions.' Three new 'sub-genera' are noticed:—

Cyanogomphus (s. g. of *Gomphus*), p. 26. Allied to *Epigomphus* and *Agriogomphus*. The internal nervule of the pterostigma prolonged direct to the principal sector; the sectors of the arculus much separated. In the ♂ the 10th segment truncate above; the superior appendages straight and conical, the inferior with the branches not divaricate. *C. waltheri*, sp. n., p. 27, Rio Janeiro.

Octogomphus (s. g. of *Gomphus*), p. 32. Branches of the inferior appendages of the ♂ divaricate, and, with the superior appendages, furcate at the apex. Type, *Neogomphus specularis*, Hagen.

Allopetalia (s. g. of *Petalia*), p. 65 (appendix). ♀ Discoidal triangles of 3 or 4 cellules, oblong in the superior wings, nearly equilateral in the inferior; internal triangle small and simple in the superior wings,

elongate, and divided into two cellules in the inferior. Eighth and ninth segments dilated. Vulvar plates almost as in the *Æschina*, to which the species form a transition. *A. pustulosa*, sp. n., p. 67, Bogotá; *reticulosa*, sp. n., p. 70, Bogotá?; the latter is declared by Hagen (*in litt.*) to be a true *Æschnid*.

The other spp. nn. are as follows:—

Gomphus confraternus, p. 16, *sobrinus*, p. 18, and *olivaceus*, p. 21, California; *scudderi*, p. 24, United States.

Hemigomphus amphi-clitus, p. 30, Queensland.

Progomphus (?) *paucinervis*, p. 34, Quito; *borealis* (McLachlan, MS.), p. 36, Oregon.

Gomphoides regularis, p. 37, Brazil.

Gomphidia maclachlani, p. 39, Labuan.

Itinus australis, p. 41, Queensland.

Ophiogomphus bison, p. 51 (appendix), California.

Gomphus personatus, Assam, *promelas*, Madras, p. 53 (appendix).

Cyclogomphus vesiculosus and *verticalis*, p. 56 (appendix), India.

Hemigomphus (?) *lateralis*, p. 57 (appendix), North Australia.

Progomphus pygmaeus, p. 58 (appendix), Bogotá.

Gomphoides suasa, p. 59 (appendix), Vera Cruz and Tampico (race of *suasa* ?), p. 60, Putla; *ambigua*, p. 61, Guatemala.

Hagenius (?) *aberrans*, p. 62 (appendix), North India.

Thecagaster parvistigma, p. 64 (appendix), Himalaya.

Cordulegaster annulatus, race *immaculifrons*, p. 65 (appendix), S. Europe, Tangiers, Asia Minor; *bidentatus*, race *anatolicus*, p. 64, Broussa.

Calopterygina.

SELYS-LONGCHAMPS, E. DE. Troisièmes additions au Synopsis des Calopterygines, pp. 1–56, et appendice, pp. 57–66. Appeared subsequently in Bull. Ac. Belg. (2) xxxv. pp. 469–519, & xxxvi. pp. 610–619.

Describing the new species and ‘races’ discovered since the publication of the ‘Secondes Additions,’ with synonymic notes. The number of species is raised to 145 (or to 152 with the appendix); and there is a general index to the Synopsis and all its ‘additions.’

The new species and ‘races’ (not described elsewhere) are as follows:—
Mnais andersoni, (McLachlan, MS.), p. 8, Yunan.

Vestalis melania, p. 10, Luzon.

Lais guttifera, p. 11, Brazil.

Heterina donna, p. 14, Brazil; *capitalis*, p. 18 (race of *majuscula* ?), Bogotá.

Euphæa subcostalis (race of *tricolor* ?), p. 19, Labuan.

Dysphæa lugens (race of *dimidiata* ?), p. 21, Borneo; *sublimbata* (race of *dimidiata* ?), p. 22, Labuan.

Rhinocypha eximia (McLachlan, MS.) and *humeralis*, p. 24, Borneo; *frontalis*, p. 26, Moluccas and Menado; *cucullata*, p. 28, Labuan.

Libellago cyanifrons, p. 29, Gaboon.

Thore picturata (race of *saundersi* ?), p. 35, Cayenne; *æquatorialis* (race of *picta* ?), p. 36, Ecuador.

Euthore plagiata (race of *fasciata* ?), p. 37, Rio Negro.

Cora alcyone, p. 39, Bogota; *inca*, l. c., Quito and Ecuador.

Sapho gloriosa (McLachlan, MS.), p. 58 (appendix), Gaboon and Cameroons.

Vestalis apicalis, p. 59 (appendix), India.

Rhinocypha monochroa, p. 61 (appendix), Celebes; *albistigma*, p. 62, Malayan Islands.

Micromerus semiopacus, p. 64 (appendix), Sarawak; *rufescens*, l. c., Celebes or Mindanao.

Previously unknown sexes of many species are described, together with indications of local forms not considered sufficiently marked to receive names. *Sapho longistigma* is referred to *Cleis*, with doubt as to the distinctive characters of the latter; *Heterina macropus* and *occisa* are united; and the species of *Thore* and *Cora* are reviewed. In the appendix (p. 65) it is stated that *Thore saundersi* = *picta*, Rambur, and *picta*, Selys, is re-named *albivittata* (Bates, MS.).

Calopteryx virginica, Westw. = *C. equabilis*, Say; Hagen, P. Bost. Soc. xv. p. 274.

Agrionina.

Telebasis zealandica, McLachlan, Ann. N. H. (4) xii. p. 35, and *T. sobrina*, p. 36, New Zealand, spp. nn.

The female of a species of this family has been seen to descend beneath the surface of the water in order to deposit her eggs; G. W. Dunn, Am. Nat. vii. p. 498. Cf. also McLachlan, Ent. M. M. x. p. 163.

ORTHOPTERA.

BY

ROBERT McLACHLAN, F.L.S.

BOLIVAR, IGNACIO. Ortópteros de España nuevos ó poco conicidos. An. Soc. Esp. ii. pp. 213-237, pl. ix.

Descriptions of new species, additions to the Spanish Fauna, and critical remarks on allied forms.

FREY-GESSNER, E. Orthopterologisches. MT. schw. ent. Ges. iv. pp. 7-20, pl. i.

12 additional species to the Swiss Fauna are recorded, making a total of 88.

GERSTÄCKER, A. Zur Morphologie der Orthoptera-amphibiotica. [Ante, p. 428.]

KRAUSS, HERMANN. Beitrag zur Orthopteren-Fauna Tirols. Verh. z.-b. Wien, xxiii. pp. 17-24, pl. i.

Supplementary to Graber's paper (*cf.* Zool. Rec. iv. p. 453) on the same fauna, with 8 additional species, making 90 in all.

SCUDDER, S. H. Notes on the *Orthoptera* collected by Dr. F. V. Hayden in Nebraska. Hayden's Survey of Nebraska, 1872.

STÅL, C. *Orthoptera* nova. Öfv. Ak. Forh. 1873, No. 4. pp. 39-53.

——. Recensio Orthopterorum. Revue critique des Orthoptères décrits par Linné, De Geer, et Thunberg. Pt. i. Stockholm: 1873, 8vo, pp. 1-154.

The commencement of a valuable and laborious work. The author comments upon the difficulty of determining some of the species described by the old entomologists, consequent upon the fact that the types have been, in some cases, apparently changed. He enters at length into the question of the rule of priority, and gives it his strongest adherence. The neururation of the wings of *Orthoptera* is critically examined. Many new genera and species existing in the Stockholm Museum are described, the former in a series of analytical tables of the groups treated upon. The systematic part of the work is in an intensely complicated form.

THOMAS, CYRUS. Descriptions of new species of *Orthoptera* collected in Nevada, Utah, and Arizona, by the expedition under Lieut. Geo. M. Wheeler. P. Ac. Philad. 1873, pp. 295-297.

——. Notes on *Orthoptera*. Hayden's 6th Annual Report of the Geological Survey of the Territories, pp. 719-725.

GERSTÄCKER, in Von der Decken's Reisen in Ost-Afrika. iii. pt. 2. pp. 1-50, pls. i.-iii., describes in detail (and in many cases figures) various new species previously diagnosed by him in Arch. f. Nat. xxxv. (*cf.* Zool. Rec. vi. p. 445).

FORFICULARIÆ.

Gerstäcker (Von der Decken's Reisen) figures *Brachylabis lata*, pl. iii. fig. 8. *Forficula gravidula*, fig. 9.

BLATTIDÆ.

Blatta carpetana, sp. n., Bolivar, An. Soc. Esp. ii. p. 214, pl. ix. fig. 1, Spain.

Gerstäcker (Von der Decken's Reisen) figures on pl. i., *Gynopeltis picta* (figs. 1 & 2), *Derocalymma porcellus* (fig. 3), and *D. capucina* (fig. 4).

MANTIDÆ.

C. STÅL. Sv. Ak. Handl., Bihang. i. No. 10. pp. 1-26. enters into a

lengthy and detailed critique of the system of classification of the groups and genera effected by Saussure.

Mantis assoi, sp. n., Bolivar, *l. c.* p. 216, Spain.

Gerstäcker (Von der Decken's Reisen) figures *Tarachodes pantherina*, pl. i., fig. 5, *Mantis vineta*, fig. 6, *M. superciliaris*, fig. 7, *Pyrgomantis singularis*, fig. 8.

PHASMIDÆ.

Bacillus. J. Wood-Mason, Ann. N. H. (4) xii. p. 347, states that the true males of *B. insignis* and its allies are to be sought in insects of the type of *Lonchodes stilpnus*, &c., and that the discovery of the male of *B. insignis* necessitates the transfer of *B. cunicularis* and *hyphereon* (Westwood), *B. patellifer* and *scytale* (Bates), *B. ramosus* (Sauss.), *B. penthesilea* and *furcillatus* (Wood-Mason), and probably also *B. woodwardi* and *scabriusculus*, to the genus *Lonchodes*. The true male of *B. insignis* (now called *Lonchodes*) is described at p. 348.

The same author, J. A. S. B. (n. s.) xlii. pt. 2, pp. 45-56, pls. v.-vii., describes as new species:—

Bacillus fuscilineatus, p. 46, pl. v. fig. 7, Punjaub; *hispidulus*, p. 47, pl. vii. figs. 2-3, South Andaman; *oxytenes*, p. 48, pl. v. fig. 3, Pegu; *lævigatus*, p. 49, pl. v. fig. 4, Assam; *westwoodi*, p. 50, pl. vi. fig. 3, South Andaman; (*Baculum*) *insignis*, p. 51, pl. v. figs. 1-2, Assam, Sikkim, &c.; (*Baculum*) *penthesilea*, p. 52, pl. v. fig. 5, Bhutan; (*Baculum*) *furcillatus*, p. 54, pl. v. fig. 6, Bhutan; *scabriusculus*, p. 55, pl. vii. fig. 1.

Bacillus patellifer, Bates, = *B. ? artemis*, Westw.; *id. l. c.* p. 51.

GRYLLIDÆ.

Orocharis saltator, Uhler. Habits noticed by Riley in Rep. Ins. Mo. v. p. 119, with figures.

Gerstäcker (Von der Decken's Reisen) figures *Gryllotalpa debilis*, pl. i. fig. 13 (wing), *Gryllus pulchriceps*, fig. 9 (wing), *xanthoneurus*, fig. 10, *scenicus*, fig. 11.

LOCUSTIDÆ.

STÅL (Efv. Ak. Forh. 1873) establishes the following new genera in this family [owing to the intricate manner in which these are arranged, in a dichotomous form, the Recorder finds it impossible to reproduce their characters]:—

Acanthoplus (allied to *Heterodes*), p. 39. Type, *Heterodes longipes*, Chp.

In the PHANEROPTERIDÆ are the following:—

Trigonocorypha (p. 39). Type, *Locusta crenulata*, Thbg.

Stilpnochlora (p. 40). Type, *Phylloptera marginella*, Serv.

Philophyllia. Type, *P. guttulata*, sp. n., p. 42, Brazil.

Eurycorypha. Type, *Phylloptera cereris*, Stål.

Plangia. Type, *Phylloptera graminea*, Serv.

Amblycorypha. Type, *Phylloptera oblongifolia*, De Geer.

Ctenophlebia (p. 41). Type, *Phylloptera myrtifolia*, De Geer.

Anaulacomera. Includes *Phaneroptera submaculata*, Stål, *nodulosa*, sp. n., p. 43, Surinam, and *opacifolia*, sp. n., *l. c.*, Brazil.

Plagiopleura. Type, *P. nigrimarginata*, sp. n., p. 42, Brazil.

Plagioptera. Type, *P. cincticornis*, sp. n., p. 43, Brazil.

Scudderia. Type, *Phaneroptera curvicauda*, De Geer.

Pyrrhicia. Type, *Phaneroptera rubescens*, Stål.

Hormilia. Type, *Phaneroptera tolteca*, Sauss.

Burgilis. Type, *Phaneroptera curta*, Serv.

Holochlora (p. 42). Types, *H. fatidica*, Sierra Leone, and *venosa*, Java (p. 43), spp. nn.

Mirollia. Type, *Phylloptera carinata*, Haan.

Terpnistria. Type, *Phaneroptera zebra*, Serv.

Eurycorypha stylata (p. 43), sp. n., Sierra Leone.

Stirodon citrifolium, Serv. (*nec L.*), is re-named *ponderosum*, p. 42.

The PSEUDOPHYLLIDÆ contain the following :—

Phyllomimus (p. 44). Type, *P. granulatus*, sp. n., p. 48, locality unknown.

Scopiorus (p. 45). Type, *S. sutorius*, sp. n., p. 48, Antioquia.

Phyllostachys. Type, *Acanthodis scariosa*, Burm.

Brisilis (p. 46). Includes *Acanthodis aquilina*, L., *vulturina*, De Geer, and *brachyptera*, Burm.

Cocconotus. Type, *Meroncidium degeeri*, Stål.

Leptotettix (p. 47). Type, *Locusta falconaria*, De Geer.

Bliastes. Type, *B. punctifrons*, sp. n., p. 49, Antioquia.

Ischnomela. Type, *I. gracilis*, sp. n., p. 49, Carthagera.

Liparoscelis. Types, *L. pallidispina* and *nigrispina*, spp. nn., p. 49, Mexico.

Trichotettix. Type, *T. pilosula*, sp. n., p. 47, Columbia.

Stenotettix. Type, *S. macilentus*, sp. n., p. 50, Antioquia.

Moristus. Type, *Locusta lanceolata*, Stoll.

Pseudophyllus lineolatus, locality unknown, and *afzeli*, Sierra Leone, spp. nn., p. 48.

Pterochroza sinuosa, sp. n., *l. c.* Brazil.

Acanthodis spiculata, sp. n., p. 49, Antioquia.

In the CONOCEPHALIDÆ are the following :—

Oxyprora (p. 50). Type, *Locusta acuminata*, De Geer.

Pyrgocorypha. Type, *Conocephalus subulatus*, Thbg.

Copiophora brevirostris, sp. n., p. 50, Carthagera.

Idioderus, g. n., allied to *Callimenes*. Lucas, Ann. Soc. Ent. Fr. (5) iii. p. 102. Type, *Callimenes grandis*, id. *l. c.* p. 103, pl. iii. figs. 1-9.

Pterolepis brunneri, sp. n., Krauss, Verh. z.-b. Wien, xxiii. p. 20, pl. i. figs. 8-15, South Tirol.

Ceuthophilus sloanii, sp. n., Packard, Rep. Peab. Ac. v. p. 93, Indiana (in a cave).

Pycnogaster graellsii, sp. n., Bolivar, Ann. Soc. Esp. ii. p. 218, Manzandres.

Platycleis saussuriana, sp. n., Frey-Gessner, MT. schw. ent. Ges. iv. p. 8, pl. i. fig. 1, Valais.

Barbitistes ruficostata (Fieber, MS.), sp. n., *id. l. c.* p. 19, pl. i. fig. 2, Ticino.

Meconema brevipenne, Yersin: both sexes described and figured by Krauss, Verh. z.-b. Wein, xxiii. p. 19, pl. i. figs. 1-5, from Tirolean examples.

Gerstäcker (Von der Decken's Reisen) figures *Eugaster loricatus*, pl. ii. fig. 1, *ephippiatus*, fig. 2, *talpa*, fig. 3, *Cymatomera paradoxa*, fig. 4 (head).

ACRYDIIDÆ.

THOMAS, C. The *Acrididæ* of the United States. Hayden's Report of the United States Geological Survey of the Territories, v. pt. i. Washington: 1873, 4to, pp. 1-258, pl.

An exceedingly valuable monographic Synopsis of all the North American species, commencing with notes on structure, a review of the different classifications proposed by authors, list of species (227), notes on critical species, tabular synopsis, &c. The family is divided into two sub-families, *Acridinæ* and *Tettiginæ*, and the former of these into 7 groups. The author adopts the reprehensible plan (in vogue with some other American naturalists) of placing his own name after already described species when they are transferred by him to other genera. He describes the following new genus and species:—

Tropidolophus, p. 138; type, *Gryllus formosus*, Say.

Tryxalis brevipennis, p. 58, fig. 12, Florida.

Pyrgomorpha punctipennis, p. 68, East Tennessee.

Chrysochraon abdominalis, p. 74, Montana.

Stenobothrus occipitalis, p. 81, Colorado, Wyoming, and Idaho; *tricarinatus*, p. 84, Wyoming.

Gomphocerus clavatus, p. 96, Kansas.

Tragocephala pacifica, p. 101, California.

Edipoda plattei [*platteana* vel *plattearum*], p. 123, Platte Rivers, Colorado and Wyoming, *hoffmani*, p. 127, Nevada?

Pezotettix unicolor, p. 151, Illinois.

Platyphyma montana [-*næ*, vel *montanense*], p. 155, Montana.

Pedioscertetes, g. n., Thomas, P. Ac. Philad. 1873, p. 295. Resembles *Acrolophitus*, but the pronotum is not crested, and its posterior margin is rounded. *P. nevadensis*, sp. n. *id. l. c.* Nevada.

Acridium shoshone [!], sp. n., *id. l. c.* p. 296, Nevada and Utah.

Ephippigera longicauda, p. 220, fig. 3, *martínezzi*, p. 222, fig. 4, *miegii*, p. 224, fig. 5, Bolivar, An. Soc. Esp. ii. pl. ix., Spain, spp. nn.

Platycleis boscæ, sp. n., *id. l. c.* p. 229, pl. ix. fig. 6, Escorial.

Thrinacus perezi, sp. n., *id. l. c.* p. 234, pl. ix. fig. 9, Spain.

GERSTÄCKER, S. E. Z. xxiv. describes the following new genus and species:—

Perixerus, p. 192. Allied to *Dactylotum*, differs in its pilose body, more slender antennæ and legs, narrower and shorter head, flat vertex, more approximate eyes, the transverse sulci of the prothorax almost

obsolete; elytra and wings squamiform, irregularly areolate. Type, *P. squamipennis*, p. 192.

Monachidium carbunculus, p. 185, Brazil.

Rhomialia nuptialis, l. c., Salto Grande; *psittacus*, l. c., Bogotá; *trogon*, p. 186, Costa Rica.

Xiphocera cyanoptera and *hymenæa*, l. c., Brazil; *bilunata* and *psittacoma*, p. 187, Columbia; *bivittata*, l. c., Bogotá; *picticollis*, p. 188, Bogotá.

Petasia satanas, l. c., South Africa.

Acridium amethystinum, p. 189, Pará; *cubiceps*, l. c., Salto Grande; *trochilus*, l. c., Bogotá; *bracteatum*, p. 190, Brazil; *virgatum*, l. c., Salto Grande; *porphyreum*, p. 191, Brazil?; *nasicum*, l. c., Salto Grande; *falconicum*, l. c., Rio Janeiro.

Dactylotum pictum, p. 192, Mexico.

Diponthus festivus and *dispar*, p. 193, Brazil.

Ommatolampis venusta, p. 194, Mexico; *cardinalis*, l. c., British Guiana; *pugnax*, l. c., Bogotá; *acanthopus*, p. 195, Guyaquil; *carinipes*, l. c., Bogotá.

Sphenarium histrio and *ictericum*, p. 196, Mexico.

STÅL, *Œfv. Ak. Forh.* 1873, works out some groups in the same manner as followed by him in the *Locustidæ*, and indicates the following new genera (mostly in a tabular form):—

Monistria, p. 50, allied to *Pyrgomorpha*. Type, *M. pustulosa*, sp. n., l. c. Australia.

Zonocerus, p. 51. Types, *Gryllus elegans* and *lævis*, Thbg.

Aularches. Type, *Pæcilocerus miliaris*, L.

Taphronota. Type, *Pæcilocerus porosus*, Stål.

Maura. Type, *Petasia rubro-ornata*, Stål.

Colpolopha, p. 52. Type, *C. sinuata*, sp. n., p. 53, New Grenada.

Elæochlora. Type, *Gryllus scaber*, Thbg.

Procolopia. Type, *Xiphicera emarginata*, Serv.

Alophonta. Type, *Xiphicera dorsalis*, Burm.

Phymateus viridipes, p. 51, Caffraria.

Tryxalis acridoides, p. 52, Mexico.

Ischnacrida. Allied to *Mesopsis*, p. 53. Type, *I. teniata*, sp. n., l. c., locality unknown.

Oxyrrhypes. Allied to *Opomala* (l. c.). Type, *Opomala lineatitarsis*, Stål.

Cælopterna. Allied to *Ædipoda* (l. c.). Type, *Acridium acuminatum*, De Geer.

Stål, l. c., also describes as new species:—

Tropinotus angulatus, Bahia.

Pneumora granulata, Caffraria.

The same author in his 'Recensio Orthopterorum,' characterizes:—

Ochrophlebia, g. n., p. 14, for *O. radiata*, sp. n., Caffraria, and *Pæcilocerus ligneolus*, Serv., and *Gryllus caffer*, L.

Porthetis (*P.*) *cinerascens*, p. 23, Caffraria; *ignota*, p. 24, locality unknown, spp. nn.

Teniopoda, g. n., p. 50. *T. superba*, l. c., Honduras, and *picticornis*, p. 51, Mexico, spp. nn.

Zonipoda, g. n., p. 51. Type, *Acridium tarsatum*, Serv.; *Z. emarginata*, sp. n., p. 52, San Jago d'Estrella.

Hermistria (g. n.) *pulchripes*, sp. n., p. 52, Mexico.

Coscineuta, g. n., l. c., to include *Acridium coxale*, Serv., and *Gryllus virens*, Thbg.

Tetratania, g. n. Type, *Gryllus surinamus*, L.

Teniophora (g. n.) *dentipes*, p. 53, New Granada, and *geniculata*, p. 54, Northern Brazil, spp. nn.

Rhytidochrota (g. n.) *turgida*, p. 54, Antioquia, *antennata*, p. 55, and *sellata*, l. c., New Granada, spp. nn.

Gonica (g. n.) *rugulosa*, sp. n., p. 56, locality unknown.

Phaeoparia, g. n., p. 56, to include *Gryllus linea-alba*, L., and *P. annulicornis*, p. 57, and *mordax*, p. 58, spp. nn., both from New Granada.

Coptacra, g. n., p. 58, to include *Acridium fœdatum*, Serv., and *A. præmorsum*, Stål.

Traulia, g. n., l. c., for *Acridium flavo-annulatum*, Stål.

Calliptenus (*Euryphymus*) *ferruginosus*, sp. n., p. 72, locality unknown.

Tristria (g. n.) *lacerta*, sp. n., p. 80, China.

Stenopola, g. n., p. 83; *S.* (*Oxybleta*, sub-g. n.) *limbatipennis*, sp. n., p. 85, New Granada.

Arnilia, g. n., p. 85, for *Opsomala cylindrioides*, Stål.

Leptysmia, g. n., l. c., to include *Opomala filiformis*, Serv., *Tryxalis obscurus*, Thbg., and *O. marginicollis*, Serv.

Tropidolopa, g. n., p. 86. Type, *O. fasciculata*, Charp.

Acrida acuminata, sp. n., p. 97, Caffraria.

Macheridia (g. n.) *bilineata*, sp. n., p. 100, Sierra Leone.

Mermiria (g. n.) *belfragii*, sp. n., p. 102, Texas.

Syrbula, g. n., l. c., to include *Oxycoryphus montezuma*, Saus., and *S. leucocerca*, Texas, sp. n.

Tryxalis angusticornis, p. 105, South Carolina, and *T.* (*Orphula*, sub-g. n.) *intricata*, sp. n., Buenos Ayres, p. 106.

Amblytropidia (g. n.) *ferruginosa*, sp. n., p. 107, Brazil.

Arphia, g. n., p. 119, to include *Ædipoda sulphurea*, Burm., and *A. sanguinaria*, l. c., Vancouver's Island, sp. n.

Camnula (g. n.) *tricarinata*, sp. n., p. 120, Vancouver's Island.

Psophus, g. n., p. 121, for *Acridium rubripenne*, D. G.

Pycnodictya, g. n., l. c., for *Gryllus obscurus*, L.

Cosmorhyssa, g. n., l. c., to include *Gryllus fasciatus*, and *sulcatus*, Thunbg.

Pachytylus (*Ædaleus*) *wahlbergi*, p. 124, and *acutangulus*, p. 125, Caffraria, spp. nn.

Prionidia, g. n., p. 127, to include *Gryllus bimaculatus* and *villosus*, Thunbg.

Heteropternis, g. n., p. 128, for *Acridium pyrroscolis*, var. a., De Haan.

Ædipoda belfragii, p. 129, Illinois, *punctata*, p. 130, Mexico, spp. nn.

Trilophidia, g. n., p. 131, to include *Ædipoda cristella*, Stål, *Gryllus annulatus*, Thunb., and *T. rugosa*, p. 132, Caffraria, sp. n.

Psinidia, g. n., p. 133, to include *Ædipoda fenestralis*, Serv., *P. capito*, l. c. Texas, and *fuscifrons*, p. 134, Texas, spp. nn.

Trimerotropis, g. n., p. 134, to include *Ædipoda placida*, Stål, and *Locusta maritima*, Harris.

Acrotylus flavescens, Cape of Good Hope and China, *apricarius*, Cape of Good Hope, p. 135, spp. nn.

Bulla longicornis, sp. n., p. 139, Caffraria.

Pompholyx, g. n., p. 144, for *Pneumora granulata*, Stål.

Tettix impressus, sp. n., p. 151, Caffraria.

Ædipoda discoidea, *rugosa*, *corallipes*, *haldemani*, and *paradoxa*. Thomas (Hayden's 6th Report, p. 720) is inclined to believe that these are all local forms of one species.

Ædipoda differentialis, figured by Riley in Rep. Ins. Mo. v. p. 14.

Gerstäcker (Von der Decken's Reisen) figures *Opomala brachyptera*, pl. ii. fig. 5, *Petasia hecate*, fig. 6, *Sphenarium pulchripes*, fig. 7, *Chorætypus hippiscus*, fig. 8, *Pomphagus atrox*, fig. 9, *Tryxalis sulphuripennis*, pl. iii. fig. 1, *Chrysochraon dasynemesis*, fig. 2, *Acridium deckeni*, fig. 3, *Catantops decoratus*, fig. 4, *Stenocrotylus cervinus*, fig. 5, *Ixalidium hæmatoscelis*, fig. 6, *Hymenotes humilis*, fig. 7.

RHYNCHOTA.

BY

E. C. RYE, F.Z.S.

HEMIPTERA—HETEROPTERA.

PUTON, A. Notes pour servir à l'étude des Hémiptères. Ann. Soc. Ent. Fr. (5) iii. pp. 11-26, pl. i.

Descriptions of new or little known species, synonymical notes, and localities for various known species.

REUTER, O. M. Ameisen-Aehnlichkeit unter den Hemiptern. MT. schw. ent. Ges. iv. pp. 156-159.

After remarks on the imitative appearance of various *Hemiptera*, the author especially notes the resemblance to ants afforded by *Systellonotus 3-guttatus*, L., ♀, and *Diplacus albo-ornatus*, St., of which the two forms are discussed, with general observations on myrmecophilous species.

STÅL, C. Enumeratio Hemipterorum. Bidrag till en Förteckning öfver alla hittills kända Hemiptera. Pt. 3. Sv. Ak. Handl. xi. (1873) No. 2, pp. 1-163.

Comprises the *Scutellerina* (a sub-family of the author's *Pentatomidæ*) of Europe, Asia, Africa, and Australia (pp. 1-32); the *Coreidæ* of Africa,

Asia, and Australia (pp. 33-100); and the extra-European *Cimicidæ* (pp. 101-105), *Nabidæ* (pp. 106-114), *Tingitidæ* (pp. 115-134), *Aradidæ* (pp. 135-147), and *Acanthiidæ* [= *Saldidæ*, auctt.] (pp. 148 & 149). In addition to the divisions of *Scutellerina* relating to European species mentioned in Zool. Rec. ix. p. 401, the following are proposed:—*Sphærocoraria* (*Sphærocoris*, Burm., *Steganocerus*, Mayr, *Hyperoncus*, St.), *Scutelleraria* (*Peltophora*, Burm., *Cantao*, A. & S., *Scutellera*, Lam., &c.), and *Tetyraria* (*Hotea*, A. & S., and *Deroplax*, Mayr); and many genera are, of course, added to the divisions before mentioned. The other groups will be noticed *infra*. Many new divisions, genera, sub-genera, and species are incidentally indicated, for the most part in tables, and in no instance accompanied by the intimations of novelty employed by all other writers, the sole clue to them being the absence of reference to a former publication; and even this is not always to be relied upon, as some of the author's groups already published are mentioned with no back reference.

VOLLENHOVEN, S. C. SNELLEN VAN. De Inlandsche Hemipteren beschreven en Meerendeels ook afgebeeld. Tijdschr. Ent. (2) viii. pp. 75-122, pls. v.-vii.

This further portion of the author's work contains descriptions and figures of (pl. v.) *Temnostethus pusillus*, H. S., fig. 1, *Anthocoris nemorum*, L., fig. 2, *A. nemoralis*, F., fig. 3, *A. limbatus*, Fieb., fig. 4, *A. vittatus*, Fieb., fig. 5, *Piezostethus galactinus*, Fieb., fig. 6, *Triphleps minutus*, L., fig. 7, *Lycocoris domestica*, Schill., fig. 8, *Microphysa coleoprata*, Fall., fig. 9, *M. pselaphiformis*, Westw., figs. 10 & 11, *Acanthia lectularia*, L., fig. 12; (Pl. vi.) *Aradus depressus*, F., fig. 1, *A. leptopterus*, Germ., fig. 2, *Aneurus levis*, F., figs. 3 & 3a, *Dictyonota crassicornis*, Fall., fig. 4, *Monanthia cardui*, L., fig. 5, *M. humuli*, F., fig. 6, *M. wolffi*, Fieb., fig. 7, *M. 4-maculata*, Wolff, figs. 8 & 8a, *M. nigrina*, Fall., figs. 9 & 9a, *M. parvula*, Fall., figs. 10 & 10a, *M. cervina*, Germ., figs. 11 & 11a; (pl. vii.) *M. carinata*, Pz., figs. 1 & 1a, *M. obscura*, H. S., fig. 2, *Campylostira verna*, Fall., fig. 3, *Derephysia foliacea*, Fall., figs. 4 & 4a, *Asopus punctatus*, L., fig. 5, *Gonocerus venator*, F., fig. 6, *Pachymerus luniger*, Schill., fig. 7, pupæ of *Tingidina* (?), figs. 8 & 9.

WALKER, FRANCIS. Catalogue of the Specimens of Hemiptera Heteroptera in the collection of the British Museum. Parts vi. pp. 210 (*Pyrrhocoridæ* continued, *Capsidæ*, *Phymatidæ*, *Tingididæ* pt.), vii. pp. 213 (*Tingididæ* continued, *Piesmidæ*, *Brachyrhynchidæ*, *Aradidæ*, *Holoptilidæ*, *Piratidæ*, *Reduviidæ* pt.), viii. p. 220 (*Reduviidæ* continued, *Stenopodidæ*, *Ectrichodidæ*, *Apiomeridæ*, *Harpactoridæ*, *Saccoderidæ*, *Emesidæ*, *Hydrometridæ*, *Leptopodidæ*, *Saldidæ*, *Pelagonidæ*, *Hebridæ*, *Veliidæ*, *Gerriidæ*, *Galgulidæ*, *Naucoridæ*, *Nepidæ*, *Corixidæ*, *Notonectidæ*): 1873.

Some corrections referring to pts. i.-viii. are made at pp. 207 & 208 of pt. viii.

Specific characters in the neuration of the underwings of *Asopus custos*, *bidens*, and *punctatus*, *Cydnus bicolor*, *morio* and *nanus*, *Ælia klugi*, *Cimex rufipes*, *lituratus*, *prasinus*, *baccarum*, and *oleraceus*; *Acanthosoma hæmorrhoidale*, *hæmatogaster*, *clypeatum*, and *griseum*, *Syromastes marginatus* and *scapha*, *Stenocephalus*, *Alydus*, *Gonocerus*, *Corizus pratensis*, *Heterogaster* and *Cymus* are pointed out by Snellen van Vollenhoven, Tijdschr. Ent. (2) viii. Versl. pp. liv. & lv.

Captures at Deal : J. W. Douglas, Ent. M. M. ix. pp. 192 & 193.

PACHYCORIDÆ.

Elvisura, Stål, *nec* Spin., is re-named *Oxyprymna*. p. 5; *Callidea 12-punctata*, Germ., Dall., *nec* F., is re-named *natalensis*, p. 24; *Alphocoris lixoides*, St., *nec* Germ., is re-named *lobulatus*, p. 26; Stål, Sv. Ak. Handl. xi. No. 2.

Aulacostethus, g. n., P. R. Uhler, P. Bost. Soc. xiv. p. 93. Type, *Tetyra marmorata*, Say.

Anoplogonius, g. n., Stål, *l. c.* p. 33 (= *Graptocoris*, St., pt.), for *Chero-coris nigricollis*, Sign.

Phymatogonia, subg. n. of *Hotea*, A. & S., for *H. denticulata*, St.; *id. l. c.* p. 24.

Hyperoncus lineaticornis, sp. n., *id. l. c.* p. 7, Indian Archipelago.

Pecilochroma equestris [-*tre*], sp. n., *id. l. c.* p. 12, Malacca.

Philia fulgurans, Mysol, *cuprina*, New Guinea, spp. nn., *id. l. c.* p. 15.

Calliphara cruenta, sp. n., *l. c.* p. 17, Australia.

Phimodera levilinea, sp. n., *id. l. c.* p. 28, Dauria.

EURYGASTRIDÆ.

Xerobia, g. n., *id. l. c.* p. 29, for *Eurygaster sculpturatus*, St., and *X. verrucosa*, sp. n., *id. l. c.* p. 30, Beyrouth.

Holophlygdus, subg. n. of *Eurygaster*, *id. l. c.* p. 30, for *Cimex hottentottus*, F.

Macrocarenus, g. n., *id. l. c.* p. 32. *Eurygaster* ? *acuminatus*, Dallas [evidently founded on Dallas's observations only].

Psacasta lethierryi, sp. n., Puton, Ann. Soc. Ent. Fr. (5) iii. p. 11. Batna.

PODOPIDÆ.

Podops dilatata, sp. n., Puton, *l. c.* p. 12, pl. i. figs. 1 & 1a, Madrid.

ODONTOSCELIDÆ.

Arctocoris incisus, sp. n., Stål, *l. c.* p. 31, Bengal.

ASOPIDÆ.

Arma colorata, Walk., = *Euthyrhynchus punicus*; F. Walker, Cat. Hem. Brit. Mus. viii. p. 207.

Podisus serieventris, sp. n., P. R. Uhler, P. Bost. Soc. xiv. p. 94, U. S. America.

CYDNIDÆ.

Crocistethus cereus, Fieb., = *waltli*, Fieb., ♂; Puton, *l. c.* p. 23.

Æthus saprinoides, p. 403, Mombas, *sculptus*, Moschi, *macrops*, Endara, p. 404, Gerstäcker, in V. d. Decken's Reisen, iii. pt. 2.

SCIOCORIDÆ.

Sciocoris basalis, Fieb., = *macrocephalus*, Fieb., ♀; Puton, *l. c.* p. 23.

Anarropa, g. n., Gerstäcker, *l. c.* p. 397. Allied to *Caystrus* and *Dymantis*, St. Second and third joints of both antennæ and rostrum subequal; lateral lobes of head not longer than middle lobe; ocelli remote. *A. trivialis*, sp. n., *id. l. c.* p. 398, pl. xvii. fig. 1, Uru.

Menaccarus ovalis, p. 12, Biskra, *hirticornis*, p. 13, Bone, Puton, *l. c.* spp. nn.

HALYDIDÆ.

Brochymena harrisi, sp. n., P. R. Uhler, P. Bost. Soc. xiv. p. 95, U. S. America.

PENTATOMIDÆ.

Lioderma, g. n., P. R. Uhler, *l. c.* p. 97. Types, *Pentatoma saucia* and *senilis*, Say.

Atomosira, g. n., *id. ibid.* Type, *A. sordida*, sp. n., *id. l. c.* p. 98, U. S. America.

Euschistus fissilis, sp. n., *id. l. c.* p. 96, U. S. America.

Æliomorpha nasica, sp. n., Gerstäcker, *l. c.* p. 399, Mombas and Cape of Good Hope.

Pentatoma (Carbula) jipensis, sp. n., *id. l. c.* p. 400, See Jipe.

Ditomotarsus uribei, sp. n., Reed, An. Univ. Chil. xli. p. 355, Llanquihue.

Nopalis ? rogersi, sp. n., *id. l. c.*, Rio Puelo, Chili.

Bagrada (Nitilia, Muls., Rey) elegans (Fieb. MS.), sp. n., Puton, Ann. Soc. Ent. Fr. (v.) iii. p. 14, pl. i. figs. 2-2c, Aranjuez [in Puton's Cat. 1869, *Nitilia*, Muls., Rey, = *Stenozygum*, Fieb., which contains a species "*elegans*, Fieb., 1869"].

MICTIDÆ.

Helcomeria, g. n., Stål, *l. c.* pp. 37 & 40, for *Petascelis spinosus*, Sig.

Prionolomia, g. n., *id. ibid.*, for *Lygæus heros*, F., *Mictis malaya*, St. &c.

Elasmomia, g. n., *id. pp.* 38 & 41, for *M. granulipes*, Westw.

Phyllogonia, g. n., *id. ibid.*, for *Petascelis bilobus*, Sign.

Elasmopoda, g. n., *id. ibid.*, for *Cimex falx*, Dru., and *Mictis undata*, Dall.

Hoplopterna, g. n., *id. l. c.* p. 41 (*Hoplopterna*, p. 39), for *Cimex valgus*, L., &c.

Plectrocnemia, g. n., *id. l. c.* pp. 39 & 42, for *Mictis cruciata*, Dall., &c.

Pternistria, g. n., *id. l. c.* pp. 39 & 43, for *Anisoscelis macromera*, Guér., and *P. bispina*, sp. n., p. 43, Australia.

Odontobola, g. n., *id. ibid.*, for *Cimex bellicosus*, F.

Ochrochira, g. n., *id. l. c.* pp. 39 & 44, for *Mictis albiditarsis*, Westw., and *O. palliditarsis*, sp. n., p. 44, N. Hindostan.

Aspilosterna, subg. n. of *Mictis*, *id. l. c.* p. 46, for *M. macra*, St., &c.

Callichlamydia, subg. n. of *Mictis*, *id. l. c.* p. 47, for *M. metallica*, Sig.

Anoplocnemis, g. n., *id. l. c.* pp. 39 & 47, for *Cimex curvipes*, F., and 45 other species (*Mictis*, auctt.).

Odontorhopala, g. n., *l. c.* p. 55. Allied to *Dalader*. *O. callosa*, sp. n., *id. l. c.* p. 56, Madagascar.

Mygdonia amplicollis, sp. n., *id. l. c.* p. 43, Silhet.

Amorbus biguttatus and *atomarius*, spp. nn., *id. l. c.* p. 52, Australia.

Mictis cervina, sp. n., Gerstäcker, *l. c.* p. 406, Wanga.

Metapodius instabilis, p. 98, N. Carolina, *confraternus*, p. 99, Florida, spp. nn., P. R. Uhler, P. Bost. Soc. xiv.

HOMEOCERIDÆ.

Aschistus, g. n., Stål, *l. c.* pp. 57 & 63, for *Ornytus* ? *brevicornis*, Dall.

Ptyctus, sub-g. n. of *Latimbus*, St.; for *Philonus* ? *punctatus*, Dall., and *Homocerus concolor*, Germ.; *id. l. c.* p. 64.

Amblypelta, g. n., *id. l. c.* pp. 73 & 74. *A. bilineata*, p. 74, New Caledonia, *nitida*, p. 75, Australia, *id. l. c.*, spp. nn.

Homocerus inornatus, p. 58, Pondicherry, *biplagiatus*, Bombay, *sigillatus*, N. Hindostan, p. 59, *lavilineus*, Ceylon, *fasciolatus*, N. Hindostan, p. 60, *albiguttulus*, p. 61, *immaculipennis*, p. 62, Cochin China, *urbanus*, Ternate, *lineaticollis*, Borneo, *tenuicornis*, Singapore, p. 62; *id. l. c.*, spp. nn.

Latimbus nigrispinus, sp. n., *id. l. c.* p. 64, locality unknown.

Pendulinus (Dasynus) laminatus, sp. n., *id. l. c.* p. 74, Java.

ANISOSCELIDÆ.

Sciophyrus, g. n., Stål, *l. c.* pp. 66 & 67, for *Lybas inermis*, St.

Acanthotyla, g. n., *id. l. c.* pp. 67 & 68, for *Cletus fasciatus*, Walk.

ALYDIDÆ.

Protenor and *Cydamus*, (presumably) gg. nn. Stål, *l. c.* p. 88, div. *Micrelytraria*: no types mentioned.

Tollius, (presumably) g. n., *id. l. c.* p. 89, div. *Alydaria*: no type mentioned.

Trichocnemus, g. n., *id. l. c.* pp. 91 & 95, for *Alydus maculatus*, Thunb.

Melanacanthus, sub-g. n. of *Mirperus*, *id. l. c.* p. 92, for *Alydus scutellaris*, Dall., and *Tupalus ferrugineus*, St.

Megalotomus (Huphus) costalis, sp. n., *id. l. c.* p. 92, Japan.

Riptortus atricornis, sp. n., *id. l. c.* p. 94, N. Australia, Java.

Tenosius capicola, sp. n., *id. l. c.* p. 95, Cape of Good Hope.

Daclera rufescens, sp. n., *id. ibid.*, Australia.

STENOCEPHALIDÆ.

Stenocephalus agilis. "Ovipositor-saws" described and figured as not before observed (with head and proboscis, &c.); J. O. Harper, Sci. Goss. 1873, p. 228 [these are the well-known genital segments].

Dichromerus, sub-g. n. of *Stenocephalus*, Stål, l. c. p. 85, for *S. caffer*, Dall., and *S. (D.) punctipes*, sp. n., *id. ibid.*, Madagascar.

Erbula, sub-g. n. of *Leptocorisa*, *id. l. c.* p. 86, for *L. apicalis*, Westw.

Cosmoleptus, g. n., *id. l. c.* pp. 86 & 87, for *Lyrnessus limbaticollis*, St.

Leptocorisa phthisica, sp. n., Gerstäcker, l. c. p. 406, Mbaramu.

COREIDÆ.

Paethrocoris, Kolen., = *Enoplops*, Am. S.; and the species of *Spathocera* allied to *obscura*, Germ., are tabulated: Puton, Ann. Soc. Ent. Fr. (5) iii. pp. 15 & 16.

Dasycoris dorsalis, M. & R., = *hirsutus*, Fieb.; *id. l. c.* p. 23.

Phyllophyta, g. n., Stål, l. c. p. 80, for *Phyllomorpha persica*, Westw.

Acanthomia, g. n., *id. l. c.* pp. 81 & 82. *Syromastes horridus*, Germ., various species of *Clavigralla* and *A. curvipes*, Bissao, and *brevirostris*, Khartum, *id. l. c.* p. 82, spp. nn.

Oncaspidia, g. n., *id. l. c.* pp. 81 & 83, for *Clavigralla pilosicollis*, St.

Hoplolomia, g. n., *id. l. c.* pp. 82 & 84, for *H. scabricula*, sp. n., *id. l. c.* p. 84, Hindostan.

Aulacosternum punctipes, sp. n., *id. l. c.* p. 73, Australia.

Plināchtus scutellaris, sp. n., *id. l. c.* p. 75, Sennaar.

Cletus ferruginosus, p. 77, Cape of Good Hope, *saucius*, p. 78, N. Australia, *id. l. c.* spp. nn.

Phyllomorpha tetraptera, sp. n., Gerstäcker, l. c. p. 407, Moschi and See Jipe.

Mevania hystrix, sp. n., *id. l. c.* p. 408, Mombas.

Spathocera stali, sp. n., Puton, l. c. p. 14, Bone.

RHOPALIDÆ.

Peliochrous, g. n., Stål, l. c. pp. 97 & 98, for *Corizus nigrimaculatus*, St.

BERYTIDÆ.

Neides decurvatus, sp. n., P. R. Uhler, P. Bost. Soc. xiv. p. 100, New Hampshire.

PYRRHOCORIDÆ.

Dindymus circumcinctus, Stål, p. 11, Australia, *Pysopelta famelica*, St., Aru, *cincticollis*, St., Batchian, Sula, p. 19, *P. schlanbuschi*, F., Penang, p. 20, *Astemma stylophthalmum*, St., p. 37, Ega, *Theraneis vittata*, Spin., p. 39, Petropolis; "? varr." described, not named, by F. Walker, Cat. Hem. Brit. Mus. pt. vi.

Pyrrhocoris volucris, sp. n., Gerstäcker, in V. d. Decken's Reisen, iii. pt. 2, p. 413, Wanga.

Cenæus abortivus, sp. n., *id. ibid.* pl. xvii. fig. 4, Mombas.

Roscius illustris, sp. n., *id. l. c.* p. 414, pl. xvii. fig. 5, Mombas.

Dysdercus cardinalis, sp. n., *id. l. c.* p. 416, Mombas and Kiriamas.

Dindymus decisis, New Guinea, *basifer*, Gilolo, Ternate, p. 5, *discoidalis*, Philippine Isles, *clarus*, *simplex*, Celebes, p. 6, *imitator*, Siam, *effusus*, Mysol, Dorey, New Guinea, p. 7, *venustus*, New Guinea, *rutilans*, Siam, p. 8, *reducioides*, Celebes, *intermedius*, Mysol, *varius*, Aru, New Guinea, p. 9, *indignus*, p. 10, Siam, *biguttatus*, p. 11, *cinctifer*, p. 12, Australia, *dubius*, p. 12, locality unknown; Walker, *l. c.* spp. nn.

Melamphaus lateralis, p. 13, *marginalis*, *rubidus*, p. 14, *costalis*, p. 14, Celebes, *femoratus*, N. Hindostan, *angulifer*, Ceram, p. 15, *scutifer*, Gilolo, *circumdatus*, Waigiou, p. 16, *lycoides*, Philippine Isles, p. 17; *id. l. c.* spp. nn.

Physopelta apicalis and *plana*, p. 21, *bimaculata*, p. 22, Hindostan, *immunis*, p. 22, Siam, *id. l. c.* spp. nn.

Ectatops largoides, p. 24, Siam, *adustus* and *tenuicornis*, p. 25, Singapore, *amabilis*, Aru, *subjectus*, Celebes, *venustus*, New Guinea, p. 26, *coloratus*, Ceram, *ruficostatus*, New Guinea, p. 27; *id. l. c.* spp. nn.

Largus concisus, Brazil, *pulverulentus* and *obtusus*, Mexico, p. 33, *torridus*, Columbia, *anticus*, Amazons, p. 34, *divisus*, p. 35, Tunantins; *id. l. c.* spp. nn.

Arhaphæ cicindeloides, sp. n., *id. l. c.* p. 36, Mexico.

Acinocoris bilineatus, Demerara, *includens*, Cuenca, *id. l. c.* p. 38, spp. nn.

LYGÆIDÆ.

Notochilus gandolphii, Put., = *Rhyparochromus impressicollis*, Luc., which is not correctly described; *Notochilus*, *Thaumastopus*, and *Taphropeltus* must probably be united: Puton, Ann. Soc. Ent. Fr. (5) iii. p. 17. *Aoploscelis bilineatus*, Fieb., = *bivirgatus*, Costa; *Lasiocoris crassicornis*, Luc., = *anomalus*, Kol.; *Megalonotus puncticollis* and ? *luctuosus*, Luc., = *niger*, Fieb.; *Neurocladus (Acanthocnemis) ater*, Fieb., = *brachioides*, Duf.; *Pachymerus 5-maculatus*, M. & R., = *Oxycarenum modestus*, Fall.: Puton, *l. c.* p. 23.

Ptochiomera nodosa, Say, *Plociomerus constrictus*, Say, and *Eremocoris ferus*, Say: for synonymy, cf. P. R. Uhler, P. Bost. Soc. xiv. p. 100, *et seq.*

Ozophora, g. n., *id. l. c.* p. 102. Type, *O. picturata*, sp. n., *id. ibid.*, Massachusetts.

Belonochilus, g. n., *id. l. c.* p. 104 (Massachusetts).

Plociomerus diffusus, sp. n., *id. l. c.* p. 101, Massachusetts.

Peritrechus fraternus, sp. n., *id. l. c.* p. 103, Massachusetts.

Nysius destructor, sp. n., Riley, Rep. Ins. Mo. v. p. 113, fig. 41, Missouri (habits, &c. described, pp. 111 & 112) [= *N. raphanus*, Howard, Zool. Rec. ix. p. 409, according to the author, who states that Howard wishes to sink his own name; an impossibility after publication. Riley suggests that it and *N. angustatus*, Uhler, will possibly prove identical with the European *N. thymi*].

Ischnodemus bacillus, sp. n., Gerstäcker, in V. d. Decken's Reisen, iii. pt. 2, p. 409, pl. xvii. fig. 2, Moschi and See Jipe.

Lygæus amœnulus and *nasalis*, spp. nn., *id. l. c.* p. 411, Wanga.
Astacops mutilatus, sp. n., *id. l. c.* p. 412, pl. xvii. fig. 3, Mombas.
Ophthalmicus timidus, sp. n., Puton, *l. c.* p. 16, Biskra.
Proderus amabilis, sp. n., *id. l. c.* p. 17, Biskra.

ANTHOCORIDÆ.

Scoloposcelis crassipes, Flor, *rogeri*, Baer., = *pulchella*, Zett.; Puton, *l. c.* p. 23.

Lycotoris domesticus and *Triphleps insidiosus*, from North Carolina: observations on synonymy, &c., by P. R. Uhler, P. Bost. Soc. xiv. p. 106.

Cacodmus, g. n., Stål, *l. c.* pp. 103 & 104, for *Acanthia villosa*, St.

Æciacus, g. n., *id. l. c.* p. 104, for *Acanthia hirundinis*, Jen̄.

CAPSIDÆ.

Myiomma fieberi, Put., figured, pl. i. figs. 3-3g; *Isometopus alienus*, Fieb., fig. 4, *I. intrusus*, H. S., fig. 5, p. 20; *Calocoris lethierryi*, Fieb., = *Megacelum infusum*, H. S., p. 23; *C. femoralis*, Luc., = *fulvimaçulatus*, De G.; *C. tetraphlyctis*, Garb., *schmidti*, Fieb., = *bimaçulatus*, Hoff.; *Lopus lineolatus*, Brullé, *miles*, D. & S., *fulvimaçinatus*, Don., = *mat*, Rossi, var.; *Capsus fairmairii*, Sign., = *Bothynotus minki*, Fieb., = *B. pilosus*, Boh.; *Cyphodema meyerduri*, Fieb., = *instabile*, Luc.; *Lygus putoni*, M. D., = *apicalis*, Fieb.; *Ætorhinus kirschbaumi*, Flor, = *bilineatus*, Fall.; *Orthocephalus minutus* and ? *rugicollis*, Luc., = *minor*, Costa, ♂; *Tytthus pellucens*, Boh., = *pygmæus*, Z.; *Orthotylus pallidus*, M. D., = *Plagiognathus infuscatus*, Fieb., p. 24; *Malacocoris albipunctatus*, Garb., = *Macrotylus luniger*, Fieb.; *Agalliastes artemisiae*, Becker, and *tibialis*, Fieb., = *albipennis*, Fall., varr.; *A. meyeri*, Fieb., = *obscurellus*, Fall., p. 25; Puton, Ann. Soc. Ent. Fr. (5) iii.

O. M. Reuter, Nott. Fenn. xiv. (1873, sep. copy, pp. 1-25), gives the following synonymy, &c.:—*Myrmecophyes oschanini*, Fieb., *tricondyloides*, Osch., = *Diplacus albo-ornatus*, Stål; *Teratocoris flori*, J. Sahlb., = *saundersi*, D. & S.; *Phytocoris falleni*, Hahn, = *Camptobrochis punctulatus*, Fall.; *C. punctulatus*, Mey., Fieb., = *lutescens*, Schill.; *Phytocoris populi*, Zett., and ? *Capsus minor*, Thoms., = *P. crassipes*, Flor; *Capsus bifasciatus*, F. Sahlb., Kirschb., Flor, *nec F.*, = *Closterotomus variegatus*, Costa; *Capsus scutellaris*, Thoms., pt., = *Deræocoris morio*, Boh.; *Capsus punctatus*, F. Sahlb., = *P. punctatus*, Zett., = *Lygus pratensis*, L.; *L. rufescens*, Hahn, is not *rubricatus*, Fall., as Fieber opined; *L. sulcifrons*, D. & S., = *contaminatus*, Fall., Fieb., *nec Kirschb.*, Flor, Thoms.; *Capsus sulcifrons*, Thoms., = *L. contaminatus*, D. & S., = *commutatus*, Fieb., = *L. viridis*, Fall.; *C. contaminatus*, Kirschb., Flor, Thoms., = *pabulinus*, F. Sahlb., = *L. lucorum*, Mey., Fieb., *nec Boh.*, Thoms., which = *Orthops cervinus*, Mey., Fieb.; *Globiceps flavinotatus*, auctt., = *flavimaçulatus*, Wolff, = *flaviquadrimaçulatus*, Deg.; *G. flavimaçulatus*, auctt., *nec W.*, = *fulvipes*, Scop.; *Capsus dubius*, Zett., = *Mecomma ambulans*, Fall., immature, and *C. nigrutilus*, Zett., is a macropterous ♀ of the same species; *Cytorhinus elegantulus*, Mey., Fieb., = *caricis*, Fall.,

Kirschb., Thoms., *nec* Hahn; *Capsus pellucens*, Boh., = *Cytorhinus pygmaeus*, Zett.; *Capsus diaphanus*, Kirschb., *nec* Fieb., = *Orthotylus tenellus*, Fall., *nec* Hahn; *Conostethus griseus*, D. & S., = *salinus*, J. Sahlb.; *Capsus pinetellus*, Thoms., *nec* Zett., Kirschb., = *Brachyarthrum nigriceps*, Boh.; *Capsus betulæ*, Kb., = *Apocremnus betuleti*, Fall., and synonymy of *A. ambiguus*, Fall., is fully discussed. *Psallus obscurellus*, Fall., and *Agalliastes impurus*, Boh., re-characterized, p. 22.

Oncotylus tanaceti, D. & S., *nec* Fall., = *Macrocoleus sordidus*, D. & S., *nec* Kbm., = *Tinicephalus hortulanus*, Fieb., *nec* Mey.; E. Saunders, Ent. M. M. x. p. 92. This opinion contradicted; J. Scott, *l. c.* p. 119. E. Saunders replies, *l. c.* p. 165.

Phytocoris (Lygus) 4-rivatus, Say (= *lineatus*, F.): habits described by W. Le Baron, Rep. Ins. Illin. i. (1871) p. 61. See also A. Fitch, Rep. Ins. N. York, xiii., in Tr. N. York Agric. Soc. 1869, p. 513 *et seq.*

Loxops coccineus, Mey., in Britain: J. Scott, Ent. M. M. x. pp. 63 & 72. On its habits, J. W. Douglas, *ibid.*

Trichymenus, g. n., O. M. Reuter, *l. c.* p. 7. Allied to *Deraocoris*, Kirschb. Type, *Capsus fairmairii*, Sign., = *Phytocoris pilosus*, Boh.

Lopus partilus (partitus), p. 198), p. 56, New Guinea, *australis* and *sordidus*, p. 57, Australia, Walker, Cat. Hem. Brit. Mus. pt. vi. spp. nn.

Capsus xanthomelas and *incisus*, p. 92, *coccineus*, p. 93, E. Florida, *limbatellus*, New York, *obscurellus*, Hudson's Bay, p. 93, *strigulatus*, Canada, *frontifer*, N. America, *pallescens*, Hudson's Bay, p. 94, *hirsutulus*, Lake Huron, *contiguus*, New York, p. 95, *stramineus*, Nova Scotia, *filicornis*, E. Florida, *marginatus*, New York, p. 96, *floridanus*, p. 97, E. Florida, *scitulus*, p. 99, *opacus*, *decoratus*, *bicinctus*, p. 100, Mexico, *jamaicensis*, p. 101, Jamaica, *basalis*, p. 108, *tibialis*, *atriluteus*, *cinctipes*, p. 109, *xanthophilus*, *squalidus*, p. 110, *incertus*, *obumbratus*, *alternus*, *leprosus*, p. 111, S. America, *spoliatus*, *nigritulus*, p. 112, 4-*notatus* and var., p. 113, Galapagos, *sobrius*, p. 115, *sericeus*, p. 117, Sierra Leone, *illepidus*, *ibid.*, *solitus*, *pallidulus*, *conspersus*, *innotatus*, p. 116, *suffusus*, *limbatus*, (re-named *limbifer*, p. 199), p. 117, S. Africa, *semiclusus*, p. 118, *subirroratus*, p. 119, *incisuratus*, p. 121, Ceylon, *partitus*, p. 119, N. Hindostan, *stramineus (pallidifer)*, p. 129), N. Bengal, *patulus*, N. Hindostan, *sinicus*, Hong Kong, p. 120, *vicarius*, Siam, *canescens*, Malacca, p. 121, *fasciatus*, Singapore, *lineifer* and *discoidalis*, Malacca, p. 122, *apicifer*, Celebes, *lucidus*, Sarawak, p. 124, *simulans (dissimulans)*, p. 199), Singapore, *tristis (lugens)*, p. 199), New Guinea, p. 125, *angulifer*, *pictulifer*, p. 126, *intaminatus*, p. 127, Australia, *laticinctus*, p. 127, *ustulatus*, p. 128, New Zealand, *marginicollis*, p. 128, locality unknown; *id. l. c.* spp. nn.

Leptomercoris simplex, Ceylon, *antennatus*, Australia, p. 145, *maoricus*, p. 146, New Zealand, *id. l. c.* spp. nn.

Monalocoris bipunctipennis, sp. n., *id. l. c.* p. 159, Ceylon.

Monalonium braconoides and *ichneumonoides*, Amazons, *humeralis*, Malacca, p. 162, *politum*, Sarawak, *divisum*, Ternate, p. 163, *id. l. c.* spp. nn.

Eucrocoris braconoides and *basifer*, *id. l. c.* p. 164, Australia, spp. nn.

Helopeltis niger, Waigiou, *braconiformis*, New Guinea, *id. l. c.* p. 165, spp. nn.

TINGIDÆ.

Stål, *l. c.*, characterizes the following new genera and species:—

Ceratinoderma, p. 117. Allied to *Serenthia*; for *C. fornicata*, *ibid.*, Caffraria.

Corythuca, pp. 119 & 122, for *Acanthia gossypii*, F., *Tingis fuscigera*, St., and 7 other known spp. of *Tingis*.

Stephanitis, pp. 119 & 123, for *Tingis pyri*, Geoffr., *T. oberti*, Kol., and *T. mitrata*, St.

Leptobyrsa, *ibid.*, for *T. steini*, St.

Lepturga, pp. 119 & 124, for *L. nigritarsis*, p. 124, Australia.

Leptostyla, pp. 120 & 125, for *Tingis oblonga*, Say, and *L. vittipennis*, *furcata*, and *hyaloptera*, p. 126, Rio Janeiro.

Leptopharsa, pp. 122 & 126, for *Monanthia marginella*, St., and *L. elegantula*, p. 126, Bogota.

Leptodictya, pp. 121 & 127, *Monanthia ochropa*, St., and 4 other known species.

Leptocysta, pp. 122 & 127, for *Tingis 6-nebulosa*, St.

Corythaica, pp. 120 & 128, for *T. monacha*, St.

Sphærocysta, *ibid.*, for *T. ? inflata* and *globifera*, St.

Coscinopea, p. 128, sub-g. of *Catoplatys*, for *Monanthia eryngii*, Latr., and *albida*, H. S.

- *Amblystira*, pp. 120 & 129, for *Monanthia pallipes*, St.

Leptoyppha, pp. 121 & 129, for *Tingis mutica*, Say.

Oncophysa, *ibid.*, for *Monanthia vesiculata*, St.

Cysteochila, *ibid.*, for *M. ? tingoides*, Mots., *M. sordida*, St., and *C. caffra*, p. 129, Caffraria.

Oncochila, p. 121, for *Monanthia scapularis*, Fieb.

Lasiacantha, p. 130, sub-g. n. of *Tingis*; for *T. (L.) odontostoma*, Sierra Leone, and *hedenborgi*, Cyprus, *ibid.*

Melanorhopala, *ibid.*, sub-g. n. of *Tingis*, for *T. (M.) clavata*, *ibid.*, *lurida* and *uniformis*, p. 131, N. America.

Americia, p. 131, sub-g. n. of *Tingis*, for *Lacometopus albilaterus*, St., and *T. (A.) limbata*, *ibid.*, Bogota.

Eurypharsa, pp. 122 & 123, for *Tingis nobilis*, Guér.

Compseuta, p. 133, sub-g. n. of *Monanthia*, for *M. ornatella* and *natalensis*, St., & *M. (C.) femoralis*, *ibid.*, Caffraria.

Cochlochila, *ibid.*, sub-g. n. of *Monanthia*, for *M. (C.) bullita*, *ibid.*, no locality mentioned.

Cantacader afzeli, p. 116, Sierra Leone.

Acalypta thomsoni, p. 122, S. Carolina.

Gargaphia obliqua, p. 124, Rio Janeiro, *fasciata*, Illinois, *trichoptera* and *nigrinervis*, Bogota, p. 125.

Catoplatys australicus, p. 128, Australia.

Teleonemia aterrima, p. 131, *validicornis*, *scrupulosa*, p. 132, Bogota, *belfragii*, p. 132, Texas.

Phyllotingis, g. n., Walker, Cat. Hem. Brit. Mus. pt. vii. p. 3. *P. arida*, sp. n., *id. ibid.*, Ega.

Dictyonota cingalensis, sp. n., *id. op. cit.* pt. vi. p. 178, Ceylon.

Tingis erosa, p. 181, *alicollis*, p. 182, Hindostan, *globulifera*, p. 182, Madras, *id. l. c.* spp. nn.

Monanthia lucida, p. 191, Vera Cruz, *lanceolata* and *lineifera*, p. 194, Brazil, *invaria*, New Guinea, *monticollis*, Sarawak, p. 196, *gibbifera*, p. 197, Australia, *id. l. c.*; *M. (Tropidochila) olivieri*, Puton, Ann. Soc. Ent. Fr. (5) iii. p. 18, Bone : spp. nn.

ARADIDÆ.

Aradus flavimaculatus, Luc., re-described, Corsica : Puton, *l. c.* p. 19.

Mezira mæsta, Stål, var. from N. America, Walker, *l. c.* vii. p. 23.

Quilnus, sub-g. n. of *Aradus*, Stål, *l. c.* p. 137. *A. (Q.) niger*, S. Carolina, and *parvicollis*, Cyprus, *id. l. c.* spp. nn.

Proxius, g. n., *id. l. c.* pp. 139 & 141, for *P. incrustatus*, sp. n., p. 141, Rio Janeiro.

Barcinus, g. n., *id. l. c.* pp. 140 & 142, for *B. horridus*, sp. n., p. 142, Malacca.

Illibius, g. n., *id. l. c.* pp. 140 & 143, for *I. laticeps*, sp. n., p. 143, Bogota.

Pictinus, g. n., *id. l. c.* pp. 140 & 145, for *P. cinctipes*, sp. n., p. 145, Bogota.

Crimia cincticornis, p. 11, Para, *C. ? marginalis*, Columbia, *simulans*, Brazil, p. 12, *C. verrucicollis*, p. 13, *lateralis*, p. 14, Ceylon, *rubescens*, p. 14, Hindostan, Ceylon, Siam, New Guinea, Australia, *armata*, p. 15, Sumatra, *laminifera*, p. 16, *polyacantha*, *doreica*, p. 17, *parviceps*, p. 19, *bispiniceps*, p. 20, *microcera*, p. 21, New Guinea, *basalis*, Celebes, *varia*, Gilolo, p. 18, *parallela*, p. 19, Sarawak, *pallescens*, p. 20, Aru, *australis*, Australia, *attenuata*, New Zealand, p. 22, Walker, *op. cit.* vii. spp. nn.

Mezira cimicoides, p. 24, *subfasciata*, p. 25, Sierra Leone, *humilis*, *tricolor*, p. 26, New Guinea, *ferrea*, Sarawak, *subfurcata*, Aru, p. 27, *proxima*, *leucotelus*, *albicornis*, p. 28, Australia, *maorica*, p. 29, New Zealand, *id. l. c.* spp. nn.

Aradus proboscideus, p. 35, *caliginosus*, *fascicornis*, *fenestratus*, p. 36, N. America, *pubescens*, p. 38, Para, *truncatus*, Penang, and var. ?, Sarawak, p. 39, *id. l. c.*; *A. robustus*, Uhler, P. Bost. Soc. xiv. p. 104, New England; *A. cedri*, Puton, *l. c.* p. 20, Batna; *A. pallidicornis* and *gracilicornis*, Cuba, *compressicornis*, Bogota, Stål, *l. c.* p. 136 : spp. nn.

Isodermus vacillans, sp. n., Walker, *op. cit.* vii. p. 42, Tasmania.

Carventus denticollis, sp. n., Stål, *l. c.* p. 140, Mysol.

Artabanus sinuatus, sp. n., *id. l. c.* p. 141, New Guinea.

Hesus subarmatus, sp. n., *id. l. c.* p. 142, Surinam.

Artagerus setosus, sp. n., *id. ibid.*, Columbia.

Brachyrhynchus punctiventris, Bogota, *abdominalis*, Cuba, *id. l. c.* p. 144; *B. fulvicornis*, Walker, *l. c.* p. 11, Ceram : spp. nn.

Aneuris inconstans and *simplex*, Uhler, *l. c.* p. 14, New England; *A. septentrionalis*, Walker, *l. c.* p. 30, N. America; *A. australicus*, Stål, *l. c.* p. 146, N. Australia : spp. nn.

REDUVIDÆ.

E. Mulsant & C. Rey, Ann. Soc. L. Lyon (n. s.) xx. pp. 65-166, revise the French species of *Reduviides*, figuring (pl. i.) *Harpactor erythropus*, *Oncocephalus notatus*, *Oreada denudata*, *Holotrichius cyrilli*, *Pygolampis bidentata*, *Acanthothorax sculus*, *Reduvius personatus*, *Pirates hybridus*, *Prostemma guttula*, and *Nabis aptera*, figs. 1-10, *N. viridula*, pl. ii. fig. 11. The same authors, l. c. pp. 167-184, revise the French species of *Emesides*, figuring *Emesodema domesticum* and *Plealaria vagabunda*, pl. ii. figs. 13 & 14. These two articles form together a part (unnumbered; but really the 4th) of the authors' "Histoire naturelle des Punaises de France: Réduvidés—Émesides." Paris: December, 1873; separate pagination.

Pygolampis pectoralis, Say, *Emesa longipes*, Deg., and *Plealaria errabunda*, Say, from New England; observations on synonymy, &c., by P. R. Uhler, P. Bost. Soc. xiv. p. 107.

Reduvius raptatorius can inflict a severe wound on the hand; R. V. Rogers, Canad. Ent. v. p. 155.

Nabis canadensis, Provancher, = *coleoptratus*, K.; A. S. Packard, Rec. Am. Ent. 1873, p. 101.

Coranus subapterus, Deg., stridulates by rubbing the apex of its rostrum across very fine striations of the cavity of the prosternum; O. M. Reuter, MT. schw. ent. Ges. iv. p. 159.

Nabis pallidus, Eversm., *ex. typ.*, = *viridulus*, Spin.; Puton, Ann. Soc. Ent. Fr. (5) iii. p. 25.

Lestomerus affinis, Serv., Hindostan, vii. p. 91, *Pirates scutellaris*, F., Santarem, p. 102, *P. morio*, Er., p. 104, *Prostemma carduele*, Dohrn, Hindostan, p. 137, *Spiniger amazonus*, St., p. 158, Amazons, and *Oncocephalus desiccatus*, Serv., Ega, viii. p. 24; F. Walker, Cat. Hem. Brit. Mus., describes, without naming, forms of these species, queried as varieties, from the localities mentioned.

Walker, *op. cit.* vii., describes the following new genus and species:—

Stenopirates, p. 139. Distinguished from *Pirates* and *Prostemma* by its filiform antennæ and long neck. *S. collaris*, N. Hindostan, and *anthoroides*, Sierra Leone, *ibid.*

Mastys vicerra and *melanospilus*, Hindostan, *venosus*, Singapore, *subannulatus*, Java, p. 88, *guttifer*, Sarawak, *simplex*, Java, p. 89.

Lestomerus piceipennis, Java, *femoralis*, China, *diffinis*, Hindostan, p. 93, *flavipes*, N. Hindostan, *diversus*, N. China, p. 94, *formicarius*, p. 94, Burmah.

Pirates semirufus, *mexicanus*, p. 99, Mexico, *degener*, p. 100, St. Domingo, *concisus*, p. 101, Columbia, *dimidiatus* (*digramma*, p. 205), p. 102, Monte Video, *indecisus*, p. 104, S. America, *lepidus*, Para, *biplagiatus*, Brazil, p. 105, *vittifer*, *megaspilus*, p. 106, *hamifer*, p. 107, *minusculus*, p. 108, Columbia, *rufiventris*, p. 107, Santarem, *æneus*, p. 108, Amazon region, *planus*, Gambia, *dimidiatus* (*tripars*, p. 205), Natal, p. 111, *sinensis*, p. 114, *turpis*, p. 120, Hong Kong, *adjunctus*, p. 114, *posticus*, p. 115, *6-maculatus*, *strigifer*, p. 116, *basiger*, p. 117, *decisus*, *instabilis*, p. 118, *latifer*, p. 119,

naboides, p. 121, Hindostan, *inscriptus*, p. 115, Siam, *rufifemur*, p. 119, Ceylon, *diffinis*, N. China, Borneo, *mutilloides*, Silhet, p. 120, *sinicus*, p. 121, N. China, *atrimaculatus*, *caliginosus*, p. 123, *sculpturatus*, p. 125, Java, *concinus*, *interruptus*, p. 124, New Guinea, *sobrius*, *fulvipennis*, *erythromelas*, p. 128, *decorellus*, *glaber*, p. 129, Australia, *contiguus*, *3-notatus*, p. 130, locality unknown.

Pachynomus zonatus, p. 131, Gilolo.

Prostemma nigricans, *luteiceps*, *ruficeps*, Amazon region, p. 135, *concinna* [-num], p. 136, *longiceps*, p. 137, Natal, *placens*, p. 137, Hindostan, *nigra* [-rum], *tarsalis* [-le], p. 138, New Guinea.

Nabis elegans, p. 144, Petropolis, *bicolor*, Celebes, *maoricus*, New Zealand, p. 145.

Platymeris fulvinigra, p. 147, E. Africa.

Spiniger leucotelus, *sigillatus*, p. 159, *umbrifer*, *maculifer*, p. 162, *pulchellus*, p. 163, *pardalinus*, p. 164, *naboides*, p. 165, Amazon region, *lutescens*, p. 160, *decoloratus*, p. 164, S. America, *pictus*, p. 160, *basalis*, p. 161, Brazil, *rutilans*, p. 161, Constancia, *bipustulatus*, p. 163, Columbia, *hieroglyphicus*, p. 165, *limbifer*, p. 166, Sarawak, *conficitus*, p. 166, Singapore.

Acanthaspis inæqualis, p. 168, Brazil, *aliena*, p. 171, Natal, *4-notata*, *luteipes*, p. 175, *megaspilus*, p. 176, *dubius*, *micrographa*, p. 177, Hindostan, *inornata*, p. 175, Singapore, *pictipes*, p. 176, Ceylon, *spinicollis*, p. 178, Australia.

Reduvius guttatus, p. 181, *signifer*, p. 182, Mexico, *pallescens*, *partitus*, p. 183, *xanthospilus*, p. 184, *plagipennis*, p. 186, Amazons, *lugubris*, p. 183, *signatus*, p. 184, *areolatus*, p. 186, Columbia, *decolor*, S. America, *tenebrosus* (*tenebrifer*, p. 205), Tejuca, p. 185, *crassipes*, p. 186, Petropolis, *semiflavus*, *turpis*, *cruentus*, Natal, *varius*, S. Africa, p. 190, *negamicus*, N'gami, *decisus*, Sierra Leone, p. 191, *curvifer*, p. 192, Cape of Good Hope, *pusillus*, p. 193, Niger, *tenebrosus*, *riculosus*, p. 194, *biligatus*, *argillaceus*, p. 195, *pyrrhophorus*, *sinensis*, *perpusillus*, p. 196, *divisicollis*, *conspersus*, p. 197, *singularis*, p. 198, various parts of Asia, *annularis*, p. 199, *unifasciatus*, p. 201, *lineatus*, *erythrinus*, Philippine Isles, *subfasciatus*, New Guinea, p. 200, *semifasciatus*, *debilis*, p. 202, Australia, *funereus*, *coleopteroides*, *pubicollis*, p. 203, *incommodus*, p. 204, locality unknown.

The same author, *op. cit.* viii., characterizes as new species :—

Opinus pygmaeus, p. 1, Tejuca, *acuticeps*, p. 2, Sierra Leone, *strigifer*, Malacca, *rugicollis*, Ceylon, p. 3, *semicostalis*, Cambodia, *nigripes*, Aru, p. 4.

Tiarodes juncturus, p. 7, locality unknown.

Petalochirus funestus, Siam, *munitus*, Sarawak, p. 9, *singularis*, p. 10, Cambodia.

Conorhinus corticalis, *lignarius*, p. 17, *limosus*, *arenarius*, p. 18, *porrigens*, *diminutus*, p. 19, S. America.

Opistoplatys indicas [sic], p. 20, Hindostan.

Oncocephalus ventralis, p. 24, St. Domingo, *cingalensis*, p. 26, *naboides*, p. 27, Ceylon.

Sastrapada bipunctata, p. 28, *longicollis*, *ibid.*, *filiformis*, p. 29, Amazon region.

Stenopoda hyalinipennis, p. 31, Brazil, *hastata*, p. 32, Hindostan.

Pygolampis innotata, Mauritius, *unicolor*, N. Bengal, p. 36, *concolor*, Hindostan, *macera*, Malacca (and ? ♀, Lombok), p. 37, *australis*, p. 38, Australia.

Ectrichodia diversipes, p. 41, Abyssinia, *marginicollis*, p. 42, *diminuens*, p. 45, Sierra Leone, *pictipes*, p. 45, S. Africa, *discrepans*, p. 46, Ceylon, *porrigens*, p. 47, Philippine Isles, *insignis*, Hindostan, *macrops*, Siam, p. 48, *limbifera*, ? Hindostan, *aliena*, Java, p. 49, *sulica*, Sula, p. 50, *intermedia*, p. 50, *luteicollis*, p. 52, *pyrophila*, p. 55, Sarawak, *ophirica*, Mt. Ophir, *includens*, China, p. 51, *cylindrica*, Celebes, *luteoatra* [!], Malacca, p. 53, *atripennis*, p. 56, *nitidissima*, p. 57, *nigriscutata*, p. 60, *tibialis*, p. 62, Amazon region, *fervida*, p. 57, Oojaca, *venusta*, p. 58, Pernambuco, *granulata*, p. 58, *geniculosa*, p. 59, Cuenca, *pallitarsis*, p. 59, locality unknown, *media*, p. 62, New Orleans.

Pothea centralis, p. 63, *reciproca*, p. 64, S. America.

Apiomerus bipunctatus, *nitidus*, *erythromelas*, p. 70, *xanthophilus*, *litratus*, *lateralis*, *decorus*, p. 71, *pulchripes*, *tarsalis*, *subapicalis*, Amazon region.

Prionotus patulus, p. 76, Guatemala, *mundus*, Venezuela, *xanthopus*, Amazon region, p. 77.

Yolinus rubifer, Celebes, *albigutta*, Cambodia, p. 78, *horrendus*, Sarawak, *siamicus*, Siam, p. 79.

Scycanus angulifer, Sarawak, *incisus*, Celebes, *leucomesus*, Burmah, p. 84, *marginatus*, Timor, *pyrrhomelas*, Hindostan, *semimarginatus*, Silhet, p. 85, *miles*, Penang, *turbidus*, Sarawak, *caliginosus*, Philippine Isles, p. 86, *invisus*, p. 87, Java.

Pristhesancus albipennis, p. 88, Waigiou, *plagipennis*, *ibid.*, *luteicollis*, p. 89, Australia.

Helonotus genualis, Aru, *pallidulus*, Cuenca, p. 90.

Stål, *l. c.*, characterizes the following new genera and species of his family *Nabide* :—

Punctius, subg. of *Pachynomus*, p. 107, for *Pach. alutaceus* and *biguttatus*, St.

Pacilta, subg. of *Nabis* (as restricted by the author), p. 108, for *Metastemma perpulchrum*, St., *Prostemma carduele*, Dohrn, and *N. (P.) fasciata*, *ibid.*, Philippine Isles.

Psilistus, pp. 107 & 109, for *P. corallinus*, p. 109, Borneo.

Aspilaspis, subg. of *Coriscus* (Schrank, = *Nabis*, auctt.), p. 114, for *C. viridulus*, Spin.

Scotomedes, *ibid.*, for *S. atra*, *ibid.*, Sumatra.

Pagasa anescens, Minas Geraes, *pallipes*, Texas, *nitida*, Wisconsin, p. 108

Allæorhynchus vittiventris, p. 109, New Granada, Bogota.

Phorticus collaris, p. 109, Texas.

Arbela costalis, p. 111, Ovalau.

Metatropi [do] phorus, g. n., Reuter, *Œfv. Ak. Förh.* xxix. (1872) No. 6, p. 93. *M. belfragii*, sp. n., *id. l. c.* p. 94, Texas.

Nabis crassipes, Mexico, *sericans*, Texas, p. 83, *sordidus*, Mexico, *pallenscens*, N. America, p. 85, *annulatus*, p. 86, *vicarius*, p. 87, Illinois, *propinquus*, p. 87, *roseipennis* and *punctipes*, p. 89, *kalmi*, p. 91, Wisconsin, *parvulus*, Valparaiso, *kimbergi*, S. America and Australia, p. 90, *punctipennis*, Chili, *rufusculus*, N. America; *id.* l. c. spp. nn.

Pantoleistes basalis, sp. n., Gerstäcker, in V. d. Decken's Reisen, iii. pt. 2, p. 417, pl. xvii. fig. 2, Endara.

Ectrichodia carnifex, sp. n., *id.* l. c. p. 418, pl. xvii. fig. 7, Mombas.

Platymeris rhadamanthus, sp. n., *id.* l. c. p. 419, pl. xvii. fig. 8, Ugono Mountains and Endara.

Onccephalus lyra, sp. n., *id.* l. c. p. 421, Mombas.

Harpactor perrisi, sp. n., Mulsant & Rey, Ann. Soc. L. Lyon (n. s.) xx. p. 77, Bone.

Coranus revellieri, sp. n., *id.* l. c. p. 90, Corsica.

Pirates ambiguus, sp. n., *id.* l. c. p. 123, S. France.

Prostemma fuscipennis [-ne], sp. n., *id.* l. c. p. 131, S. France.

Emesa mantiformis, sp. n., *id.* l. c. p. 169, pl. ii. fig. 12, ? Languedoc.

SALDIDÆ.

"*Acanthia*" *coxalis*, sp. n., Stâl, l. c. p. 149, Cuba.

HYDROMETRIDÆ.

Metrobates, g. n., P. R. Uhler, P. Bost. Soc. xiv. p. 108. Type, *M. hesperius*, sp. n., *id.* l. c. p. 109, U. S. America and W. Indies.

Rhagovelia obesa, sp. n., *id.* l. c. p. 107, U. S. America.

NEPIDÆ.

Appasus procerus, sp. n., Gerstäcker, in V. d. Decken's Reisen, iii. pt. 2, p. 422, Mombas.

Laccotrephes brachialis, sp. n., *id.* *ibid.*, See Jipe.

NOTONECTIDÆ.

Enithares cincta, sp. n., Gerstäcker, l. c., p. 424, Mombas.

Anisops pellucens, p. 424, *debilis*, p. 425, spp. nn., *id.* l. c., Mombas.

CORIXIDÆ.

Corixa. The male has a 'strigil' or 'strigiliform process,' situate on the posterior margin of the upper side of the 6th segment of the abdomen, and consisting of a chitinous plate attached to a short pedicle, provided with rows of closely-set teeth. This structure is described in 20 British species. An analytical key to the British genera and species of the family is given, with an account of their economy so far as known. F. Buchanan White, Ent. M. M. x. pp. 60-63, 75-80.

Corixa levis, Thoms., *salina*, Put., = *stali*, Fieb.; Puton, Ann. Soc. Ent. Fr. (5) iii. p. 25.

Callicorixa, subg. n. of *Corixa*, F. B. White, l. c. pp. 62 & 75. Distin-

guished from the type by having no strigil, and the posterior metatarsus being more or less conspicuously marked with black. *Corixa præusta* and *concinna*, Fieb., *socia*, *boldi*, *wollastoni*, *sodalis*, and *cognata*, D. & S.

Orinocorixa, subg. n. of *Corixa*, id. l. c. pp. 63 & 75. Head, with eyes, wider than pronotum, which is impressed with transverse lines; a strigil in male (? = *Glenocorisa*, Thoms.). *Corixa alpestris*, D. & S.

Sigara hydroporina, sp. n., Gerstäcker, l. c. p. 425, Mombas.

HEMIPTERA-HOMOPTERA.

On waxy exudations of *Homoptera*: F. Walker, Ent. vi. p. 456. Honey-dew is not produced by *Aphides*: J. D. Hooker, Gardener's Chronicle, July 19, 1873; cf. F. Walker, Ent. vi. p. 502. H. Doubleday, *op. cit.* p. 548, thinks Boissier de Sauvage's opinion correct that there are two kinds of exudation, one caused by *Aphides*, the other by plants. Cf. Boussingault, C. R. lxxiv. pp. 87-90, and abstract and note by W. T. Thiselton Dyer, J. Hort. Soc. (n. s.) iv. pt. 13, pp. 1-7.

Egg-punctures of *Ceresa bubalus*, F., and *Pæciloptera pruinosa*, Say, described, and both species figured with details; C. V. Riley, Rep. Ins. Mo. v. pp. 121 & 122, figs. 50-55.

On the connection of *Tettigometra*, *Cercopis*, *Membracis*, and *Fulgora* with ants: É. Perris, Pet. Nouv. 1873, p. 336.

CICADIDÆ.

Zygina ericetorum, J. Sahlb., = *rubrivittata*, Leth.; Puton, Ann. Soc. Ent. Fr. (5) iii. p. 25.

Cicada septemdecim, L.; recurrence and injuries to trees noted by A. S. Packard, Am. Nat. vii. p. 537.

CERCOPIDÆ.

Cercopis cardinalis, sp. n., Gerstäcker, l. c. p. 432, pl. xvii. fig. 10, Endara.

Selenocephalus compactus, sp. n., id. l. c. p. 433, pl. xvii. fig. 11, Endara.

CENTROTIDÆ.

Centrotus fenestratus, p. 429, Endara, *pacificus*, p. 430, Mombas, spp. nn., Gerstäcker, l. c.

Coloborrhis perspicillaris, sp. n., id. l. c. p. 431, See Jipe.

IASSIDÆ.

Acocephalus interruptus, Fieb., and *polystolus*, Fieb., re-described from Britain; synonymy of British species of the genus amended; *A. arenicola*, Mshall., = *albifrons*, L., var.: J. Scott, Ent. M. M. ix. pp. 264-266.

J. Scott, *op. cit.* x. pp. 22-29, 80-82, 126-131, describes the British species. *Idiocerus confusus*, Flor, *fulgidus*, Fab., *h-album*, Fieb., *Bythoscopus alni*, Schr., *Pediopsis cereus* and *tiliæ*, Germ., *fuscinervis* and *impurus*, Boh., new to Britain.

Athysanus canescens, p. 210, England, *cognatus*, p. 211, Gt. Britain, spp. nn., J. W. Douglas & J. Scott, *op. cit.* ix.

Pediopsis ulmi, sp. n., J. Scott, *op. cit.* x. p. 129, England.

FULGORIDÆ.

Pyrgoteles, g. n., Gerstäcker, *l. c.* p. 428. Differs from *Aphæna*, Guér., and *Belbina*, St., in its head being much narrower than the prothorax, and armed with an elevated slightly recurved process, which is compressed towards the apex; and from *Prolepta*, Walk., in its carinate and more strongly lobed prothorax, &c. Type, *Enchophora sicca*, Walk.

Pyrops pustulosus, sp. n., *id. l. c.* p. 427, pl. xvii. fig. 9, See Jipe.

Liburnia æmulator [-*trix*], p. 238, *consanguinea*, p. 239, England, J. Scott, Ent. M. M. ix.; *L. marshalli*, p. 104, *lethierryi*, p. 105, Corsica, *guaramanensis*, p. 106, Andalusia, *scutellata*, p. 107, England; *id. op. cit.* x.: spp. nn.

PSYLLIDÆ.

Trioza flavipennis, Först.: metamorphosis and economy in connection with *Hieracium pilosella* and *H. pratense*. F. Löw, Verh. z.-b. Wien, xxiii. pp. 141-143, pl. ii. c, figs. 7 & 8.

Psylla delarbræi, sp. n., Puton, Ann. Soc. Ent. Fr. (5) iii. p. 21, Lioran (Cantal).

APHIDIDÆ.

Aphis. On the simultaneous occurrence of winged and apterous individuals; T. G. Gentry, Canad. Ent. v. pp. 121-123; F. Walker, *op. cit.* p. 172.

Aphis: etymology discussed, W. W. Spicer, Nature, viii. p. 103.

Aphis and *Formica*: on their association in America, *cf.* T. G. Gentry, *l. c.* p. 207.

Aphis circeandis, sp. n., A. Fitch, "13th Report on the Insects of the State of New York, Agricult. Society for 1869" (Rec. Am. Ent. for 1871).

Phylloxera vastatrix.

T. E. PLANCHON and J. LICHTENSTEIN have published "Le Phylloxera de 1854 à 1873; Résumé pratique et scientifique," Montpellier: 1875, figs.

Max. Cornu commences a treatise, "Études sur la nouvelle maladie de la vigne," in No. 6, vol. xxii. of the "Mémoires présentés par divers savants à l'Académie des Sciences," Paris: 1873, pls.

'Rapports' have also appeared by Nourrigat, in the publications of the Association viticole du Canton de Lunel; by Charvat and others, Société d'Agriculture de la Drôme; by Trimoulet & De Vitton, in No. 261 (25 May, 1873) of Journ. d'Agric. et d'hortic. de la Gironde, and by Trimoulet, in Bull. Soc. L. Bord. 1873.

"Papers respecting the *Phylloxera vastatrix* or new vine-scurge," by Sir C. Murray, Dr. Hooker, and various French authorities; P. Z. S. Vict., 1873, pp. 289-323. Also referred to in Nature, vii. (1872) p. 131.

G. Jäger's observations in "Wochenblatt für Land- und Forstwirthschaft" reproduced, *Das Ausland*, xliii. (1870) p. 120: *cf.* also *op. cit.* p. 405.

Frauenfeld, *Verh. z.-b. Wien*, xxiii. pp. 1-6, gives G. Pouchet's observations on the economy of the insect (from the "Siècle," Sept. 29, 1872), which, however, appear to throw no fresh light on the subject.

C. V. Riley, *Rep. Ins. Mo. v.* pp. 57-73, reviews the experience of the past year, and does not alter any of his views.

Planchon, *C. R.* lxxvii. p. 871, gives the results of his American journey. An *Acarus* pursues the *Phylloxera* below the surface of the ground.

J. Lichtenstein, *op. cit.* p. 342 *et seq.*, gives a general summary of our knowledge of the economy of this insect. The American and European species are identical, as are the leaf and root insects. The insect is very agile in all stages; it becomes winged in the middle of June, and there are two different schemes of neuration, and two forms of the pupa. The number of moults, coupling (if any), and period of depositing the eggs are unknown.

M. Cornu, *op. cit.* pp. 656-663, states that winged individuals are more common than is generally supposed; they certainly fly, and propagate the species, and it is doubtful whether the various agents employed do not drive them out, and so further spread the evil.

Signoret, *op. cit.* pp. 343-346, considers Lichtenstein wrong in only ascribing 10 days as the period in which maturity can be reached: a year is required for perfecting each individual, which is polymorphous, and undergoes 6 moults or 10 periods. Three stages were observed in leaf galls, after which the insect went to the roots, where all the stages have been observed. Most of these statements are repeated by the author in *Bull. Soc. Ent. Fr.* (5) iii. p. cxxxix. Lichtenstein, in reply, cites a case of development in 9 days.

Cornu, *C. R.* lxxvii. pp. 710-714, thinks Signoret exaggerates the polymorphism; the maternal and tubercular types, identical in the early stage, are not so different in the adult as the later stages.

Lichtenstein, *Bull. Soc. Ent. Fr.* (5) iii. p. clxiii., re-affirms the correctness of his statement as to the short period of evolution, giving instances observed by himself. Signoret, p. clxv., refuses to be convinced. Further disputations, *l. c.* pp. cccxxv. & cccxxvi.

The first insects of the season appear about the third week in April; p. 766. Fully developed individuals, very small in size, were observed at mid-day on 14th June, on the surface of the ground; p. 1464. L. Faucon, *C. R.* lxxvi.

Transformations noted by Cornu, *op. cit.* p. 947. The same author, *C. R.* lxxvii., in a series of remarks upon the economy, &c., of this insect, states that the root and leaf species are identical (p. 190), that the insect voluntarily falls from the leaves to the ground, and that leaf-galls are rare in French vineyards, the leaves offering little nourishment (pp. 825-830). The production of leaf galls is discussed, pp. 879-883, and of root swellings, pp. 930-934, 1009-1015, 1088-1093, & 1168-1175 (whatever the vine, the swellings are alike). A sexual individual was found just changing; it had no sucker, and came from a batch of winged specimens (p. 1015). The apterous form moults three times, both in

galls and roots, at from 3 to 5 days interval (pp. 1276-1286). The pupa has 68 tubercles, and other particulars of that state are given (pp. 1330-1336). Hybernation of the root and leaf forms is discussed (pp. 1423-1430); the latter, after falling to the ground, does not at once develop, but waits for the early warmth of the next year. A comparative examination is made of the young of both forms, of hibernating and sexual individuals. Those hibernating have no modifications of organization; and the winter is a bad time for destructive agents, as the absorbing functions are suspended. Sexual individuals are not the young, but constitute a special form, differing from the produce of eggs of the ordinary apterous form, not only externally but internally (p. 1478 *et seq.*). The agility of hibernating individuals is discussed; their resuscitation can be produced artificially. They do not necessarily revive with reviving vegetation; but revive earlier and multiply quicker in light soils and warm districts, and the plague therefore increases towards the south. The best time for their destruction is when *they* revive, and the plants are still dormant.

Signoret, Bull. Soc. Ent. Fr. (5) iii. pp. lxxviii.-lxxxiii., denies the discovery of the ♂, either in France or America, and remains of opinion that the *Phylloxera* is neither the cause nor the effect of the disease of the vine. All the elaborate experiments and suggestions of remedies by careful observers are, according to him, founded on misconception. Giraud, *l. c.* p. lxxxiii., considers, with him, that the arrest of sap-circulation has much to do with the disease. *Cf.* Gallois, Bull. Soc. Angers, ii. (1872) p. 86, on the question of the insect being cause or effect of the disease; also Monier & Dupont, who adopt Signoret's view, and Lambot-Miraval, who opposes it: Bull. Soc. Hort. Var, (7) i. No. 3.

Lichtenstein, Bull. Soc. Ent. Fr. (5) iii. p. cxxi., replies to Signoret, affirming that the insect is the cause of the disease, and that there are winged males, winged and apterous females, and perhaps a full grown apterous form.

Guérin-Méneville, R. Z. (3) i. p. 415, and C. R. lxxvii. p. 929, reiterates his conviction that the insect is not the cause but the consequence of the disease, and in this he is followed by Marès (a good abstract of the latter paper in R. Z. *t. c.* p. ii.). The best conditions of growth are accompanied by the best conditions for resisting the *Phylloxera*; bad growth and deteriorating causes aggravate its effects. Méneville's opinion is strongly contradicted by De Malegnane, C. R. lxxvii. p. 1015; and by Cornu, *op. cit.* p. 1093.

H. Marès, *op. cit.* pp. 1408-1411, discusses the propagation of the insect. Its great multiplication is the effect of general causes simultaneously acting at various points. Vines should be better tended and strengthened. According to Faucon, *op. cit.* p. 1175, all manures and cultivators' methods are useless as preventives.

On varieties of vines affected: Cornu, C. R. lxxvii. pp. 766-770.

The insect is excessively rare in some districts supposed to be infected: Signoret, Bull. Soc. Ent. Fr. (5) iii. p. cxxxix. V. Mayet, *l. c.* pp. cxl. & clxxi., in denial of this statement, refers to personal experience of the injuries done in these districts.

Planchon and Lichtenstein, C.R. lxxvii. pp. 461–463, state that migrations occur both on the surface and below, from root to root. Coulomb, *op. cit.* p. 346, records the progress towards the South, and Milne-Edwards, *op. cit.* p. 572, notes its extension to Cognac.

M. Dunn, J. Hort. Soc. (n. s.) iv. pt. 13, pp. 49 & 50, states that the insect never lives more than 48 hours when isolated from the vine, and that it will touch no other plant.

A somewhat comical view of this grave question is afforded by 'M. Mollière,' and 'M. Jourdan,' who inquire seriously whether it is quite certain "que le phylloxera vastatrix soit un puceron?" Ann. Soc. Agric. Lyon (4) iv. P.-v., p. lxxxix.

"Résultats des divers procédés de guérison proposés à la Commission pour combattre la maladie de la vigne caractérisée par la Phylloxera, procédés qui ont été appliqués dans la domaine de Las Sorres, près Montpellier," a publication of the Departmental Commission of the Hérault, is stated to be printed in the Correspondence: C. R. lxxvii. p. 1487.

The following remedial and destructive methods, &c., are suggested:—

Exposing eggs on the roots to the air; Nourrigat, C. R. lxxvi. p. 361.

Submersion of the vine. A. Dumont, *op. cit.* p. 150, & lxxvii. p. 1287 (by the establishment of canals near vineyards); Faucon, *op. cit.* lxxvi. p. 361, & lxxvii. pp. 663–665 (opposes submersion in the spring, and recommends it in autumn and winter, or during the whole winter); Faucon, Bazille, and Duponchel, Bull. Soc. Hort. Var (7) i. No. 3; Dumas, C. R. lxxvi. p. 1454–1464 (submersion in early April with hot water, or water charged with deleterious substances); Gueyraud, *op. cit.* lxxvii. p. 161.

Sea-water; A. Babret, C. R. lxxvii. p. 1287, L. Lechape, p. 1016 (with bruised garlic!). Saline solution; Gaudin, C. R. lxxvi. p. 1133. Sulphuric acid; Dumas, C. R. lxxvi. p. 213; C. O. Keenan, *op. cit.* lxxvii. p. 1221. Sulphate of carbon; E. de Loyal, C. R. lxxvii. p. 601 & p. 715 (with vegetable oil), Dumas, *op. cit.* p. 520. Lecoq de Boisbaudran, p. 771, and A. Roussille, p. 772, consider this agent bad for the vines; and É. Bazille, pp. 934–936, is dubious as to its effect, giving long quotations from Bull. Soc. Hort. Var. Sulphate of copper and manure mixed; A. Pagani, C. R. lxxvii. p. 1093. Sulphate of potassium; E. de Loyal, *ibid.* Sulphohydrate of ammonia (also good as a manure); Dumas, *l. c.* p. 870. Sulphate of arsenic; Merice, Bull. Soc. Hort. Var. (7) i. No. 3. Powdered sulphur and alum; A. Sarrand, C. R. lxxvii. p. 562. Soluble sulphates and smoke; H. Marès, *op. cit.* p. 870. Vapour of sulphur and common gas; Lebou, *op. cit.* p. 603. Water from gas-condensers; Beaume, *op. cit.* p. 1177. Coal-tar; L. Petit, *op. cit.* pp. 193 & 1176. Petroleum; Stagno Colombo, *op. cit.* lxxvi. p. 1133. Ammonia; Gueyraud, *op. cit.* lxxvii. p. 111, Deleuil, p. 346, Petit, p. 193 (ammoniacal-water and lime). Fermented urine in November and March; Gauthier, *op. cit.* p. 346. Fermented soap-lye; H. Peyraud, *ibid.* Potash, sulphur, and soap; Letellier, *op. cit.* lxxvi. p. 1133. Mixture containing cyanide of potassium; A. Milius, *op. cit.* lxxvii. pp. 1336 & 1549. Carbolic acid and soot, applied thoroughly; C. V. Riley, Rep. Ins. Mo. v. pp. 57–73. Smoke; Gagnat, C. R. lxxvii. p. 772.

Wine-lees ; C. Daulé, *op. cit.* p. 834. Cultivation of hemp among the vines ; Gauban du Mont, *op. cit.* p. 715. Tobacco-leaves buried [rather an expensive remedy, if successful] ; R. Rejou, *op. cit.* p. 666. Walnut-leaves buried ; E. Rondepierre, *op. cit.* p. 936. Burying strong-smelling plants in full bloom [!] ; Mme. Vivien Jaworsta, *op. cit.* lxxvi. p. 362. Burying young cuttings ; L. Lichtenstein, Bull. Soc. Var, (7) i. No. 3. The same author, Bull. Soc. Ent. Fr. (5) iii. p. xiii., recommends planting young cuttings or shoots of vine round the infected plants ; these attract the insect and can be pulled up and burned in May or June. Surrounding the stems with some adhesive substance ; Jeanheury, C.R. lxxvi. p. 362. A solution of absinthe and tansy ; Laliman, *op. cit.* lxxvii. p. 346. Removing the vine-leaves in September ; E. Ayrál, *ibid.* Encouraging the *Empusa* fungus [!] ; M. Cornu, *op. cit.* p. 1002. Deep planting ; Pellicot, Bull. Soc. Hort. Var, (7) i. No. 3.

General notes on destructive agents : Lacroix, p. 37, Marès, pp. 209, 335, 1465, T. Dufour, p. 421, Erb & Jaworsta, p. 474, Dupré, pp. 550 & 822, Troianowski, p. 700, Faucon, pp. 766 & 1070, Barral, p. 1007, Ghisi, p. 1187, Dumas, p. 1454 ; C.R. lxxvi.

The second year of attack by the insect is the most fitting to attempt its destruction ; Bertrand, *op. cit.* lxxvii. p. 871.

The spring is the best time for using destructive agents ; M. Cornu, *op. cit.* p. 947 (but see Faucon, *suprà*).

Phylloxera quercûs. Balbiani, C.R. lxxvii. pp. 830-834, 884-890, gives particulars of the economy of this species, and of the structure of its reproductive organs. Parthenogenesis occurs in it. There are 3 sorts of eggs:—the winter, summer or parthenogenetic, and male and female (dioïques). Derbès, *op. cit.* pp. 1109 & 1110, compares the *Pemphigus* found on *Pistacia terebinthus* with the *Phylloxera*. Cf. also Milne-Edwards, p. 1111. Balbiani, *op. cit.* pp. 1164-1168, replies to Derbès : *P. quercûs* and *vastatrix* must be added to the limited number of species known to present Leuckhart's 'hétérogonie.'

COCCIDÆ.

SIGNORET, Ann. Soc. Ent. Fr. (5) iii. pp. 27-48 (pt. x.), 395-448 (pt. xi.), pls. 2, 12 & 13 (or x. xi. & xii. of the treatise as a whole), continues his 'Essai sur les Cochenilles ou Gallinsectes.' He discusses PULVINARIA, Targ., (details, pl. 2, figs. 1 *b*, *c*, *h*) and LECANIUM, giving detailed observations on *P. betulæ*, L., *carpini*, L. (pl. 2, fig. 8), *cestri*, Bouché, *evonymi*, Gour., *fagi*, Hdy., *gasteralpha*, Icery (pl. 2, figs. 2 & 2*a*), *lanata*, Gmél., *mesembrianthemii*, Vall., *oxyacanthæ*, L. (pl. 2, fig. 3), *pyri*, Fitch, *salicis*, Bouché (pl. 2, fig. 9), *vitis*, auctt. (pl. 2, figs. 1, 1*a-h*), *Lecanium hesperidum*, auctt., *lauri*, Bdv., *berberidis*, Schr. (pl. 12, figs. 5, *a* & *b*), *juglandis*, Bouché, *persicæ*, = *oblongus*, Réaum. (pl. 12, fig. 10), *piceæ*, Schr., *aceris*, auctt. (pl. 12, figs. 11 & 11*a*), *æsculi*, Koll. (pl. 12, figs. 12, *a* & *b*), *bituberculatum*, Targ. (pl. 12, fig. 13), *caprææ*, L., (pl. 12, fig. 14), *caryæ*, Fitch, *corni*, Bouché (pl. 12, figs. 20 & 20*a*), *coryli*, L. (pl. 12, fig. 15), with which *corylifex*, Fitch, is probably identical, *cynosbati*, Fitch. *fuscus*, Geoff., *genecense*, Targ. (pl. 12, fig. 16), *gibber*,

Dalm. (pl. 12, fig. 19), *prunastri*, Fonsc. (pl. 12, fig. 17), *pyri*, Schr. pl. 12, fig. 18), *quercifex*, Fitch (pl. 13, fig. 1), *quercitronis*, Fitch (pl. 13, fig. 2), *quercus*, L., *rosarum*, Voll. (pl. 13, fig. 3), *rotundum*, Réaum. (pl. 13, figs. 4, *a-c*), *tilia*, L., *ulmi*, L. (pl. 13, figs. 15, *a & b*), of which *fasciatum*, Costa, is probably a var., *anthurii*, Bdv. (pl. 13, figs. 7 & 7a), *coffea*, Wlk., *filicum*, Bdv. (pl. 13, fig. 8), *hemisphaericum*, Targ., (pl. 13, fig. 9), *hibernaculorum*, Bdv., *cycadis*, Bdv. (pl. 13, figs. 10, *a & b*), *depressum*, Targ. (pl. 13, figs. 11, *a & b*), *olea*, Bern. (pl. 13, fig. 12), *testudo*, Curt. (? = *cycadis*, Bdv.), *abietis*, Geoff., *emerici*, Planch. (pl. 13, figs. 14 & 14a), & *racemosum*, Rtz. (pl. 13, fig. 16).

Mytilaspis conchiformis, Gmél., and *M. pinifolia*, Fitch: detailed account of economy; W. Le Baron, Rep. Ins. Illin. i. (1871), p. 24 *et seq.*

Mytilaspis pinifolia, Fitch. Habits, parasites, and remedies discussed; C. V. Riley, Rep. Ins. Mo. v. pp. 97-103, figs. 35 & 36 (= *pini*, Htg., teste Signoret; *op. cit.* p. 98, note.)

Dorthesia: an allied insect, "The ribbed Scale-bark Louse," injurious, to *Acacia* in California, described (larva and ♀). R. H. Stretch, P. Cal. Ac. iv. pp. 262-264. A *Coccus*, near *C. ilicis*, occurs on pines, and an *Aspidiotus* on *Laurestinus*, in San Francisco: *id. l. c.* p. 265.

Dactylopius vitis. The ♂ pupa is active, using its 6 articulated legs. J. Lichtenstein, Bull. Soc. Ent. Fr. (5) iii. p. xiii.

Lichtens[teini]a, g. n., Signoret, *l. c.* p. 27. *Lecaniides*. Covered by a pellicle of cottony tissue. Differs from *Philippia* in its 8-jointed antennæ, and from *Pulvinaria* in having no cottony mass beneath. *L. viburni*, sp. n., *id. l. c.* p. 28, pl. 2, figs. 7 & 7a, Montpellier, on *Viburnum*.

Pulvinaria artemisiae, sp. n., *id. l. c.* p. 31, pl. 2, fig. 4, Montpellier, *cameli[i]cola*, p. 32, pl. 2, figs. 4 & 6, gardens of the Luxemburg, *fraxini*, p. 36, Montpellier, *populi*, p. 42, pl. 2, fig. 10, Montpellier, *ribesiae*, p. 43, Clamart, *tremulae*, p. 45, on aspens.

Lecanium acuminatum, p. 397, pl. 12, fig. 1, on orchids, Luxemburg Gardens; *angustatum*, p. 398, pl. 12, figs. 2 & 2a, on *Papyrus*; *maculatum*, p. 400, pl. 12, fig. 3; *tessellatum*, p. 401, pl. 12, fig. 4, on *Caryota ursus*, Montpellier; *elongatum*, p. 404, pl. 12, fig. 6, on *Prunus laurocerasus*, Mont-de-Marsan; *fitchi*, *ibid.*, pl. 12, fig. 7, Washington, U. S. A.; *genistæ*, p. 405, pl. 12, fig. 8, Hyères, Cannes; *mori*, p. 407, pl. 12, fig. 9, pl. 13, fig. 17, Savoy; *sallæi*, p. 410, Mexico; *antennatum*, p. 413, North America; *rugosum*, p. 429, pl. 13, figs. 5, *a & b*, on peach trees, Clamart; *tarsalis*, p. 430, pl. 13, fig. 6, U. S. America; *wistariæ*, p. 433, *verrucosum*, p. 442, pl. 13, figs. 13, *a & b*, Montevideo: *id. l. c.* spp. nn.

Mytilaspis pomicorticis, sp. n., C. V. Riley, Rep. Ins. Mo. v. p. 95, figs. 31 & 32 (habits, parasites, remedies, &c., discussed, pp. 76-96). The insect is apparently *Aspidiotus conchiformis*, auctt.

(ANOPLURA.)

PEDICULIDÆ.

Hæmatomyzus elephantis, Piag.: a general account, and reference to all degraded forms. E. Newman, Ent. vi. pp. 465-470.

VERMES.

BY

C. F. LÜTKEN, PH.D., F.R.D.A., &c.

I. ROTATORIA.

H. DAVIS, in notes "On a new *Callidina* (*C. vaga*), with the results of experiments on the desiccation of Rotifers" (Q. J. Micr. Soc. xiii. p. 302), comes to the conclusion that Rotifers do not revive when completely dried, though when apparently quite dry, they are often not so really. He found that Rotifers which had been exposed for 3 days to the air-pump-vacuum on sulphuric acid, and exposed for 2 hours to dry air at the temperature of boiling water, nevertheless showed, on being compressed, that they still contained fluid.

II. CHÆTOPODA.

1. CLAPARÈDE, É. Recherches sur la structure des Annélides sédentaires. Mém. Soc. Phys. Genève. xxii. 15 pls.
2. GRABER, V. Die Gewebe und Drüsen des Anneliden-Osophagus. SB. Ak. Wien, lxxii. pp. 201-218, 2 pls.
3. GRUBE, E. Die Familie der Cirratuliden. JB. schles. Ges. 1872, pp. 59-66.
4. PERRIER, É. Recherches pour servir à l'histoire des Lombriciens terrestres. N. Arch. Mus. viii. 198 pp. 4 pls.
5. ——. Étude sur un genre nouveau de Lombriciens (*Plutellus*, P.). Arch. Z. expér. ii. pp. 245-268.
6. SARS, G. O. Bidrag til Kundskab om Christianiafjordens Fauna; iii. *Annelida*. Christiania: 1873, 81 pp. 5 pls.
7. TAUBER, P. Om Naidernes Bygning og Kjønsforhold, Iagttagelser og Bemærkninger. Nat. Tids. (3) viii. pp. 376-422, pls. xiii. & xiv.
8. WILLEMOËS-SUHM, R. v. Ueber die Anneliden an den Küsten der Færøer. Z. wiss. Zool. xxiii. pp. 346-348, pl. xviii.

ANATOMY, EVOLUTION, ETC.

ALLMAN'S note on *Mitraria* (Zool. Rec. ix. p. 420) is reprinted, Rep. Br. Ass. 1872, p. 129. For further remarks on *Mitraria*, and a short description of the nervous system of *Tomopteris*, see Nature, ix. pp. 73 & 74, or Rep. Br. Ass. 1873, pp. 106-110. A note on the evolution of *Terebella* by E. Ray Lankester, Ann. N. H. (4) xi. p. 87; notochordal rudiments in *Glycera*, ib. p. 92.

The posthumous work of Claparède (1) is preceded by a biography of its author, and affords a detailed account of the histology and more delicate anatomy of the tubicolar (sedentary) Chætopods, based upon the study of 2000 sections of 13 species, belonging to *Spirographis*, *Myxicola*, *Protula*, *Owenia*, *Terebella*, *Stylarioides*, *Audouinia*, *Chætopterus*, *Thelepsavus*, *Aricia*, *Branchiomma*, and *Nerine*, and forming an important addition to the author's celebrated previous researches on the *Annulata* of the Bay of Naples. The different anatomical systems (cuticle, hypoderm, muscular layers, bristles, perivisceral cavity, circulatory, digestive and respiratory organs, the nervous system, and the segmental organs) and the modifications which they undergo in the different types, are described and illustrated by 163 figures. The generative organs, which can only be studied successfully in fresh specimens, are however omitted. To give an abstract here is hardly possible, and would be of very limited utility, as this work and the previous one by the author on the structure of the *Oligochæta* (1868) must be the starting-points for supplementary research on the structure of other *Annulata*. Attention, however, may be drawn to the chapter on the segmental organs, which demonstrates that these organs in the *Serpulidæ* and *Sabellidæ* (where they only exist in a single highly developed pair) have nothing to do with reproduction, but are the glands that secrete the tubes, while in the *Chætoperidæ* they have both reproductory and excretory functions; and to the description of the circulatory system in *Sabellidæ* and *Serpulidæ*. The intestine is here enclosed in a vascular sinus, situated between its longitudinal and circular muscular layers, and playing the part of the wanting dorsal vessel. Anteriorly, this sinus, which must receive the nutritive products immediately through the epithelium of the intestine, gives origin to a rich vascular plexus on each side of the œsophagus, with which the ultimate branches of the ventral vessel are also connected, and from which the branchial vessels spring. The blood-wave is driven forward into the plexus by the contractions of the walls of the intestinal sinus, and propelled in the gills by the contractions of the branchial vessels; as each gill-ray is only provided with a single vessel, the alternating contractions of these vessels in the opposite direction lead the aerated fluid back through the plexus into the ventral vessel, from which it is distributed to the different organs. This intestinal sinus is also present in the *Ammocharinæ*; and, in the posterior part of the body, in the *Aricionæ* and *Chætoperinæ*, while in the anterior a true dorsal vessel exists, &c.

Through the dissection of several exotic earth-worms—only a few, however, in a fresh state, the others preserved in spirits, and therefore not

affording a sufficient material for an exhaustive anatomical investigation—**PERRIER** (4) has shown that the anatomy of this tribe is much more diverse than was hitherto supposed, and that dissection is always necessary for the determination of the generic position, which cannot be fixed from external characters only. The stomach is sometimes double or quadruple (*Digaster*, *Moniligaster*); in the “ante-clitelloid” (*infra*, p. 475) genera it is situated behind the sexual organs and the lateral hearts, in the “intra-” and “post-clitelloid” before them; some have a double dorsal vessel, others perhaps a single ventral; in some a portion of the dorsal is transformed into a median heart. **E. R. Lankester’s** hypothesis, that the earth-worms have typically 2 pairs of segmental organs in each “zoonite” of which, however, generally 1 is aborted, is supported by the fact that in some genera they open above the superior pair of setæ, in others above the inferior, following the uppermost bristle of that pair, when exceptionally displaced, as in *Titanus*; in *Perichæta* both systems appear to be almost aborted. It is still an open question if some “intra-clitelloid” species are not dioecious. There may be 1 (*Titanus*, *Plutellus*), 2 (the ordinary structure), or 3 (*Lumbricus*, *Eudrilus*) pairs of testes; the vasa deferentia may perhaps also occur in 3 pairs (*Eudrilus* ?), most commonly in a single pair, but bifurcated, each branch with a vibratile funnel; in *Acanthodrilus* and *Moniligaster* there are 2 pairs of vasa deferentia, and consequently 4 male genital apertures; in *Anteus* they are replaced by the segmental organs, with which they are probably also homologous. Accessory sexual glands (vesiculæ seminales, prostata) are found in some “post-clitelloid” genera. In *Eudrilus* true penes exist, and in *Acanthodrilus* certain setæ are transformed into copulatory organs, while in *Rhinodrilus* the bristles of the clitellum have undergone a modification, probably fitting them for some similar use. The ovaries and oviducts are only described in a more restricted number of genera; in *Plutellus* the ovaries appear to be placed before the testes; the oviducts may open before the clitellum or on this portion of the body, sometimes with a common single orifice. The “copulatory pouches” may be wanting or exist in 1–5 pairs; their place is sometimes behind or before, sometimes in the same rings as the testes; after his researches on *Plutellus* (5) the author is inclined to deny their homology with the segmental organs.

TAUBER (7) has made a special study of the generative organs of the *Naidea*; his observations will better be recorded in connection with a later paper by the same author on the structure and asexual reproduction of the Naidæ, of which the present may be regarded as the forerunner.

É. ROBERT, “Sur les moyens employés par les lombrics pour défendre l’entrée de leurs galeries souterraines,” C. R. lxxvi. pp. 785 & 1033. Observations on phosphorescent earth worms by **F. COHN & ROSENBERG**, Z. wiss. Zool. xxiii. pp. 459–461.

LOCAL LISTS, DISTRIBUTION, ETC.

SARS (6) enumerates 61 species from Christiana-Fjord; many are figured or described more or less fully. **WILLEMÖES-SUHM** (8) contri-

buted a list of 25 species observed at the Faroe Islands; they are chiefly species which occur in Öresund and elsewhere in a much higher region, where the bottom has a similar character; the character of the bottom (muddy, shelly, sandy) is the principal factor in the bathymetrical distribution of the lower animals. A few anatomical facts are recorded of some of the species. EHLERS (SB. Soc. Erlang. v. pp. 7-9) enumerates 15 species from Nova Zembla and 9 from Finmark, collected by Heuglin; one is new. K. MÖBIUS ("Die wirbellosen Thiere der Ostsee, Bericht über die Expedition zur physikalisch-chemischen und biologischen Untersuchung der Ostsee im Sommer 1871, auf S. M. Avisodampfer 'Pommerania'") gives a list of 33 species observed in the Baltic; the localities are stated in detail, with indications of the depth and the character of the bottom for each species; the synonymy is also carefully attended to, and in some instances rectified through the reduction of nominal species. The Baltic fauna is an abstract of that of the North-Atlantic, composed of the "eurythermous" and "euryhalous" species, viz., those which are not damaged through any great differences or variations of the temperature or in the quantity of salts dissolved in the water; they are often inferior in size to their brethren in the Kattegat or the North Sea, but there are plenty of individuals; the deeper eastern part of the Baltic is poorer in species than the western, and the greater depths poorer than the upper regions: cf. Ann. N. H. (4) xii. pp. 80-89 for a translation of the general part of the report. C. KUPFFER ("Bericht" *ibid.* pp. 150-152) enumerates 52 species dredged in various places during the passage to Arendal (Norway).

A detailed account (partly illustrated by woodcuts) of the *Annulata* (and other *Invertebrata*) of New England is given by A. E. VERRILL, in Baird's "Report on the condition of the sea-fisheries of the south coast of New England in 1871 & 1872," part i. Washington: 1873, containing pp. 580-624, a catalogue by Verrill, S. I. Smith, & O. Harger, of the marine invertebrate animals of the southern coast of New England and adjacent waters found during the investigations and cruises of the "U. S. Commission of Fisheries," with synonymical references, facts concerning distribution, and descriptions of new genera and species. The same author, in the general "Report upon the invertebrate animals of Vineyard Sound and the adjacent waters, with an account of the physical characters of the region" (*ibid.*, pp. 295-513), describes, in a more popular manner, the fauna of the bays and sounds, estuaries, harbours, ponds, marshes, ocean shores, and outer colder waters, and for each of these divisions enumerates the species inhabiting the rocky, gravelly-shelly, sandy, or muddy shores or bottom, piles and timbers, oyster-beds and eel-grass, the free-swimming surface animals, parasitic animals, &c.: many descriptive and biological notes are also given. A. E. VERRILL'S "Results of recent dredging expeditions on the coast of New England," Am. J. Sci. (3) v. pp. 1-16, 98-106, and vi. pp. 435-441, are also rich in information regarding the lower marine fauna of New England and its distribution.

GENERA AND SPECIES.

POLYNOIDÆ AND SIGALIONIDÆ.

Polynoe cirrata, Pall., *Harmothoe imbricata*, (L.), *Evarne impar*, Johnst., *Lanilla glabra*, Mgr., and *Antinoe sarsi*, Kbg., are, according to Möbius (*l. c.* pp. 111 & 112), only varieties of one species. *Lanilla* (?) *mollis*, S., is fully described and figured by Sars (6), pp. 7-14, pl. xiv. On *Sigalion idunæ*, cf. W.-Suhm (8), p. 347. On *Enipo kinbergi*, Mgr. ?; Kupffer, *l. c.* p. 150. On the Norwegian and New England species of this and subsequent families of marine *Chatopoda*, the works of Sars and Verrill give abundant information. *Lepidonotus sublævis*, sp. n., Verrill, *l. c.* pp. 320 & 581, pl. x. fig. 42; *L. angustus*, sp. n., *id. l. c.* pp. 494, 581 & 582; *Sthenelais picta*, sp. n., *id. l. c.* pp. 348, 582 & 583, New England (Vineyard Sound, &c.).

AMPHINOMIDÆ.

Grube (JB. schles. Ges. 1872, p. 58) corrects the description of *Notopygus (crinita)*; it is probably generically identical with *Lirione*.

A new genus allied to *Euphrosyne*, discovered on a (new) deep-sea sponge, 160 miles S.W. of the island of Hierro, Canaries, is described, but not named, by Wyville Thomson, *Nature*, viii. p. 29.

EUNICIDÆ.

Onuphis quadricuspis, Sars (6), pp. 16-22, pl. xv. figs. 7-19. *Lysidice americana*, sp. n., Verrill, Report, pp. 508 & 593; *Lumbriconereis opalina*, sp. n., *id. l. c.* p. 594, pl. xiii. figs. 69-70; *L. tenuis*, sp. n., *id. l. c.* pp. 342 & 594; *Ninoe nigripes*, sp. n., *id. l. c.* pp. 508 & 595, all from New England (Vineyard Sound, &c.). *Nothria opalina*, sp. n., *id.*, Am. J. Sci. (3) v. p. 102; St. George's Bank.

STAUROCEPHALIDÆ.

Staurocephalus pallidus, sp. n., Verrill, Report, pp. 348 & 595 (New-haven).

NEREIDÆ.

According to Möbius (*l. c.* p. 113) *Nereis dumerili*, A. E., = *N. zostericola*, *Heteronereis fucicola*, and *Nereilepas variabilis*.

Nectonereis, Verrill, g. n. Head prominent, depressed, oval, rounded in front, with 2 pairs of large eyes, and 1 pair of small antennæ; palpi rudimentary. Tentacular cirri 4 on each side. Proboscis small, furnished with a pair of terminal hooks, with 2 anterior clusters of denticles on the upper side, and 5 small clusters below in a ring extending nearly half way around it. Anterior part of body fusiform, consisting of about 14 segments, the feet of which are divided into small rounded lobes, with small ventral and long dorsal cirri, those of the first 7 segments

swollen and gibbous toward the end, with a small acute terminal portion. Posterior part of body composed of numerous short segments, the feet of which are furnished with lamelliform appendages. *N. megalops*, sp. n., Verrill, Rep. pp. 440, 592 & 593, pl. xii. figs. 62 & 63 (Vineyard Sound, swimming actively on the surface).

PHYLLODOCIDÆ.

Notophyllum foliosum, S., Sars (6), pp. 24-26; *Eteone fucata*, S., *ibid.* pp. 26-29, pl. xv. figs. 1-6; *E. picta*, sp. n., Ehlers, (*l. c.* p. 8), Nova Zembla).

According to Möbius (*l. c.* p. 111) *Phyllodoce mucosa* and *assimilis*, Oerst., *rinki* and *teres*, Mgr., are only varieties of *P. maculata*, Mull.

Eumidia americana, *vivida*, and *papillosa*, spp. nn., Verrill, *l. c.* pp. 494 & 584; *Eulalia pistacia*, *granulosa*, *annulata*, *gracilis*, spp. nn., *id. l. c.* pp. 584-586; *Phyllodoce gracilis* (pl. xi. fig. 56), *catenula*, spp. nn., *id. l. c.* pp. 494, 586-588; *Eteone robusta*, *limicola*, *setosa*, spp. nn., *id. l. c.* pp. 349, 488 & 588, New England.

SYLLIDÆ.

Eusyllis moniliformis, Mgr., W.-Suhm (8), p. 347; *Proceræ ornata*, sp. n., Verrill, *l. c.* pp. 398 & 746; *Podarce obscura*, sp. n., *id. l. c.* pp. 319 & 589, pl. xii. fig. 61.

GONIADIDÆ AND GLYCERIDÆ.

Eone gracilis, sp. n., Verrill, *l. c.* pp. 508 & 596. *Glycera alba* (R.), W.-Suhm (8), p. 348, pl. xviii. figs. 1-3.

OPHELIDÆ AND SCALIBREGMIDÆ.

Ammotrypane aulogaster (R.), Kupffer, *l. c.* p. 151; Sars (6), pp. 42-45; *A. fimbriata*, sp. n., Verrill, *l. c.* pp. 508 & 604, pl. xv. fig. 79; *Eumenia crassa* (Oerst.), Sars, *l. c.* pp. 45 & 46; *Ophelia simplex* (Leidy), Verrill, *l. c.* pp. 319 & 603; *Travisia carnea*, sp. n., *id. l. c.* pp. 508 & 604; New England. *Scalibregma brevicauda*, sp. n., *id. l. c.* pp. 416 & 605.

ARICIIDÆ.

Scoloplus armiger (M.), Sars (6), pp. 40-42. *Aricia cuvieri*, A. E., *id. l. c.* pp. 31-36, pl. xviii. figs. 17-23; *A. norvegica*, S., *id. l. c.* pp. 36-40, pl. xvi. figs. 1-8; *A. ornata*, sp. n., Verrill, *l. c.* pp. 344 & 536; *Anthostoma robustum*, sp. n., *id. l. c.* pp. 343 & 597, pl. xiv. fig. 76; *acutum*, sp. n., *id. l. c.* pp. 501 & 599; *fragile*, sp. n., *id. l. c.* pp. 344 & 598; New England.

SPIONIDÆ.

Prionospio plumosus, Sars (6), pp. 63-68, pl. xvii. figs. 13-29; *Spiophanes cirrata*, *id. l. c.* pp. 68-73, pl. xviii. figs. 1-16; *Leucodore ceca*, Oerst., W.-Suhm (8), p. 348, pl. xviii. figs. 4 & 5.

Disoma multisetosum, Oerst., Möbius, *l. c.* p. 108, figs. 16–21.

Nerine agilis, sp. n., Verrill, *l. c.* pp. 346 & 600; *Scolecoplepis viridis*, *tenuis*, spp. nn., *id.*, *l. c.* pp. 345, 501, 600, & 601; *Spio setosa*, sp. n., *id.* *l. c.* pp. 344 & 602, pl. xiv. fig. 77; *S. robusta*, *id.* *l. c.* pp. 345 & 603: New England.

Periptyches festiva, g. & sp. nn., Grube (JB. schles. Ges. p. 58), allied to *Prionospio*, gills 2 pairs, pinnate, on the 4th and 5th segments (perhaps also sometimes on the 2nd), pinnulæ crowded, apparently pluriserial; caruncle narrow, flat, reaching to the 4th segment; eyes 2, elongate, 1 on each side of the caruncle, bristles of the anterior feet hair-shaped, hind lips of the upper oar larger than the lower (Adriatic).

Paraonis tenera, g. & sp. nn., *id.* *ibid.*, gills narrow, pointed, with undivided margin, on the 4th–10th segments, head roundish, eyes 2, point-like; caruncle small, flat, reaching to the 2nd segment. Bristles of the anterior segments hair-shaped, upper oar with a longer pointed hind lip, the lower short and broad; on the posterior segments the bristles are very little prominent, the upper hair-shaped, the lower acicular (Adriatic).

CHLOREMIDÆ.

Trophonia glauca (Mgr.), Sars (6), pp. 48 & 49; *T. flabellata*, S., *id.* *l. c.* pp. 49–52, pl. xvii. figs. 1–12; *Chloræma pellucidum*, S., *id.* *l. c.* pp. 52–61, pl. xvi. figs. 9–20.

Trophonia affinis (Leid.), Verrill, *l. c.* pp. 507 & 605, pl. xiv. fig. 75; *Brada setosa*, sp. n., *id.*, *l. c.* pp. 508 & 606 (N. England).

CIRRATULIDÆ.

Grube (3) has contributed a critical synopsis of this family. 3 genera only are recognized: *Cirratulus* (without tentacular cirri), *Heterocirrus*, and *Acrocirrus* (with those organs; dwelling in excavations in limestone and shells). The genera *Timarete*, *Promenia*, *Archidice*, and *Labrenda*, Kinberg, *Audouinia*, Quatref., and *Cirrinereis*, Blv., are considered as sub-genera or sections of *Cirratulus*, which comprises 2 principal divisions:—*Cirratulus* proper, and *Cirronereis*. *Narangaseta*, Leidy, and probably also *Dodecaceria*, Oerst., = *Heterocirrus*. *H. frontifilis*, Gr. (1860), is made the type of a new genus, *Acrocirrus*, Gr., distinguished by the shape of the cephalic lobe, the insertion of the prehensile tentacular cirri, and the distinct setigerous tubercles. 4 new species are described: *C. melanacanthus* and *flavescens*, Fr. M. & Gr. (Desterro), *pallidus* (locality unknown), and *fuscus* (Adriatic Sea).

Cirratulus grandis, sp. n., Verrill, pp. 319 & 606, pl. xv. figs. 80 & 81; *tenuis*, sp. n., *id.* *l. c.* pp. 416 & 607 (New England).

AMPHICTENÆ AND AMPHARETEÆ.

According to Möbius, *l. c.* pp. 109–110 (figs. 21–24) *Cistenides hyperborea*, Mgr., = *Pectinaria belgica*, (Pall.).

Cistenides gouldi, sp. n., Verrill, *l. c.* pp. 323 & 612, pl. xvii. fig. 87;

Ampharete setosa, sp. n., *id. l. c.* pp. 416 & 612; *Amage pusilla*, sp. n., *id. l. c.* p. 613.

Samythella, g. n., Verrill, *Am. J. Sci.* (3) v. p. 98. Body elongated, composed of about 50 segments, 15 of which bear fascicles of setæ, and posteriorly about 35 bear uncini only, but have a small conical papilla above the uncinigerous lobe, as in *Melinna*; the uncini commence on the 4th setigerous ring. Branchiæ 6, placed side by side in a continuous transverse row. Cephalic lobe oblique, somewhat shield-shaped, with a narrowed prominent front; buccal lobe shorter. Tentacles numerous, smooth, and slender. *S. elongata*, sp. n., *id. l. c.* p. 99 (St. George's Bank).

MALDANIDÆ.

Nicomache dispar, sp. n., Verrill, *Report*, pp. 512 & 608; *Maldane elongata*, sp. n., *id. l. c.* pp. 343 & 609; *Rhodine attenuata*, sp. n., *id. l. c.* pp. 508 & 609 (New England).

Clymenella, g. n., Verrill, *l. c.* p. 607. Body elongated, composed of 22 segments, exclusive of the cephalic and anal; all, exclusive of the buccal and 3 ante-anal, setigerous with fascicles of slender setæ above and series of hooks below. Anterior margin of 4th setigerous segments prolonged into a thin membranous collar. Proboscis swollen, ribbed. Head with a prominent convex median plate, and with a raised border on each side and behind, the lateral and posterior lobes separated by notches. Anal segment funnel-shaped, the edge surrounded by papillæ. *C. torquata* (Leidy), pl. xiv. figs. 71-73, p. 343 (New England).

HALELMINTHIDÆ.

Notomastus luridus and *filiformis*, spp. nn., Verrill, *l. c.* pp. 342, 610 & 611 (New England).

The discovery is announced (*Nature*, viii. p. 83), during the 'Challenger' expedition, at a depth of 3,000 fathoms, of a tube-building annelid, allied to *Owenia* and *Myriochele* (head rounded, mouth lateral; no trace of cephalic branchiæ; the segments not divided from one another, &c.).

TEREBELLIDÆ.

Pista cristata (M.), Kupffer, *l. c.* p. 152.

Nicolea simplex, sp. n., Verrill, *Report*, pp. 321 & 613; *Leprea rubra*, sp. n., *id. l. c.* pp. 382 & 615; *Polycirrus eximius* (Leidy), *id. l. c.* pp. 320 & 616, pl. xvi. fig. 85 (New England).

Scionopsis, g. n., Verrill, *l. c.* p. 614. Body segments numerous, the 17 following the 3rd bearing fascicles of slender setæ, the others only small uncinigerous lobes, 2nd and 3rd segments bearing branchiæ and having their anterior margins prolonged into membranous collar-like expansions, that of the 2nd forming broad lateral lobes behind the tentacles, that of the 3rd a dorsal sheath behind the branchiæ, beneath which they can be retracted. Branchiæ 4, those of the 1st pair larger (but generally one or more absent, or the anterior are smaller, owing to their having been broken off and reproduced), palmately branched and sup-

ported on elongated pedicles. Tentacles numerous, crowded. *S. palmata*, sp. n., *id. l. c.* pp. 321 & 614 (New England).

Chaetobranthus, n. g., *id. l. c.* p. 616. No blood-vessels, body much elongated, segments very numerous, nearly all bearing fascicles of setæ, those of the middle region simple or more or less branched branchial cirri, each of their divisions tipped with slender setæ, the first and last ones being smaller and simpler than the rest; anterior and posterior segments without cirri. Cephalic segment expanding into a broad tentacular (frontal) lobe, rounded or emarginate anteriorly, often scolloped laterally. Tentacles crowded, very numerous, long and slender, when distended by the blood. *C. sanguineus*, sp. n., *id. l. c.* pp. 320, 616 & 617 (New England).

SABELLIDÆ.

Sabella microphthalmia, sp. n., *id. l. c.* pp. 323 & 618; *Euchone elegans*, sp. n., *id. l. c.* pp. 432 & 618, pl. xvi. fig. 84; *Fabricia leidyi*, sp. n., *id. l. c.* pp. 323 & 619 (New England).

HERMELLIDÆ.

Sabellaria vulgaris, sp. n., *id. l. c.* pp. 321 & 611, pl. xvii. fig. 88 (New England).

SERPULIDÆ.

Protula media, Stimps.; Morse, Proc. Bost. Soc. xv. pl. i. figs. 8 & 9. *S. dianthus*, sp. n., Verrill, *l. c.* pp. 322 & 620; *Spirorbis borealis* (Daud.), *id. l. c.* pp. 322 & 621; *S. lucidus*, Fl., *id. l. c.* pp. 498, 504, & 622 (New England).

OLIGOCHÆTA.

PERRIER gives (4) the following synopsis of the genera (all new, with the exception of *Lumbricus* and *Perichæta*), which he distinguishes among the terrestrial *Lumbricini*, as far as their external characters are concerned:—

- I. *Lumbricini anteclitellini*: male genital orifices placed before the clitellum *Lumbricus*, L.
- II. *Lumbricini infraclitellini*: male genital orifices placed in the clitellum.

* Bristles disposed in 4 rows.

- A. Orifices of the segmental organs before the ventral bristles. Bristles disposed in pairs before the clitellum, but removed from each other posteriorly, and forming 8 distinct rows.

Titanus, P.

- B. Orifices of the segmental organs before the dorsal bristles.

- a. Copulatory apparatus wanting altogether; external orifices of male generative organs fused with those of the segmental organs; bristles all similar..... *Anteus*, P.

b. Male orifices distinct, in the ventral bristle rows; bristles of the clitellum modified for copulation and ornamented; cephalic lobe prolonged in the shape of a tentacle... *Rhinodrilus*, P.

c. Male and female orifices distinct, the female common with those of the copulatory pouches. A retractile muscular penis, inclosed in a distinct pouch *Eudrilus*, P.

** Bristles disposed in quincunx, at least in the posterior parts of the body *Urochæta*, P.†

III. *Lumbricini postclitellini*: male genital apertures placed behind the clitellum.

A. Bristles disposed in pairs and in 4 rows.

a. Two pairs of male genital orifices, each armed with a penis composed of a certain number of pointed and arched bristles..... *Acanthodrilus*, P.

b. A single pair of male genital orifices; no copulatory apparatus *Digaster*, P.

B. Bristles forming a circle in the middle of each ring; a single pair of male orifices.

a. Male orifices placed ventrally, but removed from each other and situated on the 2nd ring after the three-ringed clitellum; orifices of the copulatory pouches entirely lateral... *Perichæta*, S.

b. Male orifices contiguous, placed together in a pit on the first ring after the more than 3-ringed clitellum; orifices of the copulatory pouches almost contiguous, and distinctly ventral; cephalic lobe encroaching profoundly upon the first ring ...

Perionyx, P.

To this (postclitelloid) division also belongs the genus *Plutellus*, P. (5), making a third group, C, in which the bristles are disposed in 8 equidistant rows; the segmental organs are placed differently on alternating segments, their orifices alternately in the line of the 4th or 2nd row of setæ (on the first segments in the 3rd); there are 5 pairs of copulatory pouches, 1 pair of female orifices before, and 1 of male orifices immediately behind the 4-ringed clitellum; a line of dorsal pores also exists, as in *Perichæta*, &c.

IV. *Lumbricini acclitellini*, or apparently deprived of clitellum.

Bristles in 4 rows in pairs in each row; orifices of the segmental organs before the bristles of the upper row; 4 male genital orifices, 2 in the line of the ventral bristles, 2 between the two rows of the same side..... *Moniligaster*, P.

[Among Kinberg's genera (1866), *Tritogenia* must apparently be preserved; some of his *Lumbrici* must be removed, or are "incertæ sedis" in Perrier's classification. *Mandane* belongs to Division III., and is possibly identical with *Acanthodrilus*; *Geogenia* is allied to *Rhinodrilus* of Division II. *Alyattes* appears to be a distinct genus of Division I., the bristles being disposed as in *Titanus*, but *Eurydamus* is of doubtful position. *Hypogeon*, Kinb., nec Savigny, appears also to belong to Division I., if not identical with *Plutellus*. *Hegesipyle* is also dubious; and

† Inserted here according to a note received from the author.—C. F. L.

Amyntas, *Nitocris*, *Pheretima*, *Rhodopis*, *Lampito*, Kinb., are only sections of *Perichæta*.]

Lumbricus americanus, P. (4), p. 44, pl. i. figs. 6-8 (New York); *L. victoris*, P., p. 48 (Damiette). *Anteus gigas*, P., pp. 50-57, pl. i. figs. 13 & 14 (Cayenne). *Titanus brasiliensis*, P. (Brazil), pp. 57-65, pl. i. figs. 15 & 16. *Rhinodrilus paradoxus*, P., pp. 66-71, pl. i. figs. 9-12 (Caraccas). *Eudrilus lacazii*, P., pp. 75-77 (Martinique); *E. peregrinus*, P., pp. 77 & 78, pl. iv. fig. 76 (Rio Janeiro); *E. decipiens*, P., pp. 78-82, pl. ii. figs. 26-30 (Antilles). *Acanthodrilus obtusus*, P., pp. 87-89, pl. ii. fig. 17 (New Caledonia), *ungulatus*, P., pp. 89-92, pl. ii. figs. 18-23 (*ib.*), *verticillatus*, P., pp. 92-94, pl. iv. fig. 75 (Madagascar). *Digaster lumbricoides*, P., pp. 94-96, pl. ii. figs. 24 & 25, pl. iv. figs. 64 & 65 (New Holland). *Perichæta houletti*, P., pp. 99-105, pl. ii. figs. 31-44, pl. iii. figs. 45-63 (Calcutta and Cochin China); *affinis*, P., pp. 106-112, pl. iv. figs. 66 (Cochin China); *robusta*, P., pp. 112-118, pl. iv. figs. 67 & 68 (Isle de France, Manilla); *aspergillum*, P., pp. 118-122, pl. iv. figs. 71 & 72 (hab. unknown); *quadragenaria*, P., pp. 122-124, pl. iv. fig. 69 (East India); *elongata*, P., pp. 124 & 125, pl. iv. fig. 70 (Peru). *Perionyx excavatus*, P., pp. 126-130, pl. iv. figs. 73 & 74 (Cochin China). *Moniligaster deshayesi*, P., pp. 130-141, pl. iv. figs. 77-84 (Ceylon). *Urochæta hystrix*, P. (= *L. corethrurus*, F.M.), pp. 142-144, pl. iv. figs. 85-88. *Plutellus heteroporus*, P. (5) (Pennsylvania).

Lycodrilus, g. n., Grube (JB. schles. Ges. 1872, p. 67) differs from *Euaxes* by the presence of 2 much larger, very prominent, and strongly arched fragile hooks in the lower rows of the 2nd-10th segments. *L. dybowskii*, *id. ibid.* sp. n. (Lake Baikal).

Euaxes baicalensis, sp. n., *id. ibid.* (Lake Baikal).

Sænuris canadensis, Nicholson (Ontario), is no *Sænuris*, according to Verrill, Am. J. Sci. (3) v. p. 388.

Clitellio irrorata, sp. n., Verrill, Report, pp. 324 & 622.

Halodrilus, g. n., *id. l. c.* p. 623. Body long, slender; blood colourless. Setæ small, acute, in 4 fan-shaped fascicles on each segment. Alimentary canal consisting of a pyriform pharynx, followed by a portion, from which 5-7 rounded or pyriform cæcal lobes arise on each side, projecting forward and outward, and a large bilobed portion, beyond which the intestine is constricted, then thickened and convoluted, covered with polygonal greenish glandular cells, which become fewer farther back, where the intestine becomes a long, narrow, convoluted tube. *H. littoralis*, sp. n., *id. l. c.* pp. 326 & 623 (New England).

STERNASPIDIDÆ.

The structure of *Sternaspis* presents no special points of contact with the *Gephyrea*, but with the capitibranchiate polychætous annelids. E. Ray Lankester, Ann. N. H. (4) xi. p. 92.

FOSSIL ANNULATA.

Ehlers (SB. Soc. Erlang, v. p. 12) notices a fossil annelid from Solenhofen. F. Klemm (Abh. Ver. Brem. iii. p. 362) describes the markings

of a presumed Chætopod (*Psammoscolex lunaris*) from the Permian (?) system. Nicholson has established the genera *Conchiolites* and *Ortonia* for lower Silurian species of tubicolar Annelids, formerly referred to *Tentaculites* (Rep. Br. Ass. 1872, pp. 118 & 119; cf. "Descriptions of 2 new species of fossil tubicolous Annelides," Geol. Mag. x. pp. 54-57, pl. iv.; G. Young, "Note on a carboniferous species of *Ortonia*," l. c. pp. 112 & 113), and referred (a) the burrows for habitation (more or less vertical) and tunnels excavated during the search for food (more or less horizontal or oblique), and (b) the surface trails or tracts of palæozoic *Annulata* to the "genera" (a) *Arenicolites*, Salt., *Scolithus*, Haldem., *Histioderma*, Kin., *Planolites*, Nich., (b) *Crossopodia*, M'Coy, *Nemertites*, M. L., and *Myrianites*, M. L. P. R. S. xxi. pp. 288-291; Abstracted in Ann. N. H. (4) xiii. pp. 166-168; noticed, Geol. Mag. x. pp. 309 & 310.

III. DISCOPHORA.

Codonobdella truncata, g. & sp. nn., Grube (JB. schles. Ges. 1872, p. 67) from Lake Baikal, differs from the freshwater *Piscicole* in the shape of its adhesive discs, the anterior of which is convex and cup-shaped, as in *Pontobdella*, much broader than the adjoining parts of the body, from which it is sharply separated; the posterior being lower and smaller, of only half the width of the former, and hardly broader than the extremity of the body, of which it makes, as it were, the direct continuation. Vent dorsal. Body cylindrical, short, narrowing somewhat towards the anterior, very little towards the posterior extremity; rings 75, scarcely distinct, the 2 genital orifices after the 15th, every 5th of the following thickened, with a small roundish prominence on each side. Eyes invisible.

Verrill ("Report," pp. 624-626, & 458) records the following species as occurring on different fishes, &c., at the shores of New England:—*Branchiobdella ravenelii* (Gir.) (pl. xviii. fig. 89) on *Myliobatis freminwillii*; *Cystibranchus vividus* and *Ichthyobdella funduli*, Verrill, on *Fundulus pisculentus*; *Pontobdella rapax*, sp. n., Verrill (pl. xviii. fig. 91), on a flounder (*Chanopsetta ocellaris*); *P.* sp. on *Mysis americanus*; *Myzobdella lugubris*, Leidy, on a crab, (*Callinectes hastatus*); *Malacobdella obesa*, sp. n., Verrill (pl. xviii. fig. 90), in *Mya arenaria*, and *M. mercenaria*, sp. n., Verrill, in *Venus mercenaria*. According to the same author, Am. J. Sci. (3) v. pp. 387 & 388, *Clepsine patelliformis*, Nicholson ("Contributions to a fauna canadensis, being an account of the animals dredged in Lake Ontario in 1872," Canad. Journ.), = *C. elegans*, Verr.; *C. submodesta*, V., = *modesta*, V.; and *Nepheleis vermiformis*, N., may be the young of *N. lateralis* (Say) or *fervida*, V.

Clepsine maculosa, Rthke., noticed by Grube, JB. schles. Ges. 1872, p. 66.

IV. TURBELLARIA.

1. AGASSIZ, A. The history of *Balanoglossus* and *Tornaria*. Mem. Am. Ac. ix. pp. 421-436, pls. i.-iii. Abstract by

- É. PERRIER, in Arch. Z. expér. ii. pp. 395-408, pl. xviii.; noticed, Am. J. Sci. (3) v. pp. 234 & 235.
2. BÜTSCHLI, O. Einige Bemerkungen zur Metamorphose des *Pilidium*. Arch. f. Nat. xxxix. pp. 276-283, pl. xii. figs. 1-9.
 3. GRAFF, L. Zur Anatomie der Rhabdocoelen. Strasburg: 1873. Abstract in Z. ges. Naturw. (2) vii. pp. 493 & 494.
 4. HALLEZ, P. Observations sur le *Prostomum lineare*, Oestd. (Syn. *Gyrator hermaphroditus*, Ehrbg., *Derostomum notops*, Dug.). Arch. Z. Expér. ii. pp. 558-585, pls. xx.-xxii.]
 5. MARION, A. F. Recherches sur les animaux inférieurs du Golfe de Marseille. 1^{er} art. Observations sur un nouveau Némertien hermaphrodite (*Borlasia kefersteini*). Ann. Sc. Nat. (5) xvii. Art. vi. pl. xvii.
 6. MOSELEY, H. N. On the anatomy and histology of the Land-Planarians of Ceylon, with some account of their habits, and a description of 2 new species, and with notes on the anatomy of some European aquatic species. P. R. S. xxi. pp. 169-173; Ann. N. H. (4) xi. pp. 310-314; Nature, vii. p. 353.
 7. SCHNEIDER, A. Untersuchungen ueber Plathelminthen. JB. oberh. Ges. xiv. 77 pp. pls. iii.-vii. Abstract in Arch. Sc. Nat. xviii. pp. 93-96; Z. ges. Naturw. (2) viii. pp. 91-93.
 8. ZELLER —. Observations sur la structure de la trompe d'un Némertien hermaphrodite, provenant des côtes de Marseille. C. R. lxxvi. pp. 366-369; Ann. N. H. (4) xi. pp. 398-400.

ANATOMY, EVOLUTION, &c.

The starting point and chief subject of SCHNEIDER'S researches on the histology, anatomy, &c., of the *Plathelmintha* (7), is *Mesostomum ehrenbergi*, but notice is also taken of other forms. The different chapters treat of the epithelium and intermediary layers, the muscles—to the different structure and arrangement of which a peculiar systematic value is attributed, because, when an animal has no skeleton, its shape will be determined by its muscular arrangement—the small rod-like bodies of the skin (probably secreta), the spinning-glands (with interesting observations on the manner in which small *Lumbrici*, *Eniomostraca*, *Hydrachnæ*, dipterous larvæ, and *Notonecta* are enticed in the slime and sucked by the *Monostomeæ*), salivary and accessory glands of the sexual system; further, the aquiferous vessels, proboscis, and nervous system (a "commissura posterior" is demonstrated—Graff

(3) however was unable to confirm its existence), the intestinal channel (formed by a single layer of cells), the vitelligenous organ ("Dotterstock"), the formation and cleavage of the egg, and the formation of the spermatozoa. [The *Mesostomeæ* and *Rhabdocæla* commonly only produce hard-shelled eggs, but *M. ehrenbergi*, *lingua*, &c., lay 2 kinds: bright transparent eggs, hatched in the uterus, and dark hard-shelled eggs, developed in the water. The first named are summer eggs, and only produced in the first period of the sexual life of the animal; the dark eggs are winter eggs, and only hatched in the next spring. Both kinds of eggs can be self-fecundated, or fecundated through copulation between 2 animals, but normally only the summer eggs of the winter animals are fecundated by the parent itself, without copulation, this process being impossible as yet because the penis is still imperfectly developed; nor is it ever observed in such animals. Isolation is pernicious to the summer animals, and repeated copulations apparently necessary for their own well bearing. The offspring of isolated (and therefore self-fecundating) parents, whether summer or winter animals, is only capable of producing winter eggs.]

GRAFF'S dissertation (3) is a sketch of the anatomy of the *Rhabdocæla*, in anticipation of a more detailed monograph. As points of a more special interest may be cited, the demonstration of a true cellular vibratile epithelium, the description of the "rod-like bodies" as lower stages of "urticating organs," which in particular instances (*Prostomeæ*) attain a higher development, and are then in no way different from those of the *Acalephæ*; the presence of transversely striated muscular fibres in the "proboscis" of the *Prostomeæ*, and peculiar "sac-shaped muscles" in the "pharynx;" the eyes and eye-like organs, the otolithe vesicles, &c.

In HALLEZ'S detailed account of the anatomy of *Prostomum* (4), the more prominent topics are the structure of the "proboscis," the lateral excretory vessels, the highly developed poison apparatus with the chitinous stylet, opening at the posterior extremity of the body in company with the duct, which leads the spermatozoa from the testes and seminal vesicle; the female organs, which open a little more forward on the dorsal aspect, and are the ovary (germ-sac), the "vitelligène," and the receptacle of sperma: that no "ootype" or true uterus for the final completion of the egg was found, is probably due to a deficiency in the investigation. During copulation, the "head" of one individual is turned towards the "tail" of the other, and the sperm-sac becomes filled; the stylet plays no part on this occasion, but does in capturing a prey, for instance, a Cyclops; the victim is seized by the proboscis, and the body of the Planarian curved in such a manner that the terminal stylet can be applied to the Crustacean, which is pierced repeatedly; the poison acts immediately, it is then sucked by the means of the muscular "pharynx," and only the chitinous skeleton left. In the embryonic *Planaria*, which do not yet show any vestige of the male genital organs, the stylet is already present, and of the same absolute size as afterwards. *Prostomum* is hermaphrodite at all seasons, and produces eggs throughout the year, which are enclosed in capsules and attached by pedicels to *Confervæ*; thus, there is no difference between summer and winter eggs. The dis-

covery of a pulsatile organ, a sort of heart, which contracts alternately from left to right, and inversely, is also a point of importance.

MARION (5) describes the anatomy of *Borlasia kefersteini*, which lives on the rhizomes of the *Zosteraceæ*, and is hermaphrodite like the species examined by Keferstein (1868). The ova and spermatic cells are developed promiscuously in the cavity of the body between its walls and the digestive tube; the ova are free and fully developed, when the spermatozoa are still enclosed in their vesicles; afterwards these are set free and mingle with the ova. Vaillant's conception of the trunk (proboscis) as the true digestive organ ("Revue Scientifique," 1872) is combated. The poisonous qualities of the liquor secreted by the posterior part of the "proboscis," and poured out through a delicate duct, opening close to the point of the stylet, are proved through direct observation. Another species, *B. echinoderma*, sp. n., Marion, remarkable through possessing, besides the ordinary cephalic eyes, also several lateral eyes, supplied from the lateral nerves, is noted; and also a small species, very similar to *B. kefersteini*, but differing in the shape of the stylet, and living in the branchial cavity of *Phallusia mamillata*. A note by ZELLER (8), who made his studies under Marion's direction, states that this *Borlasia* is also hermaphrodite, and not specifically different from *B. kefersteini*; the structure and use of the trunk are described with a little more detail.

The condensed report of MOSELEY'S investigations of the anatomy of the Land Planarians, &c. (6) can only be alluded to here as highly promising. BÜTSCHLI'S observations (2) were made on 2 species of *Pilidium* (*gyrans* and *auriculatum*) at Arendal, and are chiefly confirmatory of Meczniokoff's. A note by ALLMAN on some points of the structure of *Tornaria*, and comparison between it and *Mitraria*: Nature, ix. p. 74; Rep. Brit. Ass. 1873, pp. 107 & 108.

A. AGASSIZ'S researches (1) have proved the correctness of Meczniokoff's suggestion (1870), that *Tornaria*, in spite of its resemblance to *Brachiolaria* and other echinodermatous larvæ, is the larval stage of *Balanoglossus*. Its metamorphosis is traced so far, that the connection between the last observed stage of *Tornaria*, and the youngest specimens of *Balanoglossus* found buried in the sand, is quite evident. The structural analogies of *Tornaria* with larvæ of Annelids are pointed out, and the whole line and mode of evolution, affording a sample of regular and direct transformation without any reabsorption or rejection of parts of the larval body, is shown to agree rather with that of the worms than with that of the Starfishes and Sea-urchins. A full description of *B. kowalewskii*, Ag. (according to Verrill, l. c. p. 627, = *B. aurantiacus*, Girard), is given, and its analogies and affinities with different lower types discussed. Agassiz regards it as an intermediate type between tubicolar Annelids and Nemerteans; the analogy between the development of Echinoderms and Nemerteans is no proof of their identity of type; the gulf between them is as wide as ever.

Species described, Local Lists.

Borlasia kefersteini and *echinoderma*. Marion, cf. supra (5).

1873. [VOL. X.]

Bipalium ceres and *Rhynchodemus thwaitesi*, Moseley, spp. nn., Ceylon (6).

Planaria schlosseri, sp. n., Girard (Arch. Z. exp. ii. p. 488, pl. xix. fig. 1), mimics in colour and appearance the variety of *Botryllus schlosseri* on which it is found.

Prorhynchus stagnalis (M. S.), Schneider (7), p. 65, pl. vii. fig. 15; *Mesostomum obtusum* (M. S.), *id. l. c.* p. 66, pl. iv. fig. 1; *Stenostomum leucops*, (O. S.) *id. ibid.* fig. 2.

Möbius (*l. c.*) records 20 species as found in the Baltic. Verrill enumerates 25 from the shores of New England ("Report," pp. 627-634), of which the following are described:—*Nemertes viridis*, Dies, p. 628; *Tetrastemma* (?) *arenicola*, pp. 351 & 629, pl. xix. fig. 98, *Meckelia lurida*, pp. 508 & 630, *Cosmocephala ochracea*, pp. 325 & 630, pl. xix. fig. 95, *Polina glutinosa*, pp. 324 & 631, fig. 97, *Stylochopsis littoralis*, pp. 325 & 632, fig. 99, *Leptoplana folium*, pp. 487 & 632, *Planaria grisea*, pp. 487 & 633, Verrill, *l. c.* spp. nn.

Works on Helminthology and Lower-worms generally.

1. BENEDEN, P. J. VAN. Les Parasites des Chauves-Souris de Belgique. Mém. Ac. Belg. xl. pp. 1-42, pls. i.-vii.

The parasites of Bats generally partake of their winter sleep; if the bat die during the hybernation, its parasites die a short time after. Lists of the species observed in each species of Bat terminate the paper.

2. COBBOLD, T. S. The internal parasites of our domesticated animals. A manual of the Entozoa of the ox, sheep, dog, horse, pig, and calf. 150 pp. London.
3. ——. Vermi. Serie di lettura sulla elmintologia pratica date al collegio medico delle spedale Middlesex, tradotte d'all'inglese ed annote col permesso dell'autore dal T. TOMASI. Milano: 1873.
4. ——. Observations on Hæmatozoa. Veterinarian, 1873, pp. 674-677.
5. ——. Observations on Entozoa (introductory lecture), *ibid.* 1872, pp. 895-899.
6. ——. On the development of *Bilharzia hæmatobia*, together with remarks on the ova of another urinary parasite (the so-called *Trichina cystica* of Dr. Salisbury) occurring in a case of hæmaturia from Natal. *Ibid.* pp. 636-646 & 746-753 (also British Medical Journal).
7. HERING, E. Beiträge zur Entwicklungsgeschichte einiger Eingeweidewürmer. Württ. Nat. J. H. 1873, pp. 305-367.

Records the observations collected during many years concerning the rate of development of *Cestoda* and *Nematoda* in domestic Mammals,

experiments on their translation from one animal to others through feeding, &c. No results of a very striking character.

8. WILLEMOËS-SUHM, R. v. *Helminthologische Notizen*. iii. Z. wiss. Zool. xxiii. pp. 332-345, pl. xvii.

SCHNEIDER (7, *suprà*, 479), p. 54, rejects the usual division of the worms into annulate and not-annulate sections; segmentation may occur in the most different types. Each of the two great worm-types, *Nemathelmintha* and *Plathelmintha*, comes forth as (1) the primitive form ("Stammform"), and (2) the generative form ("Geschlechtsform"), both as (a) simple and (b) segmented. The "generative forms" are developed through budding from asexual types, for instance, the Medusoids from the Hydroids, the Bryozoon from its Zoecium; but with them all types must be classed that, though not originating through gemmation, are like buds [!]. These views are carried out in the following system of both divisions.

A. *Plathelmintha*.

I. *Primitive Types*.

Muscular wall composed of annular, diagonal, longitudinal, and sagittal fibres; layer of longitudinal fibres not interrupted; excretory system branched, ciliated in particular places.

Simple Types.

- A. Hermaphrodite; no blood-vessels, principal nerve stems lateral.
 a. Epithelium transitory: *Trematoda*.
 b. Epithelium permanent, ciliated: *Planarida*.

Segmented Types.

- B. Blood-vessels present.
 a. Proboscis opening into the mouth, armed with calcareous stylets; nervous system with 2 lateral principal stems; ciliary epithelium: *Polia*, *Borlasia*.
 b. A posterior adhesive disc.
 1. Nervous system with 2 lateral principal stems: *Malacobdella*.
 2. Nervous system with 1 ventral principal stem: *Hirudinea*.
 3. Segments pediferous: *Onychophora*.

II. *Generative Types*.

Muscular wall composed of an external, thin, transverso-longitudinal layer and internal-longitudinal, annular, and sagittal fibres. Principal nerve stems lateral.

- A. Epithelium transitory, no intestine, no blood-vessels; hermaphrodite: *Cestoides*.
 a. Not segmented: *Caryophyllæus*, *Amphiptyches* (?).
 b. Segmented.
 1. Head roundish, without distinction: *Ligula*.
 2. Head with adhesive pits.
 aa. No proboscis: *Dibothrium*, *Tetrabothrium*, *Triacnophorus*, *Solenophorus*.

bb. Four proboscides : *Tetrarhynchus*.

3. Head with true acetabula : *Tenia*.

B. Epithelium permanent.

a. No proboscis ; excretory system present : *Rhabdocoela*.

b. A short proboscis springing from the dorsal aspect of the mouth-cavity : *Bipalium* (*Sphyrocephalus*), *Dinophilus*.

c. A proboscis without stylet, which can be protruded from the front of the head.

1. No cephalic slits.

aa. An excretory system ; no blood-vessels : *Prostomea*.

bb. No excretory system ; blood-vessels : *Cephalothrix*.

2. Cephalic slits ; no excretory system.

aa. No blood-vessels : *Stenostomum*.

bb. Blood-vessels present ; *Nemertes*.

B. *Nemathelmintha*.

I. *Primitive Types*.

Muscular wall composed of longitudinal fibres. An orifice at each end of the body. Dorsal and ventral aspect different. Excretory vessels, if present, not branched, composed of two lateral principal stems.

Simple Types.

A. No blood-vessels, principal nerve stems dorsal and ventral.

a. A single dorsal median line : *Gordiacea*.

b. Dorsal and ventral median lines and lateral areas are present. Internal-transversal muscles on the ventral aspect in circumscribed places.

1. Mouth without jaws : *Nematoidea*.

2. Mouth with jaws : *Chætognatha*.

Segmented Types.

B. Blood-vessels may exist. Dorsal and ventral lines and lateral areas are present. Internal-transversal muscles from the ventral line to the lateral area. Principal nerve-stem ventral.

* No bristles ; no external-transversal muscles : *Gymnotomá* (*Polygordius*).

** Bundles of bristles and external-transversal muscles are present : *Chætopoda*.

II. *Generative Types*.

Rhynchocephala. Muscular wall composed of externo-transversal and interno-longitudinal fibres ; no lateral areas ; blood-vessels may exist.

A. Intestine horse-shoe shaped ; mouth and vent approximated.

a. Propagation through budding : *Bryozoa*.

b. No budding : *Sipunculidea*.

B. Intestine straight.

a. No mouth and no vent : *Acanthocephala*.

b. Mouth and vent present : *Priapulidus*, *Holocryptus*, *Bonellia*, *Echiurus*, *Sternaspis*.

The *Rotatoria* are excluded, because their muscular system is different from both; Schneider regards them as "unsegmented *Arthropoda*." The *Poliida* are removed from the Nemertean on account of their different muscular system and the different relations of the proboscis, and referred to the segmented type on account of the regular arrangement of the nerves which spring from the principal stems.

V. TREMATODA.

1. LINSTOW, O. v. Ueber die Entwicklungsgeschichte des *Distomum nodulosum*, Zed. Arch. f. Nat. xxxix. pp. 1-7, pl. i. Abstract in Ann. N. H. xii. pp. 345-347; Arch. sc. Nat. pl. xlvii. pp. 328-331; Z. ges. Naturw. (2) vii. pp. 230-231.
2. ——. Einige neue Distomen, und Bemerkungen über die weiblichen Sexualorgane der Trematoden. Arch. f. Nat. xxxix. pp. 95-108, pl. v. Abstract in Z. ges. Naturw. (2) vii. pp. 231 & 232.

The chief points in LINSTOW'S researches on the anatomy, especially of the female sexual organs, of *Distomum pellucidum* (2), is the more correct interpretation of the glands, in which the germinative vesicles and the shells of the eggs are formed, and the fact that the posterior seminal vesicle does not communicate with the testes, but receives the seminal fluid through the oviduct (vagina). He also (1) describes the larva (*Cercaria*) of *D. nodulosum*; in its sexual state this fluke lives in fresh-water fishes (pike, perch, &c.); the *Cercaria*, which is provided with a piercing spine, is found free or encysted in *Paludina impura*; it originates in structureless "sporocysts," one or few in each, propagating by transversal fission, and similar in shape to the embryos of *Distomum* soon after their being hatched. When the encysted tailless *Cercaria* are devoured with the snails, &c., they develop and attain sexual maturity in the intestine of the perch; the eggs of the *Distomum* are set free with the fæces, &c. Young flukes of the same kind, but of a larger size and in a more advanced state than those found in the *Paludina*, are often found encysted on the external surface of the intestine of *Acerina*; when these are devoured by the perch they are, in their turn, transferred to the digestive channel of the larger fish. It is, however, left undecided if in this case the *Cercaria* has migrated spontaneously into the *Acerina*, or if the latter owes them to the snails it swallowed, and the *Cercaria* only forced its way through the wall of the intestine by the help of its frontal spine. A list of the species of *Cercaria* and *Distomum*, which are known to correspond, is given in the introduction to the paper.

R. v. WILLEMOËS-SUHM (Helminth. Notizen, iii. l. c. pp. 332-343, pl. xvii. figs. 2-7) has contributed several systematical, biological, anatomical, and embryological notes on various *Trematoda*. *Monostomum faba* lives in pairs in follicles of the size of a pea beneath the skin of birds; Suhm found it in Genoa in *Saxicola cenanthe*, on the legs and near the vent. The two

individuals lie with the ventral surfaces against each other, the excretory extremity turned outwards, against the skin, the oral inwards; both contain eggs, one of them, however, many more than the other; the eggs and the excretory matter are carried outwards through an orifice in the follicle. Suhm believes that the eggs are devoured by *Anoplura* or by insects inhabiting birds'-nests, and that the "interimistic host" of *M. faba* must be sought for among them. The embryo (fig. 2) is without cilia, and with no apparent organization. The anatomy of *M. faba* (which has not been studied since 1838-39) is described. Other *Trematoda*, which live together in pairs, have the same situation in the cyst, for instance, *Distomum ferox*, Z., which lives in dilatations, of the size of a pea, in the walls of the intestine of the Stork, turning the mouths toward the wall, the thinner posterior extremities against the lumen of the intestine. *Monostomum crucibulum*, R. (from the intestine of Conger-eels in the Mediterranean), = *Gasterostomum armatum*, Molin & Olsson, which should therefore be called *G. crucibulum* (R.); Olsson found it in the pyloric appendages of *Cottus scorpius*, W.-Suhm in the intestine of *Muraena helena* and *Conger cassinii*. The embryo (fig. 3) is naked, but provided with an oral spine. W.-Suhm suggests that *Bucephalus hæmeanus*, L. D. (in *Ostrea* and *Cardium*), belongs to the further developmental cycle of this very common fluke, and that the *Distomum*, which in all probability, is ultimately developed from the *Bucephalus*, will encyst itself, like *D. hystrix*, on the gills of fishes preyed upon by Congers, *Muraena*, and *Cotti*. *Distomum hians* (from the intestine of the black Stork) belongs to the smaller number of *Trematoda*, the eggs of which, when ready for deposition, contain an advanced ciliated embryo (fig. 4), with two black eye-spots, but without mouth-cup or lateral vessels, like those of *D. hepaticum* and *viviparum*, which, however, have only one eye-spot. The embryo of *D. laureatum*, Z., is also provided with cilia and one eye-spot; those of *D. globiporum* (fig. 5) and *folium* (fig. 6) have cilia, lateral vessels, and a rudimentary mouth-cup; in that of *D. nodulosum* a large eye-speck with a roundish lens is added. W.-Suhm further suggests that the "interimistic host" of *D. hepaticum* (common in the sheep of the Faroe Islands) should be sought for in one of the eight terrestrial or aquatic *Gasteropoda pulmonata* of these islands—probably in *Limax agrestis*. A synopsis of the hitherto described embryos of the monogenetic and digenetic *Trematoda* is added.

On the occurrence of *D. hepaticum* in the biliary ducts of kangaroos, cf. KREFFT, Australian Entozoa, p. 1; in hares, COBBOLD (Veterinarian, 1873, p. 171); in man in China, LEIDY (Proc. Ac. Philad. 1873, p. 364); in sheep in Australia, Veterinarian, 1872, p. 542. COBBOLD describes the egg and embryo of *Bilharzia hæmatobia*, its rapid exclusion in water, &c.; he endeavoured in vain to get them introduced into fishes, *Articulata*, or fresh-water *Mollusca* (Veterinarian, 1872, l. c.).

E. RAY LANKESTER has ascertained that *Dicyema* is clearly no Infusorian, but a degraded form of worm, being multicellular in structure; Ann. N. H. (4) xi. pp. 95 & 96.

Description of Species.

Distoma lima, Rud. (*Fasciola vespertilionis*, Müll.), V. Beneden, "Parasites," p. 25, pl. vi. figs. 1-6 & 18 (common in the intestine of all kinds of bats); *chilostomum*, Mehl., *id. l. c.* p. 27, pl. vi. figs. 7-8 & 19 (with the former, = *D. heteroporum*, Duj.); *ascidia*, sp. n., *id. l. c.* p. 28, figs. 9-17 & 20 (in several species of bats); *ascidioides*, sp. n., *id. l. c.* p. 30 (especially in *Rhinolophus hipposcrepis*).

Distoma pellucidum, sp. n., Linstow (2), p. 95, figs. 5 & 6, from the oesophagus of the common fowl; *caudatum*, sp. n., *id. ibid.*, fig. 3 (from the intestine of the hedge-hog); *tectum*, sp. n., *id. l. c.* p. 104, fig. 4 (from that of *Osmerus eperlanus*); *beleocephalum*, sp. n., *id. ibid.*, fig. 2 (from that of *Ardea cinerea*); *recurvatum*, sp. n., *id. l. c.* p. 105, fig. 1 (from that of *Anas marila*); *echinatum*, Zed., = *oxycephalum*, R., = *dilatatum*, Mir. (from the common fowl), *l. c.* p. 105; with a synopsis of the species of the sub-genus *Echinostomum*.

Cercaria echinocerca, E. Ray-Lankester, *Ann. N. H.* (4) xi. p. 95.

VI. CESTOIDA.

1. CAUVET, —. Note sur le Ténia Algerien. *Ann. Sci. Nat.* (5) xvii. art. 15.
2. FOCK, H. C. A. L. De lintworm en het middel om hem uit te driven. Utrecht: 1873. [Not seen by the Recorder.]
3. KREFFT, G. On Australian *Entozoa*, including a list of the species hitherto recorded, and description of 16 new tape-worm-colonies, with figures of each drawn from fresh specimens. *Tr. Ent. Soc. N. S. W.* 1871, 28 pp. 3 pls.
5. NITSCHKE, H. Untersuchungen über den Bau der Tæniën. *Z. wiss. Zool.* xxiii. pp. 181-197, pl. ix. Abstract in *Z. ges. Naturw.* (2) vii. pp. 494 & 495.
6. PERRIER, É. Description d'un nouveau genre de Cestoïde (*Duthiersia*, E. P.). *Arch. Zool. expér.* ii. pp. 349-362, pl. xvi.
7. ST. CYR, —. Expériences sur le Scolex du *Tænia medio-cannellata*. *C. R.* lxxvii. pp. 536-538; *J. de l'Anat. Phys.* 1873, pp. 504-510, pl. xxi.; *Ann. N. H.* (4) xii. p. 428 (abstract in Hering's *Repertorium der Thierheilkunde*, 1874, p. 149).

ANATOMY, BIOLOGY, ETC.

An abstract of SOMMERS & LANDOIS'S paper (*Zool. Rec.* ix. p. 431) is given by PERRIER (6); the anatomical constitution of *Duthiersia* agrees

completely with that of *Bothriocephalus latus*, as far as the more delicate portions of its structure could be ascertained. NITSCHKE (5) gives the results of his investigation of the more minute structure of the head of the *Tenia*, especially of the muscular system, pointing out the difference in the muscular organization of the "rostellum," between the "Cystica" (*T. crassicollis*, *solium*, and *mediocannellata*) and "Cystoideæ" of Leuckart (*T. undulata*), and adding some observations on certain organs of unknown function, which have probably been confounded with the lateral vessels; they constitute the nervous system, according to Schneider (Untersuchungen, &c.), who also describes them in several other Cestoids.

CAUVET (1) gives his reasons for regarding *Tenia medicannellata* as the most common species in Algiers. Once he succeeded in finding what he believes to be its Cysticerc, in a tumor of the cellular tissue between the pleura and diaphragm of an ox. ST. CYR (7) repeated Leuckart's experiment of administering "proglottides" of this tapeworm to calves, and describes the Cysticercs which he found, 54 days afterwards, scattered in different parts of the connective tissue. LEBLANC (Bull. Soc. med. Vétér., 3 série, vii. 1873, pp. 26 & 27, with notes from Mégnin, abstracted in Hering's "Repertorium," 1874, p. 191) found in a dog suffering from epilepsy, with a propensity for turning to the left, 5 Cysticercs in the brain, probably derived from *T. solium*. (A similar case is recorded in the "Bericht über das Weterinärwesen im Königr. Sachsen f. 1871. On the common occurrence of the *Cysticercus Tenia medicannellate* in beef in India, the medical reports printed in the "Veterinarian," 1873, pp. 484-498, may be consulted.) DE SYLVESTRI ("Il medico veterinario," 1871) instituted successful experiments in order to prove the specific identity of *Cysticercus pisiformis* (from the liver of the hare) and *Tenia serrata* (of the dog), administering the bladderworms to dogs, and segments of the tapeworm, developed in this manner, to rabbits. PERRONCITO (Gazetta medico-veterinaria, 1872) studied the structure of *C. tenuicollis*, especially that of the cyst. HERING ("Beiträge," l. c.) introduced, mostly with success, *Cenuri* from the sheep and ox into young dogs, and found afterwards *T. cenurus* in their intestines; their introduction into cats, foxes, rabbits, and goats had no result. By similar experiments on dogs, *T. marginata* was developed from *C. tenuicollis*, and *T. solium* from *C. cellulosa*. Varied experiments with feeding various animals with different *Cystica*, *Cestoida*, *Nematoda*, *Trematoda*, and *Acanthocephala*, derived from others, had no results. Hering doubts that the dog derives its *T. cucumerina* from the hair-lice, as a rule, the *Trichodectes* being rare and the tapeworm common; he therefore made many experiments of feeding dogs with segments of *T. cucumerina*; but, though he afterwards found tapeworms of this species in their intestines, the experiment is, of course, not conclusive as to their being developed from the eggs of the segments introduced, and thus directly transferred. On a case of *Echinococcus* in the human orbit, and *Tenia* in a new-born infant, cf. "Veterinarian," 1872, pp. 243 & 741.

W.-SUHM (Helminthol. Not. iii. p. 343) remarks that *Bothriocephalus ditremus** (from the intestine of *Colymbus septentrionalis*) and *B. hetero-*

pleurus (from that of *Centrolophus pompilus*) belong to that division of the genus, in which the eggs are provided with a single, solid, brown, operculated covering, and do not contain any embryo when laid, and the embryos of which, when hatched, are covered with cilia, and therefore capable of active (spontaneous) migrations. They agree (*cf.* the synoptical table, p. 345) in this respect with *B. latus*, *Schizocephalus dimorphus*, *Ligula simplicissima*, *Trienophorus nodulosus*, and *Tetracampus ciliotheca*; while the egg-shells in *B. proboscideus* *, *infundibuliformis* *, *rectangulus* *, and many others, like those of the *Tænie*, are not operculated, composed of several layers, and containing an embryo destitute of cilia, and therefore only capable of passive migrations. (The eggs or embryos of the species marked * are figured.)

Genera and Species.

On the difference between *Tænia hepatica*, Linst., and *Cysticercus fasciolaris*, Linstow, Arch. f. Nat. xxxix. p. 107.

Duthiersia, g. n., Perrier (6), allied to *Bothriocephalus* and *Solenophorus*, distinguished by 2 great, compressed, membranous, frilled "bothridia," separated by a septum, and perforated at their bases. The level of these bothridia, which form the fan-shaped head or "scolex," is at right angles with that of the tapeworm itself, the "proglottides" of which have (like those of *Bothriocephalus*) in their median line 3 apertures, 2 upper, very close together, for the penis and vagina, and a 3rd more central, for the expulsion of the eggs. *D. expansa*, sp. n. (figs. 1-4) (intestine of *Varanus bivittatus*, Moluccas); *D. elegans*, sp. n. (fig. 6) (intestine of *V. niloticus*, Senegal).

Milina grisea, g. & sp. nn., Beneden ("Parasites," *l. c.* p. 31, pl. vii. figs. 1-10) (from the intestine of *Vespertilio murinus* and *serotinus*), only known in the "Scolex"-state: 4 suckers, unarmed "rostellum," 4 excretory tubes ending in a pulsatile vesicle, &c.; cannot be the "Scolex" of *T. obtusata*, Rud. (*l. c.* p. 32, pl. vii. fig. 11-12) (from *V. serotinus*).

Tænia tuberculata (especially from *Nyroca australis*), *novahollandia* and *paradoxa* (*Podiceps australis*), *forsteri* (stomach of *Delphinus forsteri* ?), *fimbriata* (*Halmaturus* sp. ?), *flavescens* (*Spatula rhynchotis* and *Anas superciliosa*), *cylindrica* (*A. superciliosa*), *coronata* and *rugosa* (*Himantopus leucocephalus*), *mastersi* (*Halmaturus* sp.), *phalangistæ* (*Phalangista vulpina*), *pediformis* (*Anas superciliosa* and *punctata*), *moschata* (*Biziura lobata*), *chlamyderæ* (*Chlamydera maculata*), *bairdi* (many Australian ducks, especially *A. superciliosa*), and *Bothriocephalus* (?) *marginatus* (*Halmaturus* sp.), all new species from Australia, described and figured by Kreff, Austral. Entozoa, *l. c.* pp. 11-23, pls. i.-iii.

A note by D. MADDOX on an encysted Tænioid larva (*Cysticercus ovipariens*) found in the neck of a sheep, and remarkable for containing a distinct ovarian structure with numerous ova, is only known to the Recorder from the critical remarks of T. S. COBBOLD (Q. J. Micr. Soc. xiv. pp. 179 & 180, from London Medical Record, 1873, p. 487), arguing that the presumed new species is *C. ovis*, and that the "eggs" are only large calcareous corpuscles.

VII. NEMATODA.

1. BÜTSCHLI, O. Giebt es Holomyarier? Z. wiss. Zool. xxiii. pp. 402-408, pl. xxii.
 2. ——. Beiträge zur Kenntniss des Nervensystems der Nematoden. Arch. mikr. Anat. x. pp. 74-100, pls. vi. & vii.
 3. ——. Zur Entwicklungsgeschichte von *Sagitta*. Z. wiss. Zool. xxiii. pp. 409-413, pl. xxiii.
 4. COBBOLD, T. S. Notes on Entozoa. Pt. 1. P. Z. S. 1873, pp. 736-742, pl. lxiii.
 5. ——. Contributions to our knowledge of the grouse disease, including the description of a new species of *Entozoon*, with remarks on a case of rot in the hare. Veterinarian, 1873, pp. 163-172.
 6. LEWIS, T. R. On a *Hæmatozoon* inhabiting human blood, its relation to chyluria and other diseases. Calcutta: 1872; abstract in J. de l'Anat. Phys. 1873, pp. 325-328; Veterinarian, 1873, pp. 52-54 (from "Lancet").
- [The Recorder is unable to give an account of a paper on the same subject in "Revue des sciences naturelles," Montpellier, Nos. 1-3, 1872.]
7. LINSTOW, C. VON. Einige neue Nematoden nebst Bemerkungen über bekannte Arten. Arch. f. Nat. xxxix. pp. 293-307, pl. xiii.

A paper by M. GAY in "Il medico veterinario," on Nematoids in the stomach of a black Panther, is only known to the Recorder from an abstract in Hering's "Repertorium," 1873, pp. 355 & 356; likewise a note by WIRTZ on the occurrence of *Strongylus gigas* (Tijdschrift voor Veeartsenijkunde en Veetelt, 1873).

VILLOT's observations (Zool. Rec. ix. p. 435) suggested to M. CORNU (Nature, vii. pp. 265 & 266) some remarks "on the growth and migrations of Helminths."

BÜTSCHLI (1) has demonstrated the existence of muscular cells in various *Holomyaria* (Schn.) (*Gordius*, *Mermis*, *Trichosoma*, *Trichocephalus*, *Trichina*, *Pseudalius*); Schneider's classification (Zool. Rec. iii. p. 609) is therefore rejected. (Compare also on this subject the remarks of Claparède, "Recherches" &c. p. 40). Bütschli has also advanced the knowledge of the nervous system in Nematoids (2) by his microscopical examination of sections of the body.

HERING ("Beiträge," &c.) has ascertained, from the dissection of numerous young dogs, that *Ascaris mystax* (*marginata*) is never found in new-born puppies, and therefore is neither introduced directly into the fœtus from the mother nor through the milk; the eggs are probably

transferred to the stomach of the sucklings through their licking the belly of their mother, and in that of the adult dogs through their licking their own anal region. The greatest number is found in young dogs, which are not yet half a year old. On Nematoids in new-born whelps in England and India, *cf.* also the Veterinarian, 1873, pp. 21 & 22.

Eustrongylus buteonis, sp. n. (under the eyes of *Buteo swainsoni*, Wyoming), and *E. chordeilis*, sp. n. (from the brain of *Chordeiles virginianus*, New Hampshire), described and figured by Packard in F. V. Hayden's "Sixth Annual Report of the U. S. Geological Survey of the Territories," 1873, pp. 735 & 736.

Filaria horrida (Dies.), Cobbold (4), p. 737, figs. 1-4, from the stomach of *Rhea* at Bahia Blanca (Darwin); *F. immitis*, Leidy, *id. l. c.* p. 738, figs. 5-8, from the heart of Chinese and Japanese dogs, the death of which it caused, the ventricles and auricle being completely blocked up by their large number (two papers by Welsh in the "Lancet," March 8, 1873, and M. Micr. J. October, 1873, p. 157, on the same matter are mentioned). *F. hebetata*, sp. n., *id. l. c.* p. 741, figs. 9-13, from the heart of *Cystophora cristata*. *F. anthuris*, Schn., Linstow (7), p. 297, figs. 5 & 6, between the stomachal membranes of *Corvus cornix*, (*F.?*) *bicolor*, sp. n., *id. l. c.* p. 298, fig. 7, only known in the asexual state, from the peritoneum of *Silurus glanis* and the intestine of the Pike. *F. (?) sanguinis-hominis*, Lewis (6), microscopical, 1-75th of an inch, in the blood and urine of persons suffering from chyluria and hæmaturia, in India. (*Cf.* also Cobbold's observation of nematod eggs in the urine of a person suffering from hæmaturia, and infested with *Bilharzia*; Veterinarian, 1872, pp. 751-753.)

Filaroides mustelarum, V. Ben., re-described by Linstow (7), pp. 300-305, in the trachea of *Mustela foina*, in the nasal cavity of *M. putorius*, and in a cavity of the frontal bone in *M. vulgaris*, the larva probably encysted in frogs.

Ascaris (?) fissilabium, sp. n., Linstow (7), p. 299, fig. 8 (intestine of Starling).

Spiroptera euryoptera, R., *id. ibid.* (stomach-membranes of *Lanius collurio*).

Trichosoma brevispiculum, sp. n., *id. l. c.* p. 293 (intestine of *Blicca bijærkna*); *T. collare*, sp. n., *id. l. c.* p. 294, fig. 1 (intestine of the common fowl); *T. ovopunctatum*, sp. n., *id. l. c.* p. 296, fig. 2 (intestine of the Starling (also *T. contortum*, Cr.); *T. speciosum*, sp. n., V. Beneden, Paras., p. 19, pl. iv. (from various Bats).

Cucullanus pachystomus, sp. n., Linstow (7), p. 296, figs. 3 & 4 (intestine of *Bliccopsis rutiloides*).

Strongylus tipula, sp. n., V. Beneden, Paras., p. 11, pl. ii. (intestine of various Bats). *S. pergracilis*, Cobbold (5), p. 167, with figures, from the cæca of the Scotch Grouse, of the "disease" of which it is suspected to be the cause.

Strongylacantha, g. n., V. Beneden, *l. c.* p. 13 (allied to *Anchylostomum*, mouth armed with two strong hooks, symmetrically disposed, and a 3rd median dorsal). *S. glycyrhiza*, sp. n., *id. ibid.*, pl. i. (intestine of *Rhinolophus ferrum-equinum*).

Litosoma, g. n., *id. l. c. p. 21*. Body thin, surface smooth, mouth without lips, a vestibulum before the œsophageal bulb, and a double penis, with one of the spicules very large. *L. filaria*, sp. n., *id. ibid. pl. v. figs. 1-5*, (stomach of *Vespertilio auritus*).

Ascareps, g. n., *id. l. c. p. 22*. Oval papillæ 2 (?), œsophagus very long and membranous; a small roundish terminal appendage. *A. minuta*, sp. n., *id. ibid. pl. v. figs. 6-11* (encysted in the stomach of *Vespertilio dasycnemus*, perhaps also in *Rhinolophus hippecrepis*).

Ophiostemum mucronatum, Rud., V. Beneden, *l. c. p. 16, pl. iii.* (intestine of various Bats). (*O. sphærocephalum*, from the Sturgeon, is a *Dacnitis*). According to W.-Suhm (*l. c. p. 331, pl. xvii. fig. 1*), *O. spinosum*, W.-S. (from the intestine of *Vespertilio mystacinus*, from the Bavarian Highlands), = *Pterygodermatites plagiostoma*, Wedl. (from the intestine of the Egyptian *Erinaceus auritus*), and belongs to *Rictularia* (ergo: *R. plagiostoma*, W.). Both the known species of *Rictularia* agree in the singular armature with hatchet-shaped spines of the anterior part of the body, though they form in *R. cristata* a single, in *R. plagiostoma* a double row to the genital orifice; in the female *R. plagiostoma* they are continued in a more slender shape until not far from the extremity of the body.

Eight species of free living *Nematoda* (all previously described by Bastian) are noticed as occurring at Kiel, by Möbius (*l. c. p. 105*).

Verrill records 2 species of *Pontonema* (previously described by Leidy), from the shores of New England (*l. c. pp. 325 & 326*).

CHÆTOGNATHA.

Sagitta germanica, at Kiel (Möbius, *l. c.*); *S. elegans*, sp. n., Verrill, *l. c. pp. 440, 626 & 627* (New England).

BÜTSCHLI (3) supplements the researches of Kowalewsky by tracing the evolution of the reproductive organs from a cell-group, which at an early period detaches itself from the inner cell-layer of the embryo.

VIII. ACANTHOCEPHALA.

LEUCKART, R. De statu et embryonali et larvali *Echinorhynchorum* eorumque metamorphosi. Lipsiæ: 1873 (University programme), 37 pp. Abstract in *Z. ges. Naturw.* (2) viii. pp. 208 & 209.

E. proteus lives in the adult state in the intestine of *Cyprini*; as young, in the body cavity of *Gammarus pulex*. In the latter state it is globular or oviform, has the "proboscis" invaginated, but is internally fully organized; only the sexual organs are still immature. It is introduced into the digestive tube of the Amphipod as an egg, but makes its way, when hatched, through its walls into the abdominal cavity. The evolution of the embryo in the egg is described, and the structure of the embryo, which is very different from that of the perfect Echinorhynch. This is developed, with all its organs; "proboscis," hooks, retractor-muscles, generative organs, &c., within the embryo, from a central heap of cells, the embryonic-germ, which may be regarded morphologically as a rudi-

mentary digestive system. The relations between the embryo and the developing Echinorhynch are somewhat analogous to those between the *Pluteus*, *Pilidium*, or *Tornaria* and the Echinoderm, *Nemertes* or *Balanoglossus*; it is, as in these, a true metamorphosis that takes place, and not a digenesis. In other *Acanthocephala*, the evolution is more simple, and the metamorphosis more direct, though proceeding in a similar manner from a central embryonic mass, but the larva is put in a state of repose, loses its shape and mobility, at a much earlier epoch and with a much smaller size, and is more rapidly transformed into the adult Echinorhynch; for instance, *E. angustatus*, which lives as a sexual animal in the intestine of *Cyprini* and perches, and as young in *Asellus aquaticus*, into which it is also introduced as an egg; but it only penetrates into the walls of the intestine, where it dwells for some time, encysted; afterwards it is set free in the abdominal cavity of the Isopod through a degeneration of the tissue of the intestine. The axis of this Echinorhynch developing from the central mass ("Embryonalkern"),—which is more specially homologized with the lateral discs in *Pluteus* and the muscular layer ("Muskelblatt") in other embryos—is almost at right angles with that of the larva.

IX. GEPHYREA.

GRABER, V. Ueber die Haut einiger Sternwürmer (*Gephyrea*).
SB. Ak. Wien, lxxvii. pp. 61–78, 3 pls.

The histological structure of the skin (and intestinal channel) of *Priapul*, *Phascolosoma*, *Aspidosiphon*, *Sipunculus*, and *Bonellia* is examined.

A preliminary note by E. Ray Lankester on the histology of *Sipunculus nudus* (Ann. N. H. (4) xi. pp. 88–91) discusses several points of importance (for instance, the situation of the ovaria and testes), but is likewise not well capable of abstraction.

The species from Nova Zembla and Finmark (2), from the Baltic (2), and New England (3), are noticed by Ehlers (*l. c.* p. 9), Möbius (*l. c.* p. 106), and Verrill (*l. c.* pp. 353, 416, & 627). The *Priapul* from Kiel is perhaps a distinct species: *P. multidentatus*, Möbius, *Phascolosoma tubicola*, Verrill, sp. n., St. George's Bank: Am. J. Sci. (3) v. p. 99.

Leioderma, W.-Suhm, new abyssal genus (Nature, viii. pp. 28 & 29), combining the characters of the *Sipunculacea* and *Priapulacea*. "As in the former, the excretory orifice is near the mouth, in the anterior part of the body, but, as in the latter, there is no proboscis and no tentacles. The pharynx, with 6–7 folds ending in a chitinous border, is very short and attached to the walls of the body by 4 retractor-muscles. The mouth is a round aperture, with small cuticular papillæ. The perisome is divided into 4 muscular bands, the surface smooth, showing a tissue of square meshes, in each of which there are 4–5 sense-bodies, &c."

ECHINODERMATA.

BY

C. F. LÜTKEN, Ph.D., F.R.D.A.

1. AGASSIZ, A. The Homologies of Pedicellariæ. Am. Nat. vii. pp. 398-406.
2. ——. Revision of the *Echini*. Pt. 3, pp. 379-629, pl. Illustr. Catal. M. C. Z. vii. Cambridge (U. S. A.): 1873 (With a systematic list of the species described in pts. 2 & 3, and an index to pts. 1-3; reviewed Arch. Sci. Nat. xlvi. pp. 19-29).
3. ——. The *Echini* collected on the "Hassler" expedition. Bull. Mus. C. Z. iii. 8, pp. 187-190.
4. BOLAU, H. Die Spatangiden des Hamburger Museums. 23 pp., 1 pl. (Program der Realschule zu Hamburg). Hamburg: 1873.
5. GRABER, V. Beitrag zur Histologie der Stachelhäuter. Graz: 1872. 12 pp. 2 pl. (JB. d. Staats-Gymnasiums zu Graz).
6. HOFFMANN, C. K. Ueber das Blutgefäß-systems der Echiniden. Niederl. Arch. Zool. i. pp. 184-186, pl. xiv.
7. HUTTON, F. W. Catalogue of the *Echinodermata* of New Zealand, with diagnoses of the species. Wellington: 1872. [Not seen by the Recorder.]
8. ——. Description of some new Starfishes from New Zealand. P. Z. S. 1872, pp. 810-812.
9. LORIOL, P. Description de trois espèces d'Échinides appartenant à la famille des Cidaridées. Mém. Soc. Neuch. v. pp. 21-36, pls. iii.-v.
10. MARION, A. F. Reproductions hybrides d'Échinodermes. C. R. lxxvii. pp. 963-966.
11. PERRIER, É. Recherches sur l'anatomie et la régénération des bras de la *Comatula rosacea* (*Antedon rosaceus*, Linck), Arch. Z. expér. ii. pp. 29-86, pls. ii.-iv. Abstracts in C. R. lxxvi. pp. 718-720; Ann. N. H. (4) xi. pp. 461-468.

12. TROSCHER, F. H. Die Familie der Echinocidariden, II.
Arch. f. Nat. xxxix. pp. 308-356.

A. AGASSIZ'S "Revision," pts. 1 & 2, reviewed in Arch. Z. expér. ii. pp. xxiv.-xxviii; Nature, viii. p. 103; Arch. Sci. Nat. xlvi. pp. 19-30; Am. J. Sci. (3) v. pp. 158 & 159; Jahrb. f. Min. 1873, pp. 379 & 380.

LÜTKEN "on spontaneous division," &c. (Zool. Rec. ix. pp. 438, 439, & 453) translated (in abstract) Ann. N. H. (4) xii. pp. 323-337 & 391-399.

Anatomy and Physiology.

A. AGASSIZ (1) proves, from the development of the "pedicellariæ" in Starfishes, that they are homologous with the spines, originating like these from tubercles, which afterwards split. They act in the Sea-urchins as scavengers, keeping the body clean from all kind of refuse, small animals, &c., which might be entangled among the spines, &c., and passing the faecal pellets from one to the other along certain lines down the body. Agassiz never succeeded in observing them handing a prey to the mouth.

HOFFMANN (6) corrects his previous description of the vascular system of the Sea-urchins. An oral or anal vascular ring is not found in *Echini*, *Spatangi*, *Asteridæ*, or *Ophiuridæ*; the only existing vascular ring in the Sea-urchins is that which encircles the œsophagus, belonging to the aquiferous system, in which the ventral and dorsal blood-vessels of the intestine open, as is also the case with the "stone channel" ("aquiferous heart"), which springs from the "madreporite."

GRABER (5) has studied the histology of *Holothuria tubulosa*, *Schizaster canaliferus*, and *Psammechinus parvituberculatus*, especially the digestive tube, the blood-vessels, the branched "stone canals" of the *Holothuria*, &c.

From MARION'S experiments (10) on the hybridization of Sea-urchins, it appears that hybrids do not (on the southern shores of France) easily occur in a state of nature, owing to the unequal bathymetrical distribution and time of reproduction of the different species. He has succeeded in producing, through artificial fecundations, hybrid "*Plutei*" of *Toxopneustes lividus* and *Sphærechinus granularis*; the further development of which stopped at the same period as that of the normal, not hybrid "*Plutei*," produced under similar artificial circumstances.

Local Lists, Geographical Distribution.

EHLERS (*suprà*, p. 470), p. 10, records 3? species from Nova Zembla, and 2 from West Finmark; MÖBIUS (*ibid.*), p. 103, 6 from the Baltic, all, with one exception (*Ophioglypha albida*, north of Öland) from its western part alone; 23 species were observed during the cruise of the "Pommerania" to Arendal. VERRILL (Baird's Report, *l. ante c.* pp. 715-722; *cf.* also Verrill's account of the dredgings executed on the coast of New England, Am. J. Sci. 3, v. & vi.) enumerates 22 species from the Vineyard Sound and adjoining shores of New England, with notes on synonymy, distri-

bution, &c.; a few are figured in outline; the new species are recorded below. MARION (10) has given the bathymetrical distribution of the 4 species of *Echini* occurring on the southern shores of France; one is littoral (*Toxopneustes lividus*); another follows at about 10 fathoms (*Echinus parvituberculatus*); then *Sphærechinus granularis*, and at 20–30 fathoms, *E. melo*. FISCHER and FOLIN have contributed some further data on the occurrence of certain species (*Ophiactis balli*, *Thyone fusus*, at 40–90 fathoms, *Brissopsis lyrifer*, var. *biscayensis*, and *Amphiura chiajii*, at 180 fathoms) off Cape Breton (C. R. lxxvii. pp. 582–585). To the abyssal Echinoderms of the North Atlantic several chapters are devoted in WYVILLE THOMSON'S "The Depths of the Sea, an account of the general results of the dredging cruises of H.M.S. 'Porcupine' and 'Lightning,' during the summers of 1868–70" London, 1873 (noticed Am. J. Sci. 3, v. pp. 399–401, Geol. Mag. x. pp. 215–224), for instance, pp. 433–460, and in several other places. (The general results, as far as the *Echinodermata* are concerned, were recorded Z. R. ix. p. 440; the new genera and species are recorded below). Further observations, by the same author, on the invertebrate Fauna of the great depths in the Atlantic, are alluded to in "Nature," vii. pp. 385–388, viii. 28, 51, 246, 266, 347, & 400 ("Notes from the 'Challenger,'" noticed, Arch. Z. expér. ii. pp. xxix.–xxxii. & xl.–xlii.). The Sea-urchins collected during the "Hassler" expedition (off Barbadoes, at 100 fathoms, east coast of Patagonia, Straits of Magelhaës, Juan Fernandez, and Galapagos Islands; all the species found here are panamic, none East Indian) are shortly noticed by AGASSIZ (3). LYMAN enumerates the *Ophiuride* of New Caledonia (6 species), Arch. Soc. L. Bord. xxviii. pp. lxxix.–lxxx.

HOLOTHURIIDÆ.

VERRILL (*l. c.* pp. 715 & 716) corrects the synonymy of several New England species in the following manner:—*Thyone briareus* (Les.) (syn. *Anaperus carolinus*, Trosch.); *Stereoderma unisemita* (Ayr.) (syn. *Cucumaria fusiformis*, Desor); *Molpadia* (?) *oolitica* (Pourt.) (syn. *Embolus pauper*, Sel.); *Leptosynapta girardi* (Pourt.) (syn. *L. tenuis*, V., *S. ayresi*, and ? *S. gracilis*, Sel.).

New species :—

Leptosynapta roseola, Verr., *l. c.* p. 716; *Thyone scabra*, id. Am. J. Sci. (3) v. pp. 100 & 101 (George's Bank). The discovery of a remarkable new deep-sea genus, occurring down to 2125 fathoms, is announced, Nature, vii. p. 388. "Like *Psolus*, it has a distinct ambulating surface, with a central double line of feet. The body-cavity is small, but the perisome is represented by an enormously thick layer of jelly, which rises on either side of the middle line of the back into a series of rounded lobes, each perforated for the passage of an ambulacral tube. The upper pair of vessels sends out series of leaf-like sacs which fringe on either side the ambulatory disc, and appear to be chiefly concerned in the function of respiration."

ECHINIDÆ.

P. DE LORTOL (Échinologie helvétique ii.) proposes the following arrangement:—

Sub-order III. *Echinida exocyclica atelostomata*.

Family 7. *Spatangidæ*. Ambulacra petaloidea, impari ceteris dissimile ; peristomium excentricum.

Tribus 2da. *Spatangidæ veræ*. Peristomium bilabiatum.

Tribus 1ma. *Palæostomata*. Peristomium pentagonale, valvulis 5 clausum (*Leskia*, &c.).

Family 6. *Holasteridæ*. Ambulacra non-petaloidea ; peristomium excentricum.

Tribus 2da. *Echinocorydæ*. Peristomium transversum, bilabiatum ; apparatu apicali assulis complementariis destitutum (*Ananchytes*, &c.).

Tribus 1ma. *Collyritidæ*. Peristomium decagonale ; ambulacris apice disjunctis.

(Both tribes are sub-divided according to the similarity or difference of the odd ambulacrum.)

Family 5. *Cassidulidæ*. Peristomium centrale vel subcentrale ; ambulacrum impare ceteris forma et pororum structura fere semper simile.

Tribus 2da. *Echinolampidæ*. Ambulacra petaloidea. (Sub-divided in the same manner as the two preceding tribes).

Tribus 1ma. *Echinoneidæ*. Ambulacra non-petaloidea.

Sub-order II. *Echinida exocyclica gnathostomata*.

Family 4. *Clypeastridæ*. Ambulacra petaloidea.

Family 3. *Echinoconidæ*. Ambulacra non-petaloidea (*Galerites*, &c.).

Sub-order I. *Echinida endocyclica*.

Family 3. *Glyphostomata*. Peristomium incisum, branchiis munitum ; assulæ buccales sparsæ ; areæ ambulacrales plus minus latæ, tuberculis mammillatis ornatae.

Tribus 2da. *Echinidæ*. Pororum paria pluriseriata sel in arcus disposita.

Tribus 1ma. *Diadematidæ*. Pororum paria pro parte uniseriata.

(Thus sub-divided : if the apical disc is composed of the ordinary 10 plates only—*Diadema*, *Hemicidaris*, *Pseudodiadema*, *Goniopygus*, *Cyphosoma* ; if one or more supra-anal plates are developed—*Salenia*, *Acrosalenia*.)

Family 2. *Echinothuridæ*.

Family 1. *Holostomata* sive *Cidaridæ*. Ambulacra in assulis buccalibus continuata ; peristomium haud incisum, branchiis destitutum : areæ ambulacrales angustæ, granulatae modo.

Lortol would rather regard the *Tessellata* as a distinct order of Echinoderms, though he recognizes their affinities with the *Cidaridæ* and *Echinothuridæ*. In accordance with Cotteau and Barrande, he does not look upon the geological succession of types as favourable to the trans-

formation theory. In the descriptive part, the characters of the families, tribes, and genera are given in full.

In the following references to descriptions of genera and species the arrangement of Agassiz (2) is followed, for the sake of convenience, though the Recorder doubts whether all the genera are correctly placed. As the figures in this work are often dispersed on several plates, they cannot well be cited here; but where a species is illustrated by one or more figures, an asterisk follows its name.

DESMOSTICHA. Characters: Agassiz (2), p. 383; *GONIOCIDARIDÆ*, id. l. c. p. 384.

Cidaris metularia, Lmk. *, *thouarsi*, Val., id. l. c. pp. 385 & 386.

Phyllacanthus annulifera, Lmk. * [Loriol (9), p. 25, pl. iii.], *baculosa*, Ag. *, *dubia*, Br. *, *gigantea*, Ag. *, *imperialis*, Lmk. *, *verticillata*, Lmk. *. Agassiz (2), pp. 387-393. *C. luetkeni*, Loriol (9), p. 29, pl. iv. (Australia).

Stephanocidaris bispinosa (Lmk.) *, Agassiz (2) pp. 393 & 394; Loriol (9) p. 53, pl. v. (*Rhabdocidaris*).

Porocidaris purpurata, W. Thomson *, "Depths of the Sea," p. 102; Agassiz (2) pp. 394 & 395.

Goniocidaris canaliculata (Ag.) *, *geranioides* (Lmk.) *, *tubaria* (Lmk.) *, Agassiz, l. c. pp. 395-398.

SALENIDÆ. Agassiz (2) p. 398. *Salenia varispina* *, Nature, vii. p. 388, viii. p. 246 (eastern parts of the Atlantic, at great depths).

ARBACIDÆ. Agassiz (2) p. 399.

Arbacia dufresnii (Bl.), *nigra* (Mol.) *, *pustulosa* (Leske) *, *spatuligera* (Val.) *, and *stellata* (Bl.), id. l. c. pp. 399-404. The 11 species distinguished by Troschel (Zool. Rec. ix. p. 444) are now described by him (12) in detail; the Guinean species formerly referred to "*Echinocidaris loculata*" is now described as new (*E. africana*, Tr.).

Ceolopleurus maillardi (Mich.) *, Agassiz (2) pp. 406 & 407.

DIADEMATIDÆ. Agassiz (2) p. 407.

Diadema mexicanum, id. * l. c. p. 408.

Centrostephanus coronatus (Verr.), *longispinus* (Phil.), *rodgersi*, id. * l. c. pp. 409-412.

Echinothrix calamaris (Pall.) *, *desori*, Ag., *turcarum*, Sch. *, id. l. c. pp. 413-417.

Astropyga pulvinata (Lmk.) *, *radiata* (Leske) *, id. l. c. pp. 417-422.

Asthenosoma varium, Gr. *, id. l. c. pp. 422 & 423.

Calveria hystrix and *fenestrata*, W. Thomson, "Depths of the Sea," pp. 156-159 (with fig.).

ECHINOMETRIDÆ. Agassiz (2) p. 423.

Colobocentrotus atratus (L.) *, *mertensi*, Br. *, id. l. c. pp. 423-427.

Heterocentrotus mammillatus (Kl.) *, *trigonarius* (Lmk.) *, id. l. c. pp. 427-431.

Echinometra lucunter (Leske) *, *macrostoma* (Ltk.) †, *oblonga* (Blv.) *, *vanbrunti*, id. l. c. pp. 431-434.

† The Recorder did not suggest "*New Guinea*," but "*Guinea*," as the locality eventually turned out to be.—C. F. L.

Parasalenia gratiosa, id. *, l. c. pp. 435 & 436.

Stomopneustes [*Heliocidaris*] *variolaris* (Lmk.) *, id. l. c. pp. 436-438.

Strongylocentrotus [*Toxopneustes*, *Toxocidaris*, &c.] *albus* (Mol.), *armiger*, Ag. *, *depressus*, Ag., *eurythrogammus* (Val.) *, *franciscanus* (Ag.) *, *gaimardi*, Blv., (= *lividus*, ?), *gibbosus* (Val.), *intermedius* (Barn.) *lividus* (Lmk.) *, *mexicanus* (Ag.), *nudus* (Ag.) *, *purpuratus* (St.) *, *tuberculatus* (Lmk.) *, id. l. c. pp. 438-451.

Sphærechinus australiæ, Ag. *, *granularis* (Lmk.) *, *pulcherrimus* (Barn.), id. l. c. p. 451-454.

Pseudoboletia (physiognomy of *Boletia*, but pores in arcs of 4 pairs) *granulata* (Ag.), *indiana* (Mich.), id. l. c. pp. 454-456.

Echinostrephus molaris, id. * l. c. pp. 457 & 458 (= *longispina*, Blv., *laganoides*, Desor; 3-4 pairs of pores in each arc; the majority have 3).

ECHINIDÆ, p. 458; TEMNOLEURIDÆ, p. 460; id. l. c.

Temnopleurus hardwicki (Gr.) *, *reynaudi*, Ag. *, *toreumaticus* (Kl.) *, id. l. c. pp. 460-464.

Pleurechinus bothryoides, id. l. c. pp. 464 & 465.

Microcyphus maculatus, Val. *, *zigzag*, Ag. *, id. l. c. pp. 466-470.

Salmacis bicolor (Val.) *, *dussumieri*, Ag. *, *globator*, Ag. *, *rarisipina*, Ag. *, *sulcata*, Ag. * id. l. c. pp. 471-476.

Mespilia globulus (Leske) *, id. l. c. pp. 477 & 478.

Amblypneustes formosus (Val.) *, *griseus* (Blv.) *, *ovum* (Lmk.) *, *pallidus* (Lmk.), *pentagonus*, Ag. *, id. l. c. pp. 478-483.

Holopneustes inflatus (Ltk.), *porosissimus* (Ag.) *, *purpurascens* (Ltk.) *, id. l. c. pp. 483-486.

TRIPLECHINIDÆ, id. l. c. p. 487.

Phym[at]osoma [*Glyptocidaris*, olim] *crenularis*, id. l. c. pp. 487-488.

Echinus acutus, Lmk. *, *angulosus*, Leske *, *elegans*, D. K. *, *esculentus*, L. *, *magellanicus*, Phil. *, *margaritaceus*, Lmk., *melo*, Lmk., *microtuberculatus*, Blv. *, *miliaris*, Müll. *, id. l. c. pp. 489-496.

Toxopneustes [= *Boletia*] *maculatus* (Lmk.), *pileolus* (Lmk.) *, *semi-tuberculatus* (Val.), id. l. c. pp. 496-500.

Hipponee [= *Tripneustes*] *depressa*, Ag., *variegata* (Leske) *, id. l. c. pp. 500 & 501.

Evechinus chloroticus (Val.) *, id. l. c. pp. 502 & 503.

CLYPEASTRIDÆ, p. 504; EUCLYPEASTRIDÆ, FIBULARIINA, p. 505; id. l. c.

Fibularia australis, Dsml. * [= *Mortonia*], *ovulum*, Lmk. *, *volva*, Ag., id. l. c. pp. 506-509.

ECHINANTHIDÆ, id. l. c. p. 510.

Clypeaster humilis (Leske) *, *rotundus* (Ag.), *scutiformis* (Gm.) *, id. l. c. pp. 510-513.

Echinanthus testudinarius, Gr., id. l. c. pp. 514 & 515.

LAGANIDÆ, id. l. c. p. 516.

Laganum bonani (Val.) *, *depressum* (Less.) *, *putnami* (Barn.), id. l. c. pp. 516-519.

Peronella decagonalis (Less.) *, *orbicularis* (Leske), *peroni* (Ag.) *, *rostrata*, Ag., id. l. c. pp. 520-523.

SCUTELLIDÆ, id. l. c. p. 524.

Echinarachnius excentricus (Esch.) * [= *Dendraster*], *mirabilis* (Barn.) * [= *Scaphechinus*, *Chaetodiscus*], Agassiz, *l. c.* pp. 524-528.

Arachnoides placenta (L.) *, *id. l. c.* pp. 528-530.

Echinodiscus auritus (Leske) *, *biforis* (Gm.) *, *lævis*, Kl., *id. l. c.* pp. 531-534.

Mellita erythrea (Gr.), *longifissa*, Mich. *, *pacifica*, Verr., *stokesi* (Ag.) *, *id. l. c.* pp. 534-538.

Astriclypeus manni, Verr. *, *id. l. c.* pp. 538-540.

Rotula augusti, Kl. *, *rumphi*, Kl., *id. l. c.* pp. 540-544.

Encope californica, Verr., *grandis*, Ag. *, *micropora*, Ag., *id. l. c.* pp. 544-548.

PETALOSTICHA. CASSIDULIDÆ, p. 549; ECHINONIDÆ, p. 550; *id. l. c.*

Neolampas rostellatus, Ag. (800 fath., mouth of British Channel), W. Thomson, "Depths of the Sea," p. 458.

Echinoneus cyclostomus, Leske *, Agassiz (2) p. 550.

NUCLEOLIDÆ, *id. l. c.* p. 551.

Echinolampus hellei, Val. *, *oviformis* (Gm.), *id. l. c.* pp. 552-553.

Rhynchopygus pacificus (Ag.) *, *Echinobrissus recens* (Edw.) *, *Nucleolites epigonus*, Mart., *Anochanus sinensis*, Grube, *id. l. c.* pp. 554-560.

SPATANGIDÆ; ANANCHYTIDÆ, *id. l. c.* pp. 561 & 562.

Pourtalesia jeffreysi, W. Thomson, "Depths of the Sea," p. 108 (fig.).

Platybrissus rœmeri, Gr. *, Agassiz (2) pp. 562 & 563.

Palæopneustes, g. n., Agassiz (3), allied to *Ananchytes* and *Asterostoma*; but abactinal system compact, upper part of paired ambulacra imperfectly petaloid, slightly sunken; no fasciolæ. Test high, conical, flat below. Differs (?) from *Asterostoma* in having a labiate transverse actinostome, and in the absence of actinal ambulacral furrows. *P. cristatus*, sp. n., *id. l. c.* p. 188, off Barbadoes, 100 fath.

SPATANGINA, Agassiz (2) p. 564.

Spatangus luetkeni, Ag., *purpureus*, Müll. *, *raschi*, Lov. *, *id. l. c.* pp. 564-568.

Maretia alta, Ag., *planulata* (Lmk.), *id. l. c.* pp. 568-572; *carinata*, Bolau (4) p. 6 (Fiji and Ellice Islands; Bengal Bay).

Eupatagus valenciennesi, Agassiz (2) pp. 572 & 573.

Lovenia cordiformis, Ltk., *elongata*, Gr. *, *subcarinata*, Gr., *id. l. c.* pp. 574-577; cf. Bolau (4) pp. 6-8.

Breynia australasiæ (Leach) *, Agassiz (2) pp. 578 & 579; Bolau (4) pp. 10 & 11.

Nacospatangus, g. n., Agassiz (3), intermediate between *Maretia* and *Micraster*. Test high, covered with uniform tubercles, vertex posterior; ambulacra flush with the test; posterior petals as in *Maretia*; abactinal part of the anterior poriferous zone obliterated in the lateral anterior petals; anal extremity as in *Spatangus*; sub-anal fasciole heart-shaped, sending off an anal branch. *N. gracilis*, sp. n., *id. l. c.* p. 189: Juan Fernandez, 65 fath.

Echinocardium australe, Gr. *, *mediterraneum*, Forb., *id.* (2) pp. 580 & 581. Bolau (4) p. 9, refers *E. australe* to *E. cordatum*, Prt., as a variety.

LESKIIDÆ, Agassiz (2) p. 582.

Palæostoma mirabile, Lov. *, *id. l. c.* pp. 582-584.

BRISSINA, *id. l. c.* p. 585.

Hemiaster [*Abatus*] *australis* (Phil.) *, *cavernosus* (Phil.) *, *id. l. c.* pp. 585-588. On the younger stages of *H. philippii* (Lov.), *id.* (3) pp. 189 & 190.

Tripylus [= *Hamaxitus*] *excavatus*, Phil. *, *id.* (2) pp. 588 & 589.

Rhynobrissus pyramidalis, Ag. *, *id. l. c.* pp. 590-592.

Brissopsis [= *Kleinia*] *luzonica*, Gr., *id. l. c.* pp. 593 & 594; Bolau (4) p. 18.

Agassizia scrobiculata, Val. *, Agassiz (2) pp. 494-496; Bolau (4) pp. 22 & 23.

Brissus carinatus, Lmk. *, *obesus*, Verr., Agassiz (2) pp. 596-598.

Metalia africana, Verr. [= *Plagionotus*], *maculosa* (Gm.) *, *sternalis* (Lmk.) *, *id. l. c.* pp. 598-603.

Bolau (4), who makes no separation between *Brissus*, pr., and *Metalia*, distinguishes 7 species; *B. dimidiatus*, Ag., *carinatus*, Lmk., *columbaris*, Lmk., *compressus*, Lmk., *maculosus* (Leske), v. Mart., *ventricosus*, B. [not "Lmk." which is a *Meoma*] (figured in the plate), and *sternalis*, Lmk. The four last are *Metalia*; *B. ventricosus*, B., apparently a large *M. sternalis*.

Meoma grandis, Gr. *, Agassiz (2) p. 603; Bolau (4) p. 19.

Linthia [= *Desoria*] *australis*, Gr. *, Agassiz (2) pp. 604-606.

Faorina chinensis, Gr., *id. l. c.* pp. 607-609; Bolau (4) p. 20 (*Tripylus grandis*).

Schizaster canaliferus (Lmk.) *, *gibberulus*, Ag., *philippii*, Gr. *, [*Tripylus*] *ventricosus*, Gr., Agassiz (2) pp. 609-614; Bolau, pp. 20-21.

Moiria stygia, Ltk., *clotho*, Mich., Agassiz (2) pp. 615 & 616; Bolau (4) pp. 21 & 22.

ASTERIDÆ.

On the synonymy of the New England Starfishes of the genus *Asterias*, cf. Verrill, Rep. Comm. Fish. pp. 718 & 719.

Asterias mollis, *scaber*, *Pentaceros rugosus* and *Pteraster inflatus*, spp. nn., New Zealand, Hutton (8) p. 812.

Ctenodiscus australis, Lov., noticed by Grube, JB. schles. Ges. 1872, pp. 66.

Abysal species figured and described by Wyville Thomson, "Depths of the Sea:" *Brisinga coronata*, Sars (p. 19); *Solaster furcifer*, D. K. (pp. 119 & 456); *Hymenaster pellucidus*, g. & sp. nn. (p. 120); *Corethraster hispidus*, g. & sp. nn. (p. 119); *Archaster bifrons*, sp. n. (pp. 122 & 455); *A. vexillifer*, sp. n. (p. 150); *Zoroaster fulgens*, g. & sp. nn. (p. 153).

Hymenaster: Regularly pentagonal, very flat, dorsal surface covered with short paxillæ, which support a membrane, as in *Pteraster*; a row of elongated webbed spines fringe the ambulacral grooves; the web running along the side of one arm unites with that of the adjacent one, the angles between them being entirely filled up by a delicate membrane supported by spines; but there is no trace on the ventral surface of the arms of the transverse membranous combs so characteristic of

Pteraster. (The discovery of two species at great depths is announced in Nature, vii. p. 388.)

Corethraster: short-armed, cushion-like, with a double row of conical feet, the whole upper surface covered with long free paxillæ, like sable-brushes; ranges of delicate spatulate spines border the ambulacral grooves.

Zoroaster has 4 rows of ambulacral feet, and the Recorder fails to recognize from the description any distinctive generic character from *Asterias* (*Asteracanthion*) beyond the unusually close and solid arrangement of the dermal ossicles. *Zoroaster* will apparently, at the utmost, make a section or sub-genus of *Asterias*, founded upon peculiar physiological characters, like several others proposed of late.

OPHIURIDÆ.

Amphiura (*Amphipholis* ?) *abdita*, Verrill, Rep. Comm. Fish. pp. 720-722.

New species from New Zealand: *Ophiura* [= *Ophioderma* ?] *cylindrica*, *Ophiactis nigrescens*, *Ophiothrix cœrulea*, *Ophionereis fasciata* (Cook's Strait and Chatham Island), Hutton (8) pp. 810 & 811.

Abyssal species described or figured by W. Thomson, "Depths of the Sea:" *Asterophyton lincki*, M. Tr. (p. 19); *Ophiothrix luetkeni*, sp. n. (p. 100); *Ophiomusium lymani*, sp. n. (pp. 172 & 173). The discovery of several species of this genus is announced; Nature, vii. p. 388. *Ophioglypha bullata*, W. Thomson, sp. n., figured, Nature, vii. p. 400.

The diagnoses of the new species described by the Recorder (Zool. Rec. ix. pp. 447-449) are reprinted: Ann. N. H. (4) xii. pp. 398 & 399.

K. MÖBIUS observed the mode of progression, food (Nereids, bits of *Mytili*), and regeneration of lost parts in an *Ophioglypha albida*, which lived 32 months in an aquarium (Schr. Ver. Schlesw. Holst. i. p. 179: abstracted in Z. ges. Naturw., 2, viii. pp. 89-91).

CRINOIDÆ.

Pentacrinus asteria, L., *P. wyvillethomsoni*, Jeff., sp. n., *Rhizocrinus lofotensis*, S., and *Bathycrinus gracilis*, W. Th.: Wyville Thomson, "Depths of the Sea," pp. 436-553.

PERRIER (11) corrects in several important points the descriptions by previous authors (Wyville Thomson and Carpenter among the number) of the structure of the arms of *Antedon*. Their histological structure is more complex, their anatomical more simple, than hitherto supposed. The "sarcode" differentiates itself, when exposed to proper reacting agents, into a cellular epithelium, connective tissue, and muscular elements. The only existing canal system is that of the ambulacral canals, which spring from the vascular ring, encircling the digestive cavity; from them the tentacles (the distinction of which into "retractile" and "not retractile" is not well founded) arise by threes, of unequal size, from a common stem; their papillæ are armed with 3 (tactile?) setæ at the apex, but have no cavity communicating with that of the tentacle. No trace of a nervous system could be discovered. There is no reason to interpret the spherical bodies, alternating with the tentacle groups, as "calcareous

glands," though their function is probably excretory. On the disc Perrier discovered an enigmatical organ, consisting of a pore, encircled by cellules of a peculiar aspect; 5 of these organs exist in the young *Antedon* in definite places, in the adult about 20 scattered over the inter-radial area of the perisome. Observations on the regeneration of the arms and on the mode of formation of all their constituent parts terminate the paper.

Works and papers on fossil Echinoderms. G. COTTEAU: Échinides nouveaux ou peu connus, Nos. 91-96, R. Z. 1872, pp. 399-409, pls. vii. & viii. *Id.* sur les oursins jurassiques de la Suisse, Bull. Soc. Geol. (3) i. pp. 79-87. *Id.* sur le genre *Tetracidaris*, l. c. pp. 259 & 260. *Id.* Paléontologie Française, description des animaux invertébrés fossiles de la France; Terrain jurassique: Échinodermes, Livr. 23-26 (Paris: 1873). G. COTTEAU, A. PÉRON, & V. GAUTHIER: Échinides fossiles de l'Algérie, description des espèces déjà recueillies dans ce pays; Ann. Sc. Geol. iv. art 6, pls. xix. & xx. (*cf.* L. Lartet, *ibid.*, iii. art. 5, pl. ix. on the Echinoderms of Palestine). W. DAMES: Die Echiniden der nordwestdeutschen Jurabildungen; Z. geol. Ges. 1872, pp. 94-137 & 615-648, pls. v.-ix. & xx.-xxiv.; abstract in Z. ges. Naturw. (2) vii. pp. 470 & 471. GEINITZ: Das Elbthalgebirge in Sachsen Palæontographica, xx.; Seeigel, Seesterne und Haarsterne, pp. 61-93, pls. xiv.-xxiii. & pp. 1-19, pls. i.-vi. P. de LORIOU: Échinologie helvétique, description des oursins fossiles de la Suisse, ii. Échinides de la période Crétacée, 388 pp. 33 pls. (Matériaux pour la Paléontologie Suisse, 6^{me} série: Genève, Bâle, &c. 1873). *Id.* Description de quelques Astérides [*Caulonia*, g. n.] du terrain Néocomien des environs de Neuchâtel; Mém. Soc. Neuch. v. pp. 1-19, pls. i. & ii. F. B. MEEK & A. H. WORTHEN: Geological Survey of Illinois, v. Palæontology, Springfield, 1873 (important for the natural history of the palæozoic *Crinoidea*). CH. DES MOULINS: On *Pentacrinus gastaldii* and on the species of *Macropneustes*; Act. Soc. L. Bord. xxviii. pp. li.-lxi. & lxxvii. F. A. QUENSTEDT: Petrefactenkunde Deutschlands, iii. Echinodermen, Heft. 1-3, Atlas pls. lxii.-lxxiii. Leipzig: 1873. J. ROFE: Further notes on *Crinoidea*; Geol. Mag. x. pp. 262-267, pl. xi. SAUVAGE & RIGEUX: Notes sur quelques Échinodermes des étages jurassiques supérieurs de Boulogne-sur-Mer; Bull. Soc. Geol. (3) i. 1873, p. 147. SCHÜTER: Ueber *Pygorhynchus rostratus* und *Pygurus lampas*; SB. Ver. Rheinl. 1873, pp. 53-56. F. STOLICZKA: Memoir of the Geological Survey of India, No. 3; Echinodermata of the Cretaceous deposits in Southern India, 57 pp. 7 pls. [23 new species]: Calcutta and London, 1873. WRIGHT: Cretaceous Echinodermata; Pal. Soc. 1872 & 1873 (continued). J. YOUNG & R. ETHERIDGE: On a carboniferous genus of Echinoderms with overlapping plates; Geol. Mag. x. pp. 301-303 & 384.

A remarkable Silurian Starfish (*Trichotaster plumiformis*) is noticed by WRIGHT, J. G. Soc. 1873, p. 421; new species of *Palasterina* and *Dendrocrinus*, *ibid.*, p. 51, pl. iv. from Tremadoc Rocks, South Wales. The occurrence of dermal plates of *Holothuriide* (*Chiridota*, 4 species) in the inferior oolite and lias is announced by C. MOORE, Rep. Br. Ass. 1872, p. 117.

CŒLENTERATA.

BY

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ANTHOZOA.

1. DUNCAN, P. M. A description of the *Madreporaria* dredged up during the expeditions of H.M.S. "Porcupine" in 1869 & 1870. Tr. Z. S. viii. pp. 303-344, pls. xxxix.-xlix.
2. DYBOWSKI, W. Beitrag zur Kenntniss der innern Struktur der *Tubipora musica*, L. Arch. f. Nat. xxxix. pp. 284-292, pl. xii. figs. 1 & 2.
3. LACAZE-DUTHIERS, H. DE. Développement des Corallaires. 2^{me} mémoire. Actiniaires à Polypiers. Arch. Z. expér. ii. pp. 269-348, pls. xii.-xv.
4. ——. Développement des Polypes et de leur Polypier. C. R. lxxvii. pp. 1201-1207; Ann. N. H. (4) xiii. pp. 39-44.
5. LÜTKEN, C. F. En art fra Nutiden af den miocene Koralslægt *Cladangia*, C. *exusta* (Stp.). Vid. Medd. 1873, pp. 65-68, pl. ii.A.
6. MOSS, E. L. Description of a Virgularian Actinozoon, from Burrard's Inlet, British Columbia. P. Z. S. 1873, pp. 730-732, pl. lxi.

ALLMAN: "On Coral Islands and their architects" (P. R. Inst. vii. p. 58), and CLEVE, "Om Korallerna" (Stockholm: 1873; "ur vår tids forskning," No. 3), discuss the subject in a popular way. DANA's work (Zool. Rec. ix. p. 454) is reviewed in JB. f. Mineral. 1873, pp. 90-103: VERRILL opposes Duncan's criticisms upon it; Nature, vii. pp. 423-424; Am. J. Sci. (3) vi. pp. 68-74. ALLMAN on *Edwardsia*, reprinted, Rep. Brit. Ass. 1872, p. 132. H. N. MOSELEY: "On Actinochrome, a

colouring matter of Actinias, which gives an absorption spectrum," Q. J. Micr. Soc. xiii. pp. 143 & 144.

Anatomy, Evolution.

Of DUNCAN'S researches on the nervous system in *Actinie* only a short abstract has been published: P. R. S. xxii. p. 44; Ann. N. H. (4) xiii. pp. 254 & 255.

LACAZE-DUTHIERS (3) has continued his studies (Zool. Rec. ix. p. 452) of the development of the *Anthozoa*, with that of *Astroides calycularis*. After a critical review of the conceptions of previous Zoophytologists, derived from examination of the perfect polypary only, the dwelling-places, time of reproduction (June especially) and sexual organs of this species, and the shape and habits of its ciliated vermiform embryo are described. The species itself is mostly monœcic, the polypites only exceptionally hermaphrodite; the embryos make their escape partly through the mouth, partly through a rupture in the end of the tentacles. On the whole, the transformation of the embryo obeys the laws established for the *Actinie* (Zool. Rec. ix. pp. 452 & 453); the body-cavity is first divided into 2 unequal portions, and each of these again into 3, making together 6, viz., 3 larger, opposite to, not alternating with, 3 smaller, and this hexamerous stage is somewhat more stable than in the *Actinie*. A transitional octomerous stage is quickly followed by one with 12 compartments, after which a regulation takes place resulting in 12 equal compartments and 2 cycles of tentacles, 6 in each. Before this stage is attained, the deposition of "sclerites" has begun; in the still free-swimming ciliated actinoid embryo, 12 "septa" are often laid down at the same time, each built up of 3 calcareous nodules, which afterwards coalesce in the shape of a Y or V, the point turning towards the centre, the rays towards the periphery; they are formed in the basal endoderm in the middle of each of the 12 compartments. Afterwards the first vestige of the outer "wall" is formed as a thin flexible membrane (a product of secretion?), which still later, through the deposition of fresh calcareous nodules, is united with the forks of the calcareous septa. The basal layer dates from a still later epoch, and the "columella" is formed independently through the deposition of an irregular accumulation of nodules. Six of the 12 septa now for a time grow more rapidly than the others, attaining some superiority of size, and uniting their inner margin with the "columella," but the alternating 6 are not far behind, and the polypary soon contains 3 "cycles" of septa,—the 12 primary ones and 12 ultimately deposited in their interstices. The author's researches were, however, not pursued so far as to enable him to decide, whether the laws governing the evolution of the tentacles in the *Actinie* are applicable to the formation of the calcareous septa; an assumption that would involve serious difficulties, because the arrangement of the tentacles corresponds with that of the septa. The "epithea" is apparently only an accidental secretion, intended to strengthen the power of resistance against invasion.

DYBOWSKI (2) calls attention to the hitherto often overlooked fact in the organization of *Tubipora*, that the delicate tubules in the pallial

expansions, uniting the vertical tubes or cells of the polypary, communicate through small orifices which form a ring on the interior aspect of the cell, directly or by means of 6-8 minute prolongations, with depresso-globular or fusiform dilatations of a thin, hollow, calcareous chord, occupying the axis of the cell. By this structure the body cavities of the different polypes are put in direct communication through the tubular system of the pallial expansions. (The relations of the axial tubule or chord to the soft parts of the polypite are left undecided.) Analogical structures in *Syringophyllum* and *Syringopora* are compared.

Local Lists, Distribution.

DUNCAN'S (1) account of the *Madreporaria* obtained on the British deep-sea explorations in the Mediterranean and North-Atlantic records 30 species (omitting those only regarded as varieties) obtained from 36 "stations," in depths varying from 30-40 to 1094 fathoms; of these 11 are known also as fossil (*Pliocene*, *Miocene*, and *Cretaceous*), and 4 others are closely allied to fossil forms; 1 (*Gwynia*) may be regarded as an offshoot from the palæozoic fauna. Deep-sea corals differ from the reef-building forms in not possessing certain cœnenchymal structures (they are in fact almost all single, with the exception of the *Oculinidæ* and *Dendrophylliæ*); they live in very different temperatures, from 29°·9 to 56°·3, F.; their growth is vigorous at great depths and in low temperatures; the variability and horizontal distribution of many species are very large; and many genera and species exist at great depths, which are unknown elsewhere. Cf. also on deep-sea corals, WYVILLE THOMSON, "Depths of the Sea," pp. 431 & 432. VERRILL (Report Comm. Fish, pp. 734-740; cf. Am. J. Sci. (3) v. & vi. (*suprà*, p. 495) enumerates 12 species of *Anthozoa* from Vineyard Sound. MÖBIUS (Bericht, p. 100) records 3 *Actinidæ* and 1 *Edwardsia* from the western part of the Baltic; 8 *Anthozoa* were met with at Arendal and during the cruise (*l. c.* p. 149).

Genera and Species.

POLYACTINIA.

ACTINIIDÆ.

Cerianthus borealis, sp. n., Verrill, Am. J. Sci. (3) v. p. 5 (Grand Menan, St. George's Bank); *Edwardsia 12-cirrata*, Sars, = *chrysanthellum*, Peach. (Möbius, *l. c.*); *E. lineata*, sp. n., Verrill, "Report," p. 739 (no naked basal area, nor any true disk for attachment). *Peachia parasitica* occurs not only "parasitically" on *Cyanea arctica*, but also buried in the gravel at low water mark; *Epizoanthus americanus* (Dana) both on rocks and on shells inhabited by *Paguri*.

TURBINOLIDÆ.

Caryophyllia clavus, Sc. (= *smithi*, Stok., *borealis*, Flg.), *cyathus*. Ell. Sol., *arcuata*, E. H. *, *seguenzæ*, D. * (= *Ceratocyathus ornatus*, Seg.).

cylindracea, Reuss.* (formerly known as cretaceous), *abyssorum**, *inskiipi*, *calveri*, *vermiformis**, and *pourtalesi**, spp. nn., Duncan (1), pp. 309-317 (*Ceratocyathus* is merged in *Caryophyllia*). *C. borealis*, Fl.; W. Thomson, "Depths of the Sea," p. 27.

Ceratotrochus nobilis, Moseley (Azores, 1000 fath.), Nature, viii. pp. 400-402, with figure and description of the animal.

*Bathycyathus atlanticus**, sp. n., Duncan (1).

*Paracyathus agassizi**, sp. n., *striatus* (Phil.)*, *id. l. c.* pp. 319 & 320.

Sphenotrochus intermedius (Müst.) = *milletianus*, Defr., *id. l. c.* p. 320.

Sabinotrochus, g. n. (Div. *Turbinoliaceæ*). Corallum simple, flatly turbinate, adherent by a delicate peduncle; calicle flat; septa exsert; costæ delicate and numerous; columella formed of growths from the septa. *S. apertus**, sp. n. *Id. l. c.* p. 320.

Desmophyllum cristagalli, E. H. (= *dianthus*, Ehrbg., *cumingi*, and *costatum*, E. H.), *id. l. c.* p. 321.

Flabellum distinctum, E. H.* (Japanese, and tertiary in Europe: *T. extensum*), *laciniatum* (Phil.)* (Pliocene and Norwegian: *Ulocyathus arcticus*, Sars), *id. l. c.* pp. 322 & 323. *F. distinctum*, W. Thomson, "Depths of the Sea," p. 432. *F. alabastrum*, sp. n., Moseley (Azores, 1000 fath.), Nature, viii. pp. 402 & 403, with description of the animal.

Rhizotrochus affinis, sp. n., Duncan, *l. c.* p. 323 (Mediterranean).

Deltocyathus agassizi, Pourt.; A. S. Packard, Am. Nat., vii. p. 744 (East of Cape Cod, 144 fath.).

OCULINIDÆ.

Duncan merges *Diplohelia* in *Amphihelia*, placing this genus with the *Turbinoliaceæ*, and *Lophohelia* among the *Eusmilinæ*, next to *Dendrosmilia*. The species are greatly reduced. Only 1 species of *Lophohelia* and 2 of *Amphihelia* are now recognized: *A. oculata* (L.)* and *A. ramea* (Müll.) (= *miocenica*, *sculpta*, *atlantica*, and *ornata*, D., *profunda*, Pourt., *meneghiniana*, *doderleiniana*, and *sismondiana*, Seg.); *L. prolifera* (Pall.) (= *anthophyllites*, E. S., *subcostata*, E. H., *affinis*, Pourt., *defrancii*, Defr., *gracilis* and *stoppaniana*, Seg.). Duncan, *l. c.* pp. 323-330; W. Thomson, "Depths of the Sea," p. 169.

EUPHYLLIDÆ.

Solenosmilia, g. n. "Corallum bush-shaped; the corallites, which rarely unite, are cylindrical and bifurcate; the terminal calices are produced by a bigemination, and their fossæ and columellæ are in common. The tissue between the new calices is usually costulate, and that over the rest of the corallum granular and without any epitheca. The calices increase by fissiparity, and form occasionally short series. Septa numerous and not very exsert. Dissepiments common." *S. variabilis*, sp. n. Duncan (1) p. 328.

* The species thus marked are figured in Duncan's paper (1).

ASTRANGIIDÆ.

Cladangia exusta (Stp. MS.), sp. n., Lütken (5), from India. The genus was hitherto only known as fossil; young specimens exhibit the characters of *Rhizangia*, which genus therefore probably must be cancelled.

ASTRÆIDÆ.

Placastræa, g. n., Stoliczka (Palæontologia Indica, [infra, p. 509] p. 33, pl. vii. fig. 1), has in external appearance very much the characters of *Isastræa*; differs from *Astræa* by its entirely solid, compressedly-columnar columella; septa granular and denticulate, the denticles not enlarged at the inner end of the septa. (Cretaceous).

EUPSAMMIDÆ.

Balanophyllia gaditana and *cellulosa* *, spp. nn., *socialis* * (*Thecosammia*), Pourt., Duncan (1) pp. 333 & 334; W. Thomson, "Depths of the Sea," p. 433, fig. 69.

Dendrophyllia cornigera, Lmk., Duncan, l. c. p. 334.

FUNGIIDÆ.

Fungia symmetrica *, Pourt., Duncan, *ibid.*; *Diaseris*, sp. ? ? *, *id. l. c.* p. 336.

ALLOPORIDÆ.

Stylaster gemmascens *, Esper, Duncan, l. c. p. 332; *Allopora oculina*, Ehrbg., W. Thomson, "Depths of the Sea," p. 170, fig. 31.

CYATHOXONIDÆ (?).

Gwynia annulata *, Duncan, l. c. p. 335.

OCTACTINIA.

PENNATULARIÆ.

"The willow wands of Burrard's Inlet" (Zool. Rec. ix. p. 458) have attracted the attention of several observers, for instance Blake, Sclater, & Gray (Nature, vii. p. 68; viii. p. 488; ix. pp. 13 & 14). R. E. C. Stearns (P. Cal. Ac., v. pp. 7-12, Am. Nat. vii. pp. 488 & 633) first described it as *Pavonaria blakei*, sp. n., but afterwards established a sub-genus (*Verrilia*) for it. Moss's description and figures (6) show that the polypes are placed in numerous oblique rows on both sides of a unilateral wing-like seam of the polypidon, the axis occupying its rounded dorsal rim; there can hardly be any doubt that this Western American Funiculid represents a peculiar genus, the characters of which however still await full elucidation. Its generic identity with the Australian species (type of

Osteocella) cannot be established so long as the latter is known only from its axial skeleton.

On the capture of *Umbellularia* at the depth of 2125 fath., *cf.* Nature, vii. p. 388, Z. wiss. Zool. xxiii. p. vi.

FOSSIL CORALS.

M. P. DUNCAN: Supplement to the (British) Fossil Corals, iii. Oolitic (Pal. Soc. 1872). On *Caryophyllia bredai*, E. H., from the Red Crag of Woodbridge (J. G. Soc. 1873, p. 503); on the older tertiary formations of the West India Islands, *ibid.* pp. 548-565, pls. xix.-xxii. (16 new species). W. N. DYBOWSKI: Beschreibung zweier aus Oberkuzendorff stammenden Arten der *Zoantharia rugosa*; Beschreibung einer neuen *Streptelasma* Art (Z. geol. Ges. 1873, pp. 402-420, pl. xiii.) (*cf.* Lindström, *op. cit.* pp. 745-750); Beschreibung einer neuen aus Nordamerika stammenden devonischen Art der *Zoantharia rugosa*, St. Petersburg, 1873, 1 pl. (*Craspedophyllum*, g. n.); Monographie der *Zoantharia sclerodermata rugosa* aus der Silur-formation Estlands, Nord-Livlands und der Insel Gotland, nebst einer Synopsis aller paläozoischen Gattungen dieser Abtheilung und einer Synopsis der dazu gehörigen bereits bekannten Arten, pt. i. Arch. Nat. Livl. v. pp. 257-408, pls. i. & ii. [This part contains the bibliography, treats of the terminology and structure of the polypary, and gives a synopsis of the families and genera, among which many—according to Lindström too many—new genera, and the first portion of the special descriptions. New genera: *Kenophyllum*, *Acanthocyclus*, *Acanthodes* (preoccupied), *Cyathophylloides*, *Grewingkia*, *Siphonaxis*, *Densiphyllum*, *Darwinia* (preoccupied), *Fascicularia*, *Donacophyllum*, *Acanthophyllum*, *Microplasma*, *Plasmo-phyllum*, *Clisiophylloides*.] FROMENTEL: Paléontologie Française, Terrain Crétacé, Zoophytes, viii. livr. 26 (1873). GEINITZ: das Elbthalgebirge in Sachsen (Paläontographica, xx.) (Corals by Bölsche, Geinitz & Reuss). G. LINDSTRÖM: Några anteckningar om *Anthozoa tabulata* (Efv. Ak. Förh. 1873, No. 4, pp. 3-20); Förteckning på Svenska undersiluriska koraller (*ibid.* pp. 21-38) (many *Tabulata* are not true *Anthozoa*, but *Polysoa*, &c.). A. H. NICHOLSON: On the species of *Favosites* from the Devonian rocks of Western Ontario (Canad. J. Sc., n. s.; Geol. Mag. x. pp. 567-570). A. E. v. REUSS: Paläontologische Studien über die älteren Tertiärschichten der Alpen, iii. Abth. Die fossilen Anthozoen der Schichtengruppe von S. Giovanni Ilarione und von Ronca, &c., with 20 pls. (Denk. Ak. Wien, 1873; SB. Ak. Wien, lxx. 1872, pp. 270-273, abstract). G. SEGUENZA: Di qualche corallo paleozoico della Medonia, Sicilia (Boll. d. R. Com. Geol. Ital. 1872, p. 50). T. R. R. STEBBING: Notes on *Calceola sandalina*, Lam. (Geol. Mag. x. pp. 57-61, pl. v.). STOLICZKA: Corals or Anthozoa from the Cretaceous Rocks of South India (Paläontologia Indica, iv. 4) (57 species, of which 49 are new, while 7 are known from European deposits; with some additional chapters on *Annulata*, *Foraminifera*, and *Spongozoa*) 58 pp. pls. 11.—“Fourth Report of the Committee appointed to investigate the structure of carboniferous limestone Corals,” Rep. Brit. Ass. 1872, pp. 241-243.

HYDROZOA.

1. ALLMAN, G. J. On the homology of the *gonangium* in the genus *Halecium*. Q. J. Micr. Soc. xiii. pp. 55-58.
The female *gonangium* of *Halecium* (*beani*), terminating in a pair of hydranths, is not a modified hydrotheca, but a modified lateral branch, which never passes beyond the development of a single internode.
This author's "Gymnoblastic Hydroids" reviewed, Am. J. Sci. (3) v. pp. 145-148.
2. CARTER, H. F. Transformation of an entire shell into chitinous structure by the polype *Hydractinia*, with short descriptions of the polypidoms of 5 other species. Ann. N. H. (4) xi. pp. 1-14, pl. i.
3. FOL, H. Die erste Entwicklung des Geryoniden-eies. Jen. Z. Nat. vii. p. 471, pl. i. Abstract in Arch. sci. Nat. xviii. pp. 335-340.
4. KOCH, G. v. Vorläufige Mittheilung über Cœlenteraten. Jen. Z. Nat. vii. pp. 464-468, 512-515, pls. xxiii. & xxv.
5. SARS, G. O. Bidrag til Kundskab om Norges Hydroider. Förh. Selsk. Chr. 1873, 62 pp. pls. ii.-v. Noticed in Am. J. Sci. (3) vi. p. 471, and Ann. N. H. (4) xiii. p. 135, by T. Hincks.
6. SCHULTZE, F. E. Ueber den Bau von *Syncoryne sarsii*, Lov., und die zugehörige Meduse, *Sarsia tubulosa*, Less. Leipzig: 1873, 38 pp. 3 pls.

Anatomy, Evolution, etc.

SCHULTZE (6) gives an almost exhaustive account of the histological structure of *Syncoryne* and *Sarsia*. The endoderm of the cœnosarc and hydranths (in *Syncoryne*) consists of a single layer of flagellate cells, lining the interior cavity; the solid tentacles contain a single layer of large endodermal cells; it is separated from the ectoderm by the hyaline lamella and the muscular layer. In the ectoderm, nematocysts of 2 different kinds are imbedded. The "cnidocils," which are associated with and probably organically and functionally connected with the nematocysts, are distinguished from the "palpocils." The only tissue in *Sarsia* which belongs to the endoderm, is the flagellate cell-layer, which forms the radial and circular canals and the interior lining of the "manubrium" and tentacles; all other parts originate from the ectoderm. In the "manubrium" 5 layers may be traced: (1) the ectoderm, in which the ova and spermatozoa are developed; (2) the longitudinal and (3) circular muscular fibres, separated from each other by (4) the hyaline lamella; and (5) the entoderm; these layers may also be traced in the tentacles. In the "velum" the circular muscular layer only exists, but

a nervous (?) ring, composed of several fibrils, accompanies the marginal vessel. The umbrella is composed of 2 layers, which are united only along 8 radiating lines, 4 of which answer to the radial vessels, 4 to their interstices; Schultze is inclined to regard the 8 closed cavities, formed in this manner, to the body cavity (cœloma) of higher types. The outer layer of the umbrella is chiefly formed of the jelly-like substance, which has no cellular structure, but is pierced by fibres, combining the cellular membranes, which invest both its sides; the inner layer is formed of striated, circular muscular fibres and a cellular epithelium.

FOL (3) has investigated the evolution of *Geryonia fungiformis*. The undivided egg consists of a denser *ectoplasm* and a more aqueous *endoplasm*, and the 6th and 7th division (resulting in a total number of egg-cells respectively 64 and 96) takes place in such a manner, that *the ectoderm is formed solely of the ectoplasm, the endoderm of the endoplasm only*, both layers forming 2 concentric balls, the one within the other. The jelly-like substance, which afterwards forms the main portion of the bell, is excreted between the ectoderm and the endoderm, which flattens and assumes the shape of a watch-cover, adhering to the ectoderm at a certain place, where the mouth is afterwards formed through perforation. The ectoderm invests itself with cilia, and the floating life of the embryo begins. From the ectoderm the margin and inner investment of the bell, the tentacles, velum, and organs of sense are successively built up, from the endoderm the stomach, the radial vessels, and the axial tissue of the tentacles.

KOCH (4) speculates on the questions,—Is the Medusoid derived phylogenetically from the Hydroid, or *vice versa*? (thinking the first alternative the more probable of the two), and—Do the Medusoids originate from the transformation of the reproductive *organs* into independent *organisms*, or are they developed from hydroid individuals, which, being set free, adapt themselves to a natatory life? Reasons are given for adopting the latter view, and the further phylogenetic history of Hydroids is sketched hypothetically. In other paragraphs Koch investigates the histological structure and the evolution of *Tubularia*, and affords evidence of the *endodermal* origin of the ova in *Veretillum*, *Saccanthus*, and *Coryne*.

Notes on the "Habits and economy of the Freshwater Polype," by FULLAGAR: Q. J. Micr. Soc. xiii. pp. 105 & 325.

Distribution, Local Lists, &c.

EHLERS (SB. Soc. Erlang. v. p. 10) notices 3 species of *Medusæ* from the open sea, S. W. of Nova Zembla; an unnamed species of *Sarsia* is described shortly. SARS (5) enumerates 84 species of Norwegian Hydroids, and gives tables of their geographical and bathymetrical extension; 6 are littoral, 11 known from 0–10 fathoms (Laminarian zone), 13 from 10–20 fathoms (zone of *Florideæ*), 42 from the "Coralline" zone; 54 occur from 50–100 fathoms, 20 below the 100 fathom line, 15 below 150, 5 below 200, and 1 from 300–400 fathoms. 28 species are not found at the British Islands (19 of these are new), 19 are found in the Mediter-

ranean, 11 at Greenland, 25 at the east coast of North America, and 12 are common to all these seas. The bathymetrical distribution of many species is extended in an unexpected manner through Sars's investigations. The 58 species occurring below the 50-fathom line (among which 16 are regarded as new) are made the subjects of shorter or longer notes or of detailed descriptions; those treated more fully are named in the following pages, in which are also embodied the results of HINCKS'S critical review of Sars's paper.

MÖBIUS ("Bericht," pp. 100-102) gives 18 *Hydromedusæ* (13 Hydroids and 7 *Medusæ*), 2 *Lucernariæ* and 2 *Ctenophora*, as occurring in the (western part of the) Baltic; 10 species were observed during the cruise to Arendal and in this region. VERRILL ("Report," pp. 722-737) enumerates 5 *Ctenophora*, 3 *Siphonophora*, 7 "*Discophora*," (*Steganophthalmata*, &c.), and 57 "*Hydroidea*" (Hydroid Polypes and allied Medusoids) from Vineyard Sound, &c. The new species are registered below with a few others described by Verrill in his papers on the invertebrate fauna of New England; *Am. J. Sci.* (3) v.-vi. G. J. ALLMAN'S "Interim Report of the Hydroids collected by L. F. de Pourtalès during the Gulf-stream Expedition of the U. S. Coast Survey" (*Bull. Mus. C. Z.*, vii. pp. 185 & 186), announces the discovery of 65 new species, not previously obtained beyond the limits of the area examined; the 8 remaining could not, as far as the incomplete evidence goes, be distinguished from European species.

Genera and Species.

DISCOPHORA (GYMNOPTHALMATA).

Ametrangia, g. n., Allman (*Nature*, ix. p. 73; *Rep. Br. Ass.* 1873, *Trans. of Sections*, pp. 108-110). Hemispherical, marginal tentacles very numerous (over 100) and extensile, originating in a bulbous base with a distinct "ocellus;" no lithocysts on the margin. Velum of moderate width. Manubrium small, terminating in 4 rather indistinct lips. Radial canals 3, disposed at equal intervals, opening in the circular canal, but sending off from their wider proximal part a number of irregular branches, partly abutting on the circular canal, partly terminating blindly in the umbrella. Oval sporosacs (ovaria) are developed one on each of the 3 primary canals, where the wider base passes into its narrower continuation. The planula is spherical, never acquires cilia, and possesses little or no power of locomotion. *A. hemispherica*, sp. n., *id. U. cc.*, South Coast of Ireland.

Circe invertens, sp. n., *id. U. cc.* pp. 74 & 109, South Coast of Ireland. *Circe* of Mertens is not identical with *Trachynema* of Gegenbaur (unless this should be an immature form), and cannot be removed from the true Hydroida.

E. RAY LANKESTER has confirmed the Medusoid nature of the remarkable parasite of *Phyllirhoe* (*Mnestra*), but could not make out the way in which it becomes attached; *Ann. N. H.* (4) x. p. 94.

MILLEPORIDÆ.

Pliobothrus symmetricus, Pourt., North Atlantic, 500-600 fathoms, Duncan, *l. c.* p. 536, pl. xlix. fig. 7.

GYMNOBLASTICA.

The occurrence of *Cordylophora lacustris*, Allm., in the basins of the "Jardin des Plantes," at Paris, is noticed by Perrier, Arch. Z. expér. ii. p. xvii. : on its occurrence in the Baltic, cf. Möbius, "Bericht," p. 100.

Syncoryne eximia (Allm. ?), Sars (5), p. 130, is probably a new species, according to Hincks (*l. c.*).

Dicoryne flexuosa, sp. n., Sars (5), (Lofoten, 80-100 fathoms) p. 128, pl. v. figs. 21-26.

Rhizorhagium, g. n., Sars (5), p. 129. "Polyparium corneum, e tubulo ramoso repente et sarculis polypiferis de illo surgentibus, singulis, erectis, filiformibus, non ramosis constans. Capitula polyporum clavata seu fusiformia, non retractilia, medio tentaculis filiformibus uniserialibus circumdata ; ore in proboscide prominente terminali. Gonophori singuli, sessiles, numquam caduci, globosi, seu ovati, breviter pedicellati, absque ore et cirris marginalibus, non in sarculis, sed e stolone enascentes; in aliis coloniis omnes masculi, in aliis feminei." *R. roseum*, M. Sars, sp. n.

Perigonimus abyssi, sp. n., Sars (5), p. 126, pl. v. figs. 27-30, Norway (83-400 fathoms), on shells.

Carter (2) has examined *Buccinum*-shells, the substance of which was partially absorbed and eroded by the basal net-work of *Hydractinia echinata*, and another shell, which was entirely (columella and all) transformed into or replaced by a chitinous substance by another *Hydractinia* (*lævispina*, C., *l. c.* p. 9, pl. i. fig. 1). This observation led to the discovery that *Ceratella* and *Dehitella* of Gray, previously ranged among sponges, are really polyparies of *Hydractiniidae*. Two new species of *Ceratella*, *procumbens* and *spinosa*, from the Cape of Good Hope and Natal, and a new genus, *Chitina* (*Ch. ericopsis*, C., from New Zealand), are described. While *Hydractinia* is incrusting, *Ceratella* and *Dehitella* are "branched procumbent," *Chitina* "branched erect." [Of course these genera can only be regarded as duly established, when the polypes and other soft parts are known.]

According to Möbius (Bericht, p. 101), *Dysmorphosa fulgurans* is the planoblast of *Podocoryne carnea*, S. On the occurrence of this Zoophyte on crabs, cf. Sars, *l. c.* 131.

Acaulis primarius, Stps. (Sars, *l. c.* p. 123, pl. v., figs. 14-20), is fixed, not free and floating as suggested by Stimpson; the reproductive bodies are simple sporosacs. Hincks thinks it entitled to stand as the type of a separate family.

Myriothela cocksii (Vig.), = *M. phrygia*, Hcks., but differs from the true *M. phrygia* (Fabr.), = *arctica*, S.; Sars, *l. c.* p. 130.

CALYPTOBLASTICA.

Campanulina panicula, sp. n., Sars (5), p. 121, pl. v. figs. 9-13 (Dröbak, 50-60 fathoms).

Lafoeina, g. n., Sars (5), p. 119. Similar to *Cuspidella* in its general aspect and in the shape of the *hydrotheca*, but distinguished by the presence of peculiar slender tentacle-like individuals, invested with thin chitinous sheaths, and armed with nematocysts at the apex, which arise from the stolons between the *hydrothecæ*. *L. tenuis*, sp. n., *id. l. c.* pl. v. figs. 1-5 (Lofoten, Bodö, &c., 60-300 fathoms).

Calycella producta, sp. n., *id. l. c.*, p. 118, pl. v. figs. 6-8 (Bodö, Lofoten) (according to Hincks, probably a *Lovenella*).

Lafoea capillaris, sp. n., Sars (5), p. 115, pl. iv. figs. 22-24 (Dröbak, 50-60 fathoms); *pinnata*, sp. n., *id. l. c.* p. 116, pl. iv. figs. 25-28 (Hardangerfjord, 90-100 fathoms); *gracillima* (Ald.), pl. iv. figs. 19-21; *fruticosa*, S. (*nec* Hincks), pl. iv. figs. 16-18. [According to Hincks, *L. fruticosa*, M. Sars, = *L. gracillima*, Alder (Sars's name having the priority), but *L. fruticosa*, G. O. Sars, = *L. grandis*, Hincks.]

Halecium gracile, sp. n., Verrill, "Report," pp. 328 & 729 (New England). *H. gorgonoide*, sp. n., Sars (*l. c.* p. 112, pl. iv. figs. 9-15, Bodö, 80-100 fathoms), is provided with extensile tentacle-like appendages, analogous to nematophores, but clavate and naked (without basal cups), and is therefore very properly employed by Hincks (*l. c.*) as the type of a new genus: *Hydrodendron*. According to a note in *Am. J. Sci.* (3) vi. p. 471, *H. gorgonoide* = *H. robustum*, sp. n.; Verrill (*op. cit.* v. p. 9) (off St. George's Bank).

Ophiodes parasitica, sp. n., Sars, *l. c.* p. 109, pl. iv. figs. 5-8 (Hvitingsö, 80-100 fathoms). Hincks urges its affinity with the *Plumulariidae* (already hinted at by Sars), and makes it the type of a new genus: *Ophionema*.

Diphasia mirabilis, sp. n., Verrill, *Am. J. Sci.* (3) v. pp. 9 & 10 (St. George's Bank); *D. elegans*, sp. n., Sars (5), p. 107, pl. iii. figs. 23-26 (Hvitingsö, &c., 150-200 fathoms).

Sertularia tenera, sp. n., Sars (5), p. 108, pl. iv. figs. 1-4 (Skudesnæs, 150 fathoms).

Aglaophenia radicellata, sp. n., Sars (5), p. 97, pl. ii. figs. 1-6 (Hvitingsö, 150-200 fathoms), *bicuspis*, sp. n., *id. l. c.* p. 98, figs. 7-10 (Hvitingsö, 80-100 fathoms), and *integra*, *id. l. c.* p. 100, figs. 11-15 (Hvitingsö and Bodö, 80-100 fathoms). The reproductive capsules in the 2 last species are not worn in corbulæ, but ranged along one side of the main stem; in *A. bicuspis*, bifid or trifid processes, studded with nematophores, are developed from the pinnulæ for their protection. (This species is a *Gonocladium*, Allm., MS.; *A. radicellata* a *Lytocarpia*, Kirchn.; and for those with unprotected "gonothecæ," like *A. integra*, the new genus *Gymnangium* is proposed by Hincks, *l. c.*)

Polyplumaria, g. n., Sars (5), p. 101, agrees in the characters of the pinnulæ and hydrothecæ, and in the structure and disposition of the nematophores with *Plumularia*, from which it differs in the peculiar

fan-like ramification of its polypary. *P. flabellata*, sp. n., *id. l. c.* pl. ii. figs. 16-22) (Hvitingsö, 80-100 fathoms).

Plumularia elegantula, sp. n., *id. l. c.* p. 103, pl. iii. figs. 9-14, Hardangerfjord, Mangor, 90-190 fathoms); *gracillima*, S., *id. ibid.* figs. 1-8; *tenella*, sp. n., Verrill, Rep. pp. 407 & 731.

Aglaophenia arborea (Des.), Verrill, *l. c.* p. 730.

Heteropyxis norvegica, sp. n., Sars (5), p. 104, pl. iii. figs. 15-22 (Norway, 50-100 fathoms). Under *Heteropyxis*, Sars comprehends the species which have the general aspect of *Antennularia*, but the pinnulæ arranged spirally, not in circles with regular intervals. *H. norvegica* has "cornucopia"-shaped capsules, resembling those of *Plumularia cornucopia*, Hcks., but developed in pairs from the lowest joints of the "pinna," a little above its origin.

FOSSIL HYDROZOA AND GRAPTOLITES.

P. M. DUNCAN: "On the genus *Palæocoryne*, D. & J., and its affinities" (J. G. S. xxix. pp. 412-417), suggests that *Palæocoryne* should still remain associated with the tubularian *Hydrozoa* in spite of its abnormalities. Short notes on Graptolites by J. HOPKINSON; Geol. Mag. x. pp. 518-520; Rep. Br. Ass. 1872, p. 107. C. LAPWORTH: "On the *Diprionidæ* of the Moffat Shale" (Geol. Mag. x. p. 133, abst.); "Notes on the British Graptolites and their allies. 1. On an improved classification of the *Rhabdophora*" (op. cit. pp. 500-504, & 555-560: new genera, *Leptograptus*, *Amphigraptus*, *Lasiograptus*, and *Clathrograptus*). H. A. NICHOLSON: "On some fossils from the Quebec group of Point Lewis, Quebec;" Ann. N. H. (4) xi. pp. 133-143. The genus *Dawsonia* is introduced for the bodies formerly described as the "ovarian capsules" of Graptolites ("grapto-gonophores"); the resemblance of certain "species" to small Brachionopods, or to "Statoblasts" of *Polyzoa*, is pointed out. The same author's "Monograph of the British Graptolites" is reviewed, Geol. Mag. x. p. 229. G. STACHE: "Ueber die Graptolithen der schwarzen Kieselschiefer in Kärnthen" (Verh. geol. Reichsanst. 1872, p. 323).

CTENOPHORA.

EIMER, T. Zoologische Studien auf Capri. I. Ueber *Beroë ovatus*, ein Beitrag zur Anatomie der Rippenquallen. Leipzig: 1873, 91 pp. 9 pls.

A profound histological and anatomical investigation of the greater part of the organization of this Ctenophor, throwing much new light upon its more delicate structural composition especially as to the muscular and nervous systems. The jelly-like substance, which forms the *Beroë*, contains some (not many) "connective-tissue cells," but is traversed in all directions by a great number of "connective-tissue-filaments," band-like polymorphous muscular filaments and delicate varicose, often ramified, nerve fibrils, with numerous nerve cells and ganglionic cells in their course and at their points of

union and ramification; its outer homogeneous layer (the so termed "nervea," or "neuroderma"), which increases in thickness towards the ab-oral pole, and is successively lost towards the mouth, is however devoid of muscular filaments, these, when entering it, assuming suddenly the character of branching nervous fibrils, the ends of which terminate in the "nuclei" of the epithelial cells. The complex arrangement of the muscular system throughout the body, and the concentration of its elements around certain organs, is described in detail. Nerve-chords do not exist, only isolated fibrils and trains of fibrils, which, for instance, are found abundantly in and about the "neurophors," chord-like condensations of the outer homogeneous jelly layer, forming the bottom of the costal furrows and separating them from the underlying radial vessels; nor is there any true central organ for the nervous system, though the most ab-oral part of the "nervea" may be regarded as such, owing to its richness in nervous elements. Nematocysts ("secretory products of unicellular glands") are found sparingly in the epithelium, especially towards the oral and ab-oral poles. The flappers on the ribs may be considered as flagellate cells, glued together; their importance for locomotive purposes is small, but they keep the body floating in the water, revolve it on its axis, and promote respiration. The "stomata," through which the body-parenchyme communicates with the interior of the vessels, perhaps play a part in the hydrostatic functions. The "sensatory corpuscle" at the bottom of the blind pit in the ab-oral pole wears 4 eye-specks, with lenses, and an auditory organ. The stomach, its coeca and communication with the "funnel," from which the 2×4 radial and 2 gastric vessels spring, the delicate branches, through which the "excretory tubes" communicate with the exterior at the ab-oral pole, the relation between the vascular system and the sensory organs, the entoderm, &c., are also described in detail. (Excellent specimens are obtained by rapidly pouring diluted osmic acid over fully dilated individuals, and preserving them in strong alcohol.)

P R O T O Z O A.

BY

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SPONGOZOA.

1. BOWERBANK, J. S. Contributions to a general history of the *Spongiadæ*. Pts. iv. & v. P. Z. S. 1873, pp. 3-25 & 319-333, pls. i.-iv., xxviii.-xxxii.
2. ——. Report of a collection of Sponges found at Ceylon, by E. W. Holdsworth. *Tom. cit.* pp. 25-32, pls. v.-vii.
3. ——. Reply to Dr. J. E. Gray's Observations on certain species of Sponges described in the "Proceedings of the Zoological Society" for 1873. *Ann. N. H.* (4) xii. pp. 488-491.
4. CARTER, H. J. Description of *Labaria hemisphærica*, Gr., a new species of hexactinellid Sponge, with observations on it, and on the sarcohexactinellid Sponges generally. *Op. cit.* xi. pp. 275-286, 421-430.
5. ——. Points of distinction between the *Spongiadæ* and the *Foraminifera*. *L. c.* pp. 351-355.
6. ——. On two new species of *Gummineæ*, with special and general observations. *Op. cit.* xii. pp. 17-30, pl. i.
7. ——. On the *Hexactinellidæ* and *Lithistidæ* generally, and particularly on the *Aphrocallistidæ*, *Aulodictyæ*, and *Fareæ*, together with facts elicited from their deciduous structures, and descriptions respectively of 3 new species. *L. c.* pp. 349-373, 437-472, pls. xiii.-xvii.
8. ECKHEL, G. v. Der Badeschwamm in Rücksicht auf die Art seiner Gewinnung, die geographische Verbreitung und lokale Variation. Triest: 1873, 42 pp., map and 2 pls.

9. GRAY, J. E. Notes on the siliceous spicules of Sponges, and on their division into types. *Ann. N. H.* (4) xii. pp. 203-217.

(Reviews the different types of siliceous spicula and their secondary modifications, with reference to the works of Bowerbank, Schultze, O. Schmidt, Carter, &c. The chief types are the "needle-like," "hamate," "quinqueradiate," "sexradiate," "multiradiate," and "birotulate spicules," and the "spicular spherules.")

Häckel's "Kalkschwämme" is noticed or reviewed in "Nature," vii. p. 279; "Naturforscher," Oct. 1873; *Arch. Sci. Nat.* xlvii. pp. 43-49, 130-147. The chapters on the systematic position of these organisms in the animal kingdom, and on their relation to the theory of descendance, are translated in *Ann. N. H.* (4) xi. pp. 241-262, 421-430.

Distribution, Local Lists, &c.

MÖBIUS (Bericht, p. 99) is acquainted with 1 *Halisarca*, 3 siliceous and 3 calcareous Sponges from the Baltic; 14 *Silicispongiae* and 6 *Calcispongiae* were met with during the cruise to Arendal (*l. c.* pp. 147-149). From the shores of New England (Vineyard Sound, &c.), 3 *Calcispongiae* and 14 *Silicispongiae* are registered by VERRILL (Baird's "Report," &c. pp. 740-745). Special attention is devoted to the Sponges of the North Atlantic abyssal kingdom in WYVILLE THOMSON'S "Depths of the Sea," *cf.* pp. 416-431; and further discoveries in that department are announced, *Nature*, vii. p. 388, viii. pp. 28 & 274.

Genera and Species.

Leuconia glomerosa, sp. n., Bowerbank (1), p. 17, pl. iv. figs. 1-6 (Port Elizabeth; = *Aphroceras alcornicis*, J. E. Gray, *Ann. N. H.* (4) xii. p. 264; this identification rejected by Bowerbank (3), p. 489.

Corticium abyssi, sp. n., Carter (6), p. 18, pl. i. figs. 1-9, & 15 (Mouth of British Channel, 500 fathoms).

Chondrilla australiensis, sp. n., *id. l. c.* p. 23, pl. i. figs. 10-14 & 16 (Australia).

Halisarca mimosa, sp. n., Girard (*Arch. Z. expér.* ii. p. 488), mimics *Botrylloides rubrum* (Boulogne); in like manner a *Halisarca* allied to *H. guttula*, Schm., mimics a small *Cynthia* at Roscoff. The egg (in 2 different stages of development) and the "*planogastrula*" of the last named species are figured. The analogy of shape and aspect between *Tethya cranium* and *Polyclinum ficus* is also alluded to. Carter's remarks *Ann. N. H.* (4) x. p. 47, and xii. p. 27, on the structural analogy between Sponges (*Gummineae*) and *Ascidia composita* are severely criticized [too severely, partly through a misunderstanding of the English text].

Tethea robusta, sp. n., Bowerbank (1), (Australia) p. 10, pl. ii. figs. 12-17; *simillima*, sp. n., *id. l. c.* (South Sea) p. 15, pl. iii. figs. 6-13; *cliftoni*, sp. n., *id. l. c.* (Australia) p. 16, pl. iii. figs. 14-18.

Geodia flemingi, sp. n., *id. l. c.* p. 3, pl. i. figs. 1-8 (Australia); *depressa*, sp. n., *id. l. c.* p. 5, pl. i. figs. 9-15 (Dardanelles); *gibberosa*, Lmk., *id. l. c.* p. 6, pl. i. figs. 16-22 (West Indies); *perarmatus*, sp. n., *id. l. c.* p. 8, pl. ii. figs. 1-11, and *inæqualis*, sp. n., *id. l. c.* p. 12, pl. ii. figs. 18-23 (hab. unknown); *media*, sp. n., *id. l. c.* p. 13, pl. ii. figs. 24-29 (Mexico); *dysoni*, sp. n., *id. l. c.* p. 14, pl. iii. figs. 1-5 (Honduras); *parasitica*, sp. n., *id. l. c.* p. 328, pl. xxxi. figs. 12-15, and *paupera*, sp. n., *id. l. c.* p. 329, pl. xxxi. figs. 16-21 (habitat unknown).

Desmacidon fistulosa, sp. n., *id. l. c.* (Australia) p. 19, pl. iv. figs. 7 & 8, compared with *D. jeyffreysi* and a fossil species from the chalk, *D. spinosa*. On the identity of *Desmacidon* with *Oceanapia*, Norm., and *Rhizochalina*, Schm., cf. J. E. Gray, Ann. N. H. (4) p. 266.

Ciocalypta tyleri, sp. n., Bowerbank (1), p. 21, pl. iv. fig. 9 (Port Elizabeth). On its identity with *Halichondria panicea*, cf. Gray, *l. c.*, & Bowerbank (3), p. 489.

Spongionella holdsworthi, sp. n., Bowerbank (2), p. 25, pl. v. figs. 1 & 2, & pl. vi. fig. 7 (Ceylon). On its identity with *Phyllospongia papyracea*, Esper, cf. Gray, *l. c.*, & Bowerbank (3), pp. 489 & 490.

Dysidea conica, sp. n., Bowerbank (2), p. 26, pl. vi. fig. 1 (Ceylon).

Isodictya donnani, sp. n., *id. l. c.* p. 28, pl. vi. figs. 2-6 (Ceylon); cf. Gray, *l. c.* p. 267, and Bowerbank (3), p. 490; *mirabilis*, sp. n., Bowerbank (1), p. 319, pl. xxviii. figs. 1-8 (India).

Haliphysema tubulatum, sp. n., Bowerbank (2), p. 29, pl. vii. figs. 1-6 (Ceylon); = *Acarnus innominatus*, Gr., according to Gray, *l. c.*; cf. Bowerbank (3), p. 489.

Xenospongia patelliformis, Gr., previously known from Torres Strait only, occurs at Ceylon, on the pearl bank; Holdsworth, P. Z. S. 1873, pp. 32 & 33.

Dictyocylindrus dentatus, sp. n., Bowerbank (1), p. 321, pl. xxix. (Australia); *setosus*, sp. n., *id. l. c.* p. 325, pl. xxx. figs. 15-17 (Devonshire?).

Ecionema acervus, sp. n., *id. l. c.* p. 322, pl. xxx. figs. 1-6 (Fiji Islands); *densa* [-sum], sp. n., *id. l. c.* p. 323, pl. xxx. figs. 7-14 (same locality):

Pachymatisma inconspicua[uum], sp. n., *id. l. c.* p. 326, pl. xxxi. figs. 1-6 (South Sea); *contorta*[-tum], sp. n., *id. l. c.* p. 327, pl. xxxi. figs. 7-11 (Fiji Islands).

Psetalia, g. n., Gray, Ann. N. H. (4) xi. p. 234. *P. globulosa*, sp. n. (Philippines), allied to *Lophiurella*, Gr. (*Tetilla polyura*, Schm.).

Pellina semitubulosa (Adriatic), = *P. bibula* (Baltic); Möbius, "Bericht d. Pommerania," p. 99.

Polymastia mespilus, Schm., *Hymenaphia plicata*, S., *Esperia anceps* and *lucifera*, Schmidt; *id. l. c.* p. 148 (Arendal).

Microciona prolifera (E. S.), *Suberites compacta*, sp. n. (Virginia to Martha's Vineyard), *Chalina arbuscula*, sp. n. (N. Carolina to Cape Cod). *Polymastia robusta*, Bowbk. ?, *Clione sulphurea*, Desor; Verrill, "Report," pp. 741-744.

Spongilla baicalensis (Pall.) (Lake Baikal), Grube, Ber. schles. Ges. 1872, p. 62.

Stylocordyla (g. n.) *borealis* (Lov.), W. Thomson, "Depths of the Sea," p. 114. "*Hyalonema*" *longissimum*, Sars, is also found at the

American side of the Atlantic, at moderate depths: *Am. J. Sci.* (3) vi. pp. 440 & 470.

Thecophora semisuberites, S., and *ibla*, sp. n., W. Thomson, *l. c.* pp. 147 & 148.

Chondrocladia (g. n.) *virgata*, sp. n., *id. l. c.* p. 187. According to Verrill, *Am. J. Sci.* (3) vi. p. 470, this new genus = *Cladorhiza*, but the species is probably distinct from *Cl. abyssicola*.

Celosphæra (g. n.) *tubifera*, sp. n., W. Thomson, *l. c.* p. 485. Spherical, with a smooth, glossy, external rind composed of closely meshed, pin-headed spicules, with 2 kinds of "sarcode spicules," one large, C-shaped, the other much more minute, tridentate, equianchorate. The interior is filled with soft semi-fluid sarcode, supported by the loosest possible meshwork of granular horny matter and pin-headed spicules. From the surface of the sponge several long narrow tubes run out in all directions; their walls are thin and delicate, especially towards the distal ends, where they contract slightly to an open orifice," &c.

Arabescula parasitica, g. & sp. nn. (*Lithistidæ*). Carter (7), p. 464, pl. xvii. figs. 7-9, from the Seychelles and the mouth of the British Channel.

Azorica pfeifferæ, sp. n., Carter (7), p. 442 (Azores); *Corallistes borealis*, sp. n., *id. l. c.* p. 443 (Farøe).

Farrea densa, sp. n., *id. l. c.* p. 463, pl. xvii. figs. 5 & 6 (Seychelles); compared with *F. occa*, B., *id. l. c.* p. 454, pl. xvi. fig. 4; *F. infundibuliformis*, sp. n. (Caribbean Sea), *id. l. c.* p. 448, pl. xvii. figs. 1-4.

Labaria, g. n. (*Hexactinæ*), Gray, *Ann. N. H.* (4) xi. p. 235. *L. hemisphærica*, *id.*, sp. n.; Carter (4), (Philippines).

On manufactured *Hyalonemæ*: J. E. Gray, *Ann. N. H.* (4) xii. pp. 76 & 347; *H. lusitanicum*, Bocage, W. Thomson, "Depths of the Sea," p. 421. *H. toxeres*, sp. n., W. Thomson, *Nature*, viii. pp. 247 & 248, from the deep water off West Indies. A species of *Euplectella* with the spicules not fused together into a continuous siliceous network; *id. op. cit.* vii. p. 388.

Poliopogon amadou, W. Thomson, g. & sp. nn. (*Hexactinæ*) (*Nature*, viii. pp. 29 & 30): "has very much the appearance of a large tinder-fungus; both surfaces are covered with a delicate net-work of square meshes, closely resembling that of *Hyalonema*, and formed by spicules of almost the same patterns. The sponge is bordered by a fringe of fine spicules, and from the base a large brush of strong glassy anchoring-spicules project; anchors very much like those of the spicules of *Synapta*."

Holténia carpenteri, W. Th., *Tisiphonia agariciformis*, W. Th., *Rossella velata*, sp. n., and *Asconema setulabense*, K.; *id.*, "Depths of the Sea," pp. 71, 74, 412 & 429.

CARTER (5) announced the following arrangement of the Sponges:—

1. Sponges with horny fibre and granular axis, without foreign objects. *Aplysinidæ*.
2. Sponges with horny fibre, amorphous sarcode, and axis of foreign objects. *Hircinidæ*.
3. Sponges with horny fibre and axis of proper spicules only (sponge formed by the species itself). *Chalinidæ*.

4. Sponges with horny fibre and axis of proper spicules, more or less echinated also with proper spicules. *Armata*.
5. Sponges in which the fibre is formed of proper spicules cemented together by amorphous sarcode. *Renierine*.

FOSSIL SPONGES.

G. DEWALQUE: "Un Spongiaire nouveau du système Eifelien" [*Astræospongia*], Bull. Ac. Belg. (2) xxxiv. p. 23. O. FISCHER: "On the phosphatic nodules of the cretaceous rocks of Cambridgeshire," J. G. Soc. 1873, pp. 52-62, pl. vi. (abstract in Geol. Mag. x. p. 45). GEINITZ, Das Elbthalegebirge in Sachsen (Seeschwämme) (Palæontographica, xx.). H. B. HOLL: "Notes on fossil Sponges," Geol. Mag. ix. pp. 309 & 343. A. POMEL: Paléontologie de la province d'Oran; Spongiaires (Oran: 1872, 36 pls.). W. J. SOLLAS: "On the *Ventriculite* of the Cambridge Upper Greensand," J. G. Soc. 1873, pp. 63-69 (abst. l. c.), (the *Ventriculites* are Keratose Sponges!); "On the Coprolites of the Upper Greensand formation and on flints," l. c. pp. 76-79 (abst. Geol. Mag. x. pp. 92 & 93), (New genera: *Rhabdospongia*, *Bonneyia*, *Acanthophora*, *Polycantha*, *Retia*, *Hylospongia*); "On the Foraminifera and Sponges of the Upper Greensand of Cambridge" (Geol. Mag. x. pp. 268-274). On the *Ventriculites*, compare W. Thomson, "Depths of the Sea," pp. 482-486, and L. Toulmin Smith, Nature, viii. p. 484.

INFUSORIA.

1. ALÉNITZIN, WL. *Wagneria cylindroconica*, ein neues Infusionsthier. Arch. mikr. Anat. x. pp. 122 & 123.
2. BALBIANI, E. G. Observations sur le *Didinium nasutum* (Stein) (*Vorticella nasuta*, O. F. Müll.). Arch. Z. expér. ii. pp. 363-394, pl. xvii.
3. BÜTSCHLI, O. Einiges über Infusorien. Arch. mikr. Anat. ix. pp. 657-678, pls. xxv. & xxvi (abstract in Q. J. Micr. Soc. xiv. pp. 96 & 96).
4. CIENKOWSKI, L. Ueber *Noctiluca miliaris*, Sur. Arch. mikr. Anat. ix. pp. 47-61, pls. iii.-v. Abstracts in Arch. sc. nat. xlvi. pp. 167-171; Ann. N. H. (4) xii. pp. 262-264.
5. DALLINGER, W. H., & DRYSDALE, J. Researches on the life history of a Cercomonad, a lesson in "Biogenesis." M. Micr. J. 1873, pp. 53-58, pls. xxiv.-xxvi.
6. EHRENBERG, C. G. Die das Funkeln und Aufblitzen des Mittelmeeres bewirkenden unsichtbar kleine Lebensformen. Festschr. nat. Fr. 1873, 6 pp. 1 pl.

7. EVERTS, E. Untersuchungen an *Vorticella nebulifera*. SB. Soc. Erlang., v. pp. 68-71; Z. wiss. Zool. xxiii. pp. 592-622, pl. xxx.

This paper is corrected by R. Greeff (SB. Ges. Marb.), who is replied to by Everts (SB. Soc. Erlang.)

8. HINCKS, T. On the Protozoon *Ophryodendron abietinum*. Q. J. Micr. Soc. xiii. pp. 1-9, pl. i.

9. HÄCKEL, E. Zur Morphologie der Infusorien. Jen. Z. Nat. vii. pp. 516-560.

10. ——. Ueber einige neue pelagische Infusorien. *Op. cit.* pp. 561-568, pls. xxvii. & xxviii.

Both papers (9 & 10) are noticed in Q. J. Micr. Soc. xiv. pp. 96 & 97.

ALLMAN on *Vorticella* and *Noctiluca* (Zool. Rec. ix. p. 487) reprinted in Rep. Br. Ass. 1872, pp. 130 & 131. E. RAY LANKESTER: "Blue stentorin, the colouring matter of *Stentor cæruleus*," Q. J. Micr. Soc. xiii. pp. 139-142.

HÄCKEL (9) revives and upholds with great skill and force the Siebold-Kölliker theory of the unicellular nature of the *Infusoria ciliata*. Three conceptions of these organisms have hitherto prevailed: (1) the "polygastric" theory of Ehrenberg, of which their classification with the Worms would be the result; (2) the "gastro-vascular" of Claparède, Lachmann, & Greeff, according to which the *Acalephæ* and Sponges would be their nearest relatives; and (3) the "unicellular" theory, which has successively been adopted for all the other types of *Protozoa* (*Noctiluca*, *Amœba*, *Gregarina*, &c.). In supporting this, Häckel takes his starting-point from the undoubted fact, that the "spore" (egg or germ-ball of authors), which originates through division of the "nucleus," is a single nucleated cell, transforming itself directly through a differentiation of its constituent elements, ciliation of its surface, &c., into the embryo Infusorian, without any division, cell-multiplication, or other analogous process, through which the embryo of *Cœlenterata* and higher animals is invariably built up. Reviewing the structure of the ciliated Infusorian, he is unable to find anything which is not in accordance with the nature of the true animal or vegetable cell, either in its "cuticula" (though it often assumes the character of a tube or shell); in the layer wearing the cilia (spines, hooks, &c.); in the other layers, which simulate a muscular structure or contain the "trichocysts," but which, when existing, all belong to the exoplasm; or in the revolving motions of the endoplasm. Of course the Infusorian cell must not be compared with the simplest, but with the most differentiated forms of cells; and it ought to be borne in mind, that cells, which live in sociable union with other cells in a multicellular animal or vegetable body, are only differentiated in a single direction, while the isolated unicellular Infusorian, which subsists solely on its own resources, must be developed in all biological directions, and represents in fact the highest stage of development attainable for the "primary individual." The presence of a "mouth" (*cyto-*

soma) or "vent" (*cytopyge*) is therefore not less compatible with the cell-nature than is the power of eating and drinking possessed by the true *Amæbæ* or amœboid cells; nor are the contractile "vacuoles" or "vesicles," whatever may be their functions. Hæckel is an unbeliever in the sexuality of the *Infusoria ciliata*; their "germ-balls," derived from the true "nucleus" of the cell, are accordingly not regarded as eggs but as spores, not requiring fecundation; should however the "nucleolus" really be the organ ("testis") in which the hair-like "spermatozoa" are formed, that would be no real obstacle to the theory, as every cell may be, during its propagation, pluricellular *ad interim*. Nor is the small number of *Infusoria ciliata*, which contain several "nuclei," and therefore must be regarded as pluricellular (perhaps this multiplicity is only a transitory phenomenon, bearing upon propagation?), any more an impediment to the theory than are the pluricellular *Gregarinæ* to the typical unicellularity of this order. Hæckel therefore separates the true *Protozoa*, which are single cells, undergo no cell-division, never differentiate into an ectodermal and endodermal cell-layer, and possess no true intestine, &c., as a chief division of the Animal Kingdom from the *Metazoa* or *Gastrozoa*, with cleavage of the egg, 2 primary germ-leaves, a true intestine, &c. In the *Zoophyta* and lower worms (*Plathelminthes* or *Acelomi*) no body-cavity is differentiated between the ectoderm and endoderm or between the 2 layers of the mesoderm, and consequently no true blood or chylus, as in the higher worms (*Cœlometri*), the Echinoderms, Arthropods, Vertebrates, and Mollusks. A phylogenetical table of these 8 principal divisions of the Animal Kingdom terminates the paper.

Similar results are attained by E. RAY LANKESTER ("On the primitive cell-layers of the embryo as the basis of genealogical classification of animals, and on the origin of vascular and lymph-systems;" *Ann. N. H.* 4, xi. pp. 321-328), who assumes 3 primary divisions of the Animal Kingdom: I. *Homoblastica*; 1. *Homogenea* (*Nuda: Moneræ; Testacea, Foraminifera*); 2. *Nucleifera* (*Amæboidea, Gregarinida, and Catalacta*); 3. *Cytophora* (*Heliophora, Radiolaria*); 4. *Infusoria* (*Suctoria and Ciliata*; the "*Flagellata*" should be referred to the Volvocinian *Algæ*); 5. *Noctilucidæ* (*Noctiluca, Peridinium*). II. *Diploblastica* (*Cœlenterata, inclusive Spongozoa*). III. *Triploblastica* (*Vermes, Echinodermata, Mollusca, Vertebrata, Arthropoda*).

J. D. MACDONALD ("On the distribution of the *Invertebrata* in relation to the theory of evolution," *P. R. S.* xxi. pp. 218-224; *Ann. N. H.* 4, xi. pp. 391-396), on the other hand, distributes the *Invertebrata* in 4 series, starting from 4 types of *Protozoa*: (a) *Nematoida, Trematoda, and Cestoida*, through *Gregarina* and *Thalasicolla* from *Collosphæra*; (b) *Echinodermata, Sipunculida, Turbellaria, and Infusoria*, through *Gromia* and *Actinophrys* from *Porifera*; (c) *Articulata, Annulata, Rotifera, Noctilucidæ*, through *Podocystis* and *Acanthometra* from *Polycystina*; (d) *Mollusca, Molluscoïda, Cœlenterata*, through *Diffugia* and *Amæba* from *Foraminifera*. He remarks that it would be a great presumption to say that even an approach to perfection had been attained in this attempted classification of a whole sub-kingdom of animals.

The unicellular nature of *Vorticella* is also advocated by EVERTS (7), whose description and interpretation of *V. nebulifera* differs essentially from that of Greeff, in not regarding the central substance of the body as a "chymus" but as an endoplasm, the regular currents of which are compared to that of the protoplasm in vegetable and other cells. Similar movements, but in an opposite direction, also take place, according to the author (Greeff, however, disputes this point) in the cortical substance (exoplasm), of which the longitudinally striated (pseudomuscular) layer is a part, while the transverse striations belong to the cuticle, which is compared to the cell-membrane. Food-balls and vacuoles are only found in the endoplasm; the "stem-muscle" is a continuation of the pseudo-muscular layer of the body. Everts' observations on the reproduction and evolution of *Vorticella* are particularly valuable. The often described longitudinal division of the body is accompanied by a division of the "nucleus" and results in the formation of two distinct *Vorticellæ*, of which the one assumes a terminal, the other a lateral position at the end of the stem; this zooid first develops a posterior ring of cilia, contracts its peristome, detaches itself and swims away, soon followed by the other. (Occasionally they may both undergo these transformations and become detached while their separation is still incomplete). The free barrel-shaped *Vorticellæ* now undergo a further retrograde metamorphosis and encyst themselves; in the compressed, lens-shaped, floating cysts the "nucleus" divides into several (6-10) ball-like bodies, which are set free through the bursting of the cyst, develop cilia, vacuoles, &c., and are, in short, transformed into *Trichodinæ* (*T. grandinella*, Ehrbg.), which, after having developed a second set of cilia and assuming a biscuit-like shape, undergo division. These *Trichodinæ* of the second brood fix themselves with their ciliated extremity, from which a stem is gradually developed, while the cilia disappear and the peristome, with its row of cilia and terminal disc, is formed at the opposite extremity; they are thus, in their turn, transformed directly into true pedunculated *Vorticellæ*. (A false encystation takes place, as observed by Stein, under certain conditions, and results in the formation, on the sides of the plasm—not of the "nucleus"—of fusiform bodies, [*Vibriones* ?], which, after being set free and having moved about, ultimately dissolve without undergoing any evolution; it is still doubtful if this is a morbid process or a case of parasitism). The conjugation described by Greeff between a free and a sessile zooid is apparently provoked by evaporation of the water, but does not result in any reproductive act; it is not provoked by lowering or heightening the temperature, and does not depend upon the season. The parallelism by the author of the exoplasm and endoplasm on the one side, and ectoderm and endoderm on the other, is supported in a remarkable manner by the observations of Fol (*cf. supra*).

BALBIANI (2) describes *Didinium nasutum* as a sac-shaped animalcule, the anterior extremity of which is produced into a conical prominence, at the end of which the mouth is situated, while the vent opens at the opposite rounded extremity of the body, which is encircled by 2 rings of vibratile cilia, an anterior and a posterior. A "cuticula" may be traced, but no

true "cortical layer," or fibrillated (pseudomuscular) layer are differentiated from the "central substance" or inner parenchyme ("sarcode" as Dujardin called it), which is subjected to a continuous circulation, the ascending current following the periphery, the descending the axis of the body. A true intestine or continuous digestive channel runs straight from the mouth to the vent, and becomes very distinct during the deglutination of food, but is apparently not divided from the "parenchyme" by a special membrane. (This is the first time that a complete digestive tube has been demonstrated in the *Infusoria*, in which it is probably of rare occurrence.) *Didinium* feeds, amongst other things, on *Paramœcia*, which are killed by the emission from its pharynx of a bundle of rod-like darts, and seized with a widely-protruded "tongue," by the retraction of which they are drawn back into its mouth and digestive system; after the course of an hour the digested remains are rejected from the vent. Near this is also placed the "contractile vesicle," the highest dilatation of which is immediately followed by the appearance around it of a ring of smaller vesicles, which during the contraction and subsequent disappearance of the central vesicle increase in size, unite and take the place of the former. The transverse fission of *Didinium* is preceded by the lengthening of the body and the appearance of two additional rings of cilia; and induces the division of the "ovary" (nucleus). Though Balbiani often observed the copulation, which takes place through apposition of the oral extremities of the individuals, the "testis" (nucleolus) was not made out. On the whole the author's observations on the reniform, convoluted, sometimes branched "ovarian" band are not quite exhaustive; it is provided with a membrane, and its contents are granular, globular, vesicular, or broken up into the "embryonic balls" observed by Engelmann. (This is, however, according to Balbiani, rather a pathological phenomenon, because it was also observed in fissiparous individuals, and it is a rule that sexual reproduction and sporogenesis, or fissiparity, are never observed at the same time in *Infusoria*.) The viviparity observed in *Didinium* by O. F. Müller may depend on parasitism; once, however, Balbiani observed in a *Didinium* with the nucleus broken up in the manner described, the birth of a little organism, the shape and ring of cilia, &c., of which were not opposed to the idea that it might be the young of *Didinium*. He also observed the encystation of the *Didinia*, during which the "nucleus" preserved its character, while the circulatory motion of the parenchyme and the rhythmic contractions of the "vesicle" were suspended. *D. nasutum*, or a closely allied species, is described as a new genus and species from the bottom-mud of the Neva by ALENITZIN (1); the size however is different, the *Wagneria* having only half the length and not half the breadth ascribed to *D. nasutum* by Balbiani.

Though BÜTSCHLI'S observations (3) on the conjugation of the *Infusoria*, especially *Paramœcium aureola*, do not throw much light on this much disputed problem, they are of interest just now, not only because they confirm some, both of Balbiani's and Stein's statements, but still more because they have led the author to doubt, with HÄCKEL, whether a fecun-

dation really takes place in the *Infusoria*. The striated appearance of the "nucleolus" or so-termed "seminal capsule," cannot be regarded as a proof that it really contains spermatozoa. Bütschli's other remarks relate to the presence of amyloid crystalloid deposits in *Strombidium sulcatum*, the arrangement of the cilia in *Stentor* and *Spirostomum*, the spiral disposition of the rods in the basket-shaped "oesophagus" of *Chilodon* and *Nassula*, and the presence of true nematocysts, quite agreeing with those of the *Celenterata*, in *Polykrikos* (g. n.) *schwartzi*, sp. n. (pl. xxvi. fig. 22) a barrel-shaped animalcule (observed at Arendal and Kiel) with 6-8 ciliated furrows, which encircle the body, but are interrupted along a longitudinal line on one of its sides; it has a flagelliform cilium near the oral extremity and another a little behind, a vacuole and a quadruple "nucleus," and was observed in the act of dividing transversely. Agreeing with Hæckel, Bütschli does not regard the presence of nematocysts as an objection to the unicellularity of *Infusoria*, these organisms not being modified cells, but developed in the protoplasm of cells, independently of the nucleus, in *Celenterata*.

HÆCKEL (10) describes 7 pelagic species of *Infusoria ciliata*, belonging to *Dictyocysta*, Ehrbg., and *Codonella* (g. n.), allied to *Tintinnus* and *Tintinnopsis*, and like these provided with a very remarkable shell. In *Dictyocysta cassis*, *mitra*, *templum*, and *tiara*, spp. nn. (pl. xxvii. figs. 1-7, from Lanzarote and Messina) this shell is siliceous, fenestrate, bell- or helmet-shaped with a wide inferior opening opposite the apex; in *Codonella galea*, *orthoceras*, *campanella*, spp. nn. (pl. xxviii. figs. 8-14, from the same localities) it has a similar shape, but is chitinous with siliceous deposits. As the animal itself is either protruded and moving about very actively or retracted into the interior of the shell, to the bottom of which it is attached, its structure is not easily made out. The truncated oral extremity of *Dictyocysta* is encircled by 2 rows of cilia, the outer flagelliform, the inner setiform; in its interior a contractile vesicle and a reniform "nucleus," or in its place a number of "spores" or eggs, containing a "nucleus" and a "nucleolinus," are observed. In *Codonella*, the inner row of cilia is replaced by a ring-like membrane, the margin of which is carved into pedunculate lappets; the body contains several "vacuoles" and a "nucleus," or in its place a number of "spores" or ciliated embryos, in which a vesicle and reniform "nucleus" are visible. *Tintinnus campanula* and *cinctus*, Cl. L., are probably species of *Codonella*.

The dimorphic character of the curious genus *Ophryodendron*, Cl. L. (*Corethria*, St. Wr.), is elucidated by HINCKS (8), who has studied 2 species, *O. abietinum*, Cl. L., and *pedicellatum*, sp. n., distinguished by the curved pedicels with which both are provided. It occurs on *Hydrozoa* (*Halecium*, *Plumularia*, &c.) in colonies, or rather associations, composed of (1) a small number of cup-shaped individuals, from the bottom of the cups of which a long straight "proboscis," armed with "tentacles" at the apex, may be protruded with the swiftness of light, and (2) a large number of lageniform bodies with a mouth (?) at the apex and moving restlessly about in all directions, as if searching for food. Though there is no organic connection between the 2 sets of individuals

forming the association, the flask-shaped forms are developed as buds not only from each other, but also from the "proboscidian," and these, in their turn, produce (according to Claparède) new cup-like, trunk-bearing zooids. Longitudinal fission probably also takes place. The body consists of a granular sarcode, in which no other differentiation or organization has been observed. The reproduction through ciliated embryos developed in the probosciferous zooids, observed by Claparède & St. Wright, was not confirmed, and *O. abietinum* had not the nematocyst-like covering described by Claparède. The systematic position of *Ophryodendron* is perhaps among the "*Infusoria suctoria*."

To *Asthmatos ciliaris*, Salisbury (Z. Parasit. iv. pp. 6-11, abstract in Q. J. Micr. Soc. xiii. p. 199), the parasitic disease known as the "hay-asthma" is attributed. "Body spherical or oval, armed on one side with cilia, frequently sends out a long 'proboscis,' at the end of which is a dilated and elongated cilium. One or more large 'nuclei,' and many smaller granules of various sizes, are contained in the interior of the sac-like body. The young are developed within the parent cell, and, when mature, are discharged at the end of the body opposite the cilia."

A new type of *Infusoria*, with a membranous vibratile collar, is announced, Ann. N. H. (4) xi. p. 96, by E. Ray Lankester.

Whether Monads and other "flagellate *Infusoria*" may be *Microzoa* or *Microphyta*, the experiments of DALLINGER & DRYSDALE (5) must be recorded here as affording a good "lesson in biogenesis," and suggesting a source of error in many experiments on "abiogenesis."* Watching with admirable perseverance a "Cercomonad," which is under certain circumstances found in enormous quantities in the fluid resulting from

* Though the question as to spontaneous generation in *Bacteria*, *Vibriones*, &c., falls, properly, beyond the limits of this record, it will, from its connection with the history of the lowest animals, be appropriate to allude briefly to the papers published upon it. H. CHARLTON BASTIAN "Note on the origin of *Bacteria*, and on their relation to the process of putrefaction," P. R. S. xxi. p. 129-131; Ann. N. H. (4) xi. pp. 283-286: "On the temperature at which *Bacteria*, *Vibriones*, and their supposed germs are killed, when immersed in fluids or exposed to heat in a moist state," P. R. S. xxi. pp. 224-232; Ann. N. H. (4) xi. pp. 454-463: "Further observations on the temperature at which *Bacteria*, *Vibriones*, and their supposed germs are killed when exposed to heat in a moist state, and on the causes of putrefaction and fermentation," P. R. S. xxi. pp. 325-338. C. C. PODE & E. RAY LANKESTER, "Experiments on the development of *Bacteria* in organic infusions" (*op. cit.* pp. 349-358). D. HUIZINGA: "Beiträge zur Kenntniss von der Abiogenesis" (Arch. ges. Phys. vii. p. 549; Nature, vii. pp. 380 & 381). BURDON SANDERSON: "Note on Huizinga's experiments," Rep. Br. Ass. 1873, pp. 131-133, Am. J. Sci. (3) vi. pp. 384-387, Nature, viii. p. 478 & 504; various contributions to vols. vii. & viii. of the latter periodical, by BASTIAN, B. SANDERSON, LANKESTER, and ROBERTS. O. GRIMM; "Nachträgliche Bemerkungen zur Kenntniss der Vibrioniden" (Arch. Mikr. Anat. ix. p. 118). BASTIAN's book: "The beginning of life, being some accounts of the nature, mode of origin and transformation of lower organisms," is severely criticized in Q. J. Micr. Soc. xiii. pp. 59-74, and by H. L. SMITH (*op. cit.* pp. 357-366, reprinted from the "Lens," 1873).
—C. F. L.

the maceration of a cod's head," they observed, that it multiplies, when mature, through fission, for a period of 2-8 days. It then takes an amœboid shape; 2 such individuals coalesce slowly, increase in size, and become encysted; the cyst bursts, and incalculable hosts of immeasurably small sporules (distinguishable only as the finest specks under a magnifying power of 2500) are poured out; these slowly enlarge, acquire "flagella," become active, rapidly attain the parent form, and, in their turn, propagate through fission, &c. The experiments instituted demonstrate, that, if dried through evaporation and exposed to a dry heat raised to 121° C., the sporules may still partially have preserved their vitality. The adult Cercomonads are destroyed by boiling at 66°, but young Monads will appear and develop in an infusion which has been raised to 127° C.; an experience which suggests that the sporule is uninjured at a temperature considerably above that which is wholly destructive of the adult. The same may be the case with the still smaller "sporules" of *Bacteriæ*, &c., which cannot be detected.

CIENKOWSKI (4) sums up the results of his researches on *Noctiluca* in the following manner (*cf.* Zool. Rec. ix. p. 487):—(1) The "cilium" of *Noctiluca* is attached to a wing-like lip, not at the base of the "tooth," but near its apex. (2) The contents of the "nuclei" are at times subject to transformations; the branches and rays of these contents have been regarded as "nucleoli." (3) By drawing back or shedding the "flagellum," disappearance of the rod-like organ and fusing together of the lobes of the body, *Noctiluca* is transformed into a smooth ball. (4) The forms regarded by Busk as young *Noctiluca* originate from the wounding of these animalculæ, and are only regenerating portions of protoplasm, endowed with vitality. (5) Numerous zoospores, united into a sort of shield, are found on the *Noctiluca*, which have assumed the globular shape; they originate from evagination and restriction from the parental bladder, from which they ultimately separate, and swim actively in the water by the aid of a long cilium. (6) Copulation takes place in *Noctiluca*, and the formation of zoospores is apparently quickened by the accumulation of protoplasm, provided for by this process, which is no more a sexual action than the melting together of myxomycetean zoospores. (7) *Noctiluca* must be placed among the "*Flagellata*," where it will represent a special group. Brightwell's observations on the division of *Noctiluca* are confirmed, though biscuit-shaped bladders are mostly conjugating individuals. The anatomical description differs in some particulars from Allman's.

GREGARINÆ.

SCHNEIDER, A. C. J. Sur quelques points de l'histoire du genre *Gregarina*. Arch. Z. expér. ii. pp. 515-533, pl. xx.

Gregarina ovata, Duf. (in the stomach of the earwig), occurs singly, or as 2 loosely united individuals, which separate easily when exposed to pressure. It is not decided whether this union is a conjugation or the result of a fission. The cysts, which are found abundantly among the

fæces of the insects, are in *G. ovata*, *G. cuneata* (from *Tenebrio molitor*), in a third species infesting *Harpalus serripes*, and probably in all *Gregarinæ* proper, of 2 sorts, differing not only in size, but also in some respects in structure, and sometimes in shape. Schneider believes that the larger cysts are the products of 2 conjugated individuals, the smaller of single *Gregarinæ*. Nevertheless they undergo analogous transformations, the granular content of the cyst assuming a star-shaped appearance, and the radiating prominences developing into sporoducts through which the spores or "psorospermia," which are simple "leptocytodes," are ejaculated. In *G. ovata* a few of the smaller cysts developed sporoducts in an uncommonly small number, but of large size, and emitted spores 4 times larger than usual; therefore "macrospores" and "microspores" are distinguished. The small *Protamæbæ* which commonly abound in company with the spores of *G. ovata*, are, according to Schneider, not derived from them. In those genera of *Gregarinæ*, the "spores" of which have a higher organization, the ejaculatory apparatus is wanting.

Lankester's "remarks" (Zool. Rec. ix. p. 483) are reviewed by E. Perrier, *op. cit.* p. i.

Macrocystis amarœcii, sp. n., Girard (*op. cit.* pp. 495 & 496, figs. 15-13), from the intestine of *Amarœcium punctatum*, with observations on copulation and encystation.

RHIZOPODA.

1. EHRENBURG, C. G. Mikrogeologische Studien über das kleinste Leben der Meeres-Tiefgründe aller Zonen und dessen geologischen Einfluss. Abh. Ak. Berlin, 1872 (published in 1873), pp. 131-393, with 12 pls. and 1 chart.

605 species of *Polythalamia*, and 279 species of *Polycistinea* are tabulated according to their range over one or more of the 5 great geographical zones and 7 bathymetrical regions (from 0 to 20,000 feet). Both orders show a great preponderance of the temperate and æquatorial over the polar belts; but, while the *Polythalamia* are most numerous from 0 to 100 feet, and show a tolerable regular decline towards the greatest depths reached by the bottom-line (only 7 species being found between 15,000 and 20,000 feet), the inverse rule holds good for the *Polycistinea*, which show an almost regular increase in the number of species, from the bottom substance taken above 100 feet to that picked up from 15,000 to 20,000 feet, from which not less than 132 species are known. The productiveness of lower organisms of the bottom of the ocean in 10 different localities (Davis Strait, "Telegraphic Plateau," bottom of the Gulf Stream, Pacific, Indian Ocean, South Polar, Ægean and Aralo-Caspian Seas) is illustrated in the 12 plates.

Ehrenberg's preliminary paper (Zool. Rec. ix. p. 482) is reviewed, JB. f. Mineral. 1873, pp. 974 & 975, and Ann. N. H. (4) xi. pp. 224-226, in which critical remarks upon the author's new genera of *Foraminifera* are also made.

2. GREEFF, R. *Pelomyxa palustris*, ein amœbenartiger Organismus des süßen Wassers. Arch. mikr. Anat. x. pp. 51–73, pls. iii.–v. Abstract in Arch. sci. nat. xlvi. pp. 358–362; Z. ges. Naturw. (2) viii. pp. 200–202; Ann. N. H. (4) xiv. pp. 161–163; Q. J. Micr. Soc. xiv. p. 97.

Pelomyxa owes its dark hue to particles of the mud-bottom on which it lives. Its protoplasm consists of a hyaline and homogeneous cortical layer, the contractility of which is the source of the amœboid motions, and an inner granuliferous semi-fluid substance, full of nuclei, water-filled vacuoles, delicate rod-like bodies of unknown function and “resplendent corpuscles,” apparently developed from the granular content of the nuclei, and probably to be regarded as the zoospores. The small amœboid young (provided with a nucleus and vesicle) seen by Greeff to disengage themselves in great numbers from the decomposing *Pelomyxa*, and afterwards assume the appearance of *Flagellata*, were probably derived from these. *Pelomyxa* is regarded as a multi-nucleated amœboid Rhizopod, allied to *Myxomyxeta*.

3. ——. Ueber Radiolarien und radiolarienartige Rhizopoden des süßen Wassers. SB. Ges. Marb. 1873, pp. 47–49.

A preliminary note, describing the following fresh-water *Radiolaria*:—*Acanthocystis turfacea*, Cart. (*viridis*, Gr.), *spinifera*, Gr., *flava*, Gr., *Pompholygophrys punica*, Arch. (= *Hyalolampe fenestrata*, Gr.), *Heterophrys myriopoda*, Arch., and the following new genera and species:—*Elæochanis cincta*, *Pinaciophora fluviatilis*, *Chondropus viridis*, *Astrococcus rubescens*, *Heliophrys variabilis*, and *Sphaerastrium conglobatum*. (As no distinction is made between generic and specific characters, an abstract of the first must be deferred until the publication of the more detailed monograph). Observations on the encystation of *Actinosphaerium (Actinophrys) eichhorni* are appended.

4. HEITZMANN, C. Untersuchungen über das Protoplasma. I. SB. Ak. Wien, lxviii. pp. 100–115.
5. MILLER, H. J., & BROECK, E. v. D. Les Foraminifères récents et fossiles du Belgique. I. Ann. Mal. Belg. Noticed Ann. N. H. (4) xii. pp. 494 & 495.

Eighty-three recent species are enumerated, and their occurrence on sandy or muddy bottoms indicated.

On *Amœba terricola*; Bütschli, Arch. mikr. Anat. ix. p. 676. Short notes on rare or new *Rhizopoda* and *Acineta* are given by Archer, in Q. J. Micr. Soc. xiii. pp. 102, 212, & 320: the outer envelope of *Astrodisculus* is not siliceous, as suggested by Greeff, but soft, plastic, hyaline, and structureless.

The Rhizopodous (and Monerian) organisms of the North Atlantic abyssal regions are discussed in a general way by Wyville Thomson in

the "Depths of the Sea," pp. 408-416; *Globigerina bulloides*, *Orbulina universa* and *Orbitulites tenuissimus*, are figured, pp. 22, 23, & 91.

FOSSIL RHIZOPODA.

H. B. BRADY: "On *Archæodiscus karreri*, a new type of carboniferous *Foraminifera*," Ann. N. H. (4) xii. pp. 286-290, pl. xi. CARRUTHERS, "on *Traquairia*" (Zool. Rec. ix. p. 483), reprinted Rep. Brit. Ass. 1872, p. 126. J. W. DAWSON, "The *Eozoon canadense* and related palæozoic species," Canad. Nat. (n. s.) vii.; Am. J. Sci. (3) vi. p. 61, argues that the gigantic representatives of one of the lowest forms of organisms (*Eozoon*, *Archæocyathus*, *Stromatopora*, *Cænostoma*) have extended from the Laurentian through the Huronian, Cambrian, &c., formations down nearly to the close of the palæozoic period. GIEBEL, on *Thalamopora cribrosa*; Z. ges. Naturw. (2) vii. p. 361. The type of a peculiar family of *Foraminifera*, distinguished by longitudinal series of alternating chambers, devoid of external orifices, but with the walls perforated by pores and communicating with an axial canal, the whole forming a polypideous assemblage. C. W. GÜMBEL: "Die sogenannten Nulliporen und ihre Betheiligung an der Zusammensetzung der Kalkgesteine. II. Die Nulliporen des Thierreiches (*Dactyloporidæ*);" Abh. bayer. Ak. ix. pp. 229-290, pl. D i.-D iv.; noticed Geol. Mag. x. p. 122-124, JB. f. Mineral., 1873, pp. 779-781 (new genera: *Haploporella*, *Dactyloporella*, *Thyrsoporella*, *Gyroporella*). "Ueber zwei Jurassische Vorläufer der Foraminiferengeschlechter *Nummulina* und *Orbitulites*;" JB. f. Mineral., 1872, p. 241, noticed Geol. Mag. x. p. 82. R. J. L. GUPPY: "On *Foraminifera* from the tertiaries of S. Fernando, Trinidad;" P. Sc. Ass. Trinid. 1872, Abstract in Geol. Mag. x. pp. 362 & 363. T. R. JONES, "On the Jurassic *Foraminifera* of Switzerland," a critical examination of the species described by Zwingli & Kübler; Geol. Mag. x. pp. 208-213. H. A. NICHOLSON: "On some new species of *Stromatopora*," Ann. N. H. (4) xii. pp. 89-95, pl. iv. A. E. v. REUSS, "Die Foraminiferen des Pläners" in Geinitz's "Das Elbthalgebirge in Sachsen," Palæontographica, xx. 1872, pp. 134-140, pl. xxxiii. and 1873, pp. 73-127, pls. xx.-xxiv.; noticed Geol. Mag. x. p. 118. M. SCHULTZE (SB. Ver. Rheinl. 1873, pp. 164 & 165) has confirmed the organic (foraminiferous) nature and analogy with *Polytrema* of the true *Eozoon canadense*.

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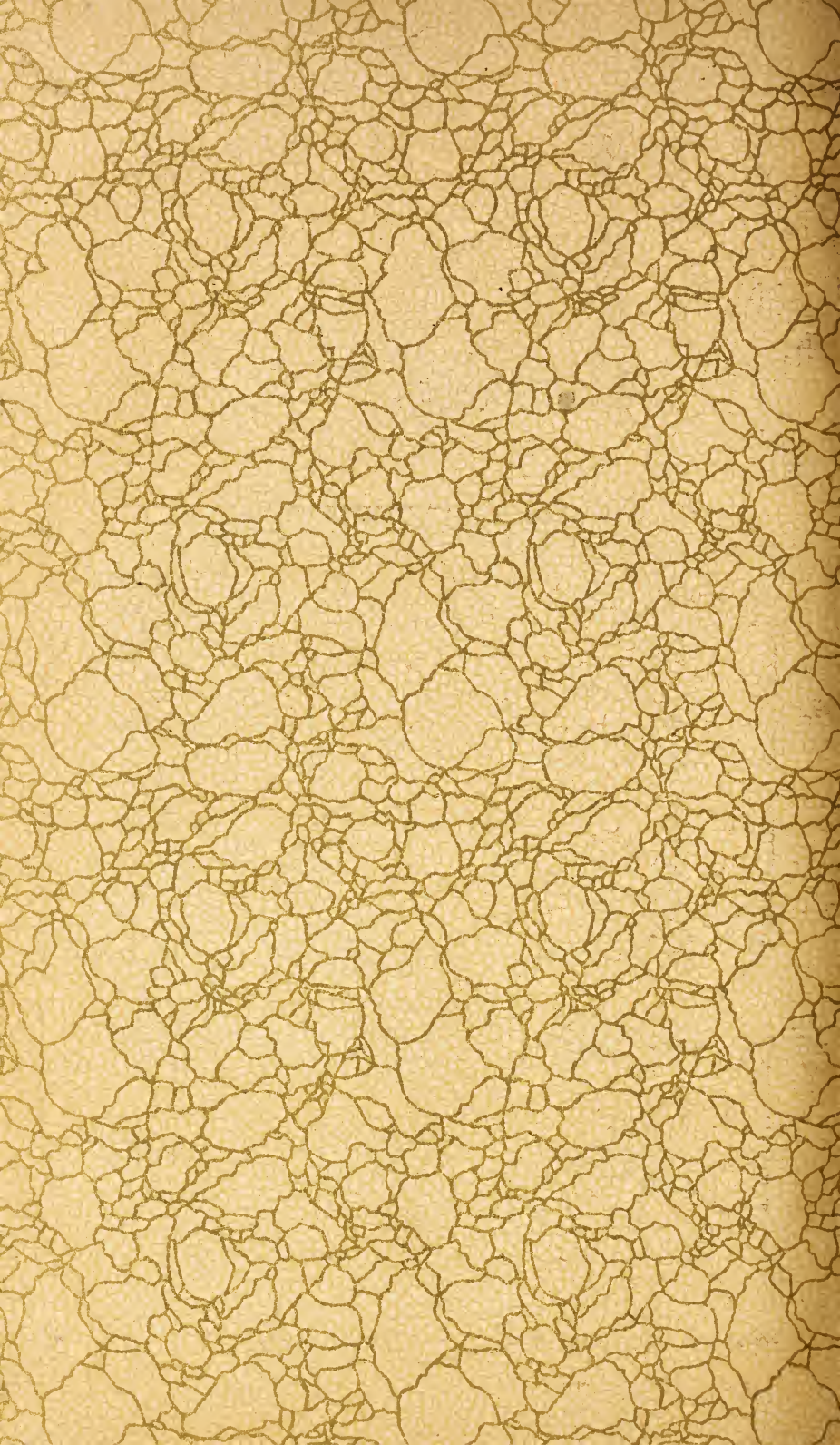
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