

of this museum a specimen of *P. perversa* said to have been brought from South Carolina; but I should not like to lay much stress upon this, as the localities given, in collections, for foreign shells are too often, alas! not to be depended on.

I may add that my notes on these species were submitted to Dr. Eduard von Martens, of Berlin; and it is at his suggestion they are published.

In conclusion, I would suggest the following amended diagnosis of the shells in question:—

Pyrula carica (Lamarck).

Shell pyriform, ventricose, tumid, rather thick, more or less transversely striated; whorls *dextral*, more or less depressedly angled round the upper part, armed at the angle with large flattened spines; interior of the aperture striated or faintly grooved; columella varying in colour from deep orange to white; exterior of the shell white, variously streaked and banded with reddish brown.

Hab. South Carolina, West Indies?

Var. α . The *Pyrula perversa* of Lamarck.

The shell the same as the last; but whorls *sinistral*; aperture more or less distinctly grooved; colour of the columella varying from pure white to deep yellow.

Hab. West Indies, Gulf of Mexico, Florida, South Carolina?

Two other varieties might perhaps be added, namely:—

Var. β . Shell thin; colours pale or uniform; smooth within; *dextral*.

Var. γ . The shell with large spines, with a rather short but very gibbous and swollen canal.

Hab. Guyana. A specimen in the Museum at Berlin (Dr. von Martens).

Clifton, near Bristol, June 10, 1867.

VI.—On the Tunnelling Coleopterous Genera *Bledius*, *Heterocerus*, *Dyschirius*, and their Danish Species. By Professor J. C. SCHIÖDTE*.

THE connexion between these three genera is not of a systematic character, for they belong to three widely different families;

* Translated from the Danish original in 'Naturhistorisk Tidsskrift,' 3 ser. vol. iv. p. 171. Copenhagen, 1866.

but they are closely connected by their habits, living together as they do on the shores of fresh and salt waters, where they excavate tunnels and galleries, which betray their presence on the surface by small heaps of earth, like diminutive mole-hills. Besides, *Dyschirii* and their larvæ are specially equipped for hunting the others.

The species of *Bledius* and *Heterocerus* are generally not seen about in the daytime, but leave their habitations on warm summer evenings, after sunset, flying in numbers near the surface. Those few which are observed in the daytime are only such as have been pressed out of the soft ground by footsteps, and hurry away for safety. They may, in fact, be collected in this manner; but very many are thus squeezed to death, and it is better to dig them out. The small heaps indicating their dwelling-places are easily observed, because, consisting as they do of loose particles of earth, they dry soon and distinguish themselves by a lighter colour from the moist ground. The different species of *Dyschirius*, on the contrary, are constantly in motion, both in their galleries and out of them, hunting their prey, love to bask in the sun, and exhibit upon the whole the same wild, restless, insatiably rapacious nature as the shrew-mouse and the mole, which they may be said to represent amongst Carabidæ.

I.

“*Oxytelini genuini*,” Er. (Gen. et Spec. Staphylinorum, 30) forms a well-defined small group of *Oxytelini*, easily distinguished by triarticulate tarsi; but the views hitherto entertained of the mutual relationships of the genera belonging to this group can scarcely bear a thorough sifting. Thus the existence of two rows of fossorial spines on the anterior tibiæ of *Bledius* is erroneously regarded as the most characteristic peculiarity of that genus (which is more specially than any other constructed for digging); for *Oxytelus* and *Platystethus*, when carefully inspected, exhibit the same structure. On the other hand, it seems to have been overlooked that *Bledius* possesses another character distinctive of its peculiar fossorial type—viz. that the basal joint of the antennæ can be received into a groove situated close in front of the eyes, which therefore in *Bledius* are flatter than in the other genera. Nor is *Bledius* properly placed near *Oxytelus* and *Platystethus*; for that genus really represents the type of the *Carpalimi* modified for tunnelling-purposes. A close inspection will show that the entire group of *Oxytelini genuini*, Er., naturally divides itself into two sub-groups principally distinguished by the structure of the eyes

and the position of the coxæ, according to whether they move more on the surface and in daylight, or in darkness and underground. In the first case, as in *Oxytelus* and *Platystethus*, the eyes are finely granulated and naked, the middle coxæ separated from one another by a broad expanse of the sternum; the whole figure is flatter, the integuments with coarser sculpture and less hairy. But in *Carpalimus**, *Haploderus*, and *Bledius* the eyes are coarsely grained, only fit for near vision, with lashes between the facets; the coxæ are closely approximated to one another, the general figure more cylindrical, the sculpture finer, and the hair more abundant, finer, and closer. The pronotum is more smooth and vaulted, in the same proportion as the animals are more calculated for digging; in those which merely root on the surface, the coxal muscles are weaker, and the prothorax is by external cavities relieved of so much of its inner space as is not required for the neck and its muscles. Those which dig or root in the ground have the tibiæ furnished with spines, whilst in those which merely run about on the surface the tibiæ have fine hairs. The organs of the mouth exhibit a more or less protruding membranaceous labellum divided into two lobes, of which either the external margin alone, or the internal alone, or both margins are fringed or ramified, the ramifications being in some cases several times subdivided; besides, a kind of comb of horny spines is placed at the base of the inner side of each lobe, the two combs meeting in the middle of the labium. The mandibles possess a large rough grinder, and a well-developed, lobated, fringed or ramified inner lobe; its terminal part is slender and provided with few teeth in *Bledius* and others, but very powerful and with many teeth in *Platystethus*, *Haploderus*, and *Carpalimus*. The lingua is broad, with thin integuments, more or less emarginate in front, the corners pointed or (in *Carpalimus*) rounded; the paraglossæ are small, closely united with the lingua, and do not show in front of its corners. In *Bledius* alone the narrow fulcrum linguæ reaches the anterior margin of the lingua or protrudes in front of it as a ligula, carrying on its truncated apex a row of pointed spines.

The mutual relations of the principal genera of the group would therefore appear to be the following:—

* Names suggestive of life under the bark of trees are not to be allowed for animals living in moist places and in vegetable mould (cf. also Linn. Philos. Botan. § 232, and Fabr. Philos. Entom. § 22). The names *Haploderus*, Steph., and *Carpalimus*, Leach, ought therefore to be preferred (though not originally sustained by real characters) to *Phlæonæus*, Er., and *Trogophlæus*, Mannerh.

- I. Eyes finely granulated, naked. Middle coxæ distant from one another.
OXYTELUS, PLATYSTETHUS.

- II. Eyes coarsely granulated, hairy. Coxæ approximated.

1. No antennal grooves.

- a. Legs calculated for rooting; anterior tibiæ with only one row of spines, emarginate at the point. The lateral rib of elytra close to the margin.

HAPLODERUS.

- b. Legs calculated for running; tibiæ with fine hairs, not emarginated. The lateral rib of elytra distant from the margin.

CARPALIMUS.

2. Antennal grooves in front of the eyes.

- Legs constructed for digging; anterior tibiæ whole, with double row of spines; lateral rib of elytra distant from the margin.

BLEDIUS.

Two attempts have been made at a subdivision of the old genus *Bledius*, Leach; but they have failed to command general support, having been aimed rather at an isolation of some more remarkable species than a careful analysis of the mutual relations of the species in general. Nevertheless such a general analysis, carefully executed, reveals so many important differences between the species, particularly in the structure of the mouth and the prothorax, that it becomes impossible to preserve *Bledius*, Leach, as an undivided natural genus. This will have become manifest already to those who have studied the descriptions and details of the larva which I have given on a former occasion*; and the divisions of the old genus suggested by the differences between the larvæ correspond most closely to those I have now to point out in the perfect insects, and which may be thus summed up:—

- I. Terminal part of *mandibles* thick, with a strong sharp tooth behind the apex. Inner lobe of *maxillæ* spinulous, the terminal spines blunt and powerful. Anterior margin of *labium* straight; lobes rounded, their margins ramified all round; the spines of the comb (see above, p. 32) ramified at their points. Posterior corners of *pronotum* rounded, not separated from the posterior margin.

- A. Sockets of *first pair of coxæ* externally open.

- Lobes of *labellum* with three elongated ramifications, the innermost of which is very long, all profusely subdivided.

- Spinulous ridges of *anterior tibiæ* widely separated.

BLEDIUS, s. str.

Danish species:—1. *B. tricornis*, Herbst, fr. Sometimes re-

* In the "Observationes de Metamorphosi Eleutheratorum," in vol. iii. of the 'Naturhist. Tidsskrift,' tab. 12.

markably tenacious of the locality: thus a small colony of this species still existed thirty years ago in the unpaved footpath of a little-frequented street in Copenhagen, which in ancient times was a meadow such as it generally inhabits. 2. *B. bicornis*, Ahrens, m. fr. on marshy soil near high-water mark, in company with *Corophium longicorne*; its tunnels reach a depth of 2 feet, and are of importance for the formation of new alluvium. 3. *B. diota*, n. sp., resembles *B. hinnulus*, Er., but is distinguished by the great size and development of the anterior corners of the forehead, and by the elytra being more sparingly and finely punctate. The larva was described in 'Naturhist. Tidsskrift,' iii. p. 148 as that of *B. hinnulus*, Er., for which the Danish specimens of the imago were first mistaken; and it is Dr. Gerstäcker who kindly undertook to compare Danish specimens with the original specimens of *B. hinnulus* of Erichson in the Berlin Museum, and has thus ascertained that the former belongs to a different species.

B. Sockets of *anterior coxæ* closed.

Lobes of *labellum* with only one long, much subdivided branch.

Spinulose ridges on *anterior tibiæ* close together.

TADUNUS, nov. gen.

Danish species:—1. *T. fracticornis*, Payk., fr. 2. *T. crassicollis*, Boisd. & Lacord., r. 3. *T. atricapillus*, Germ., r.

II. Terminal part of *mandibles* attenuated. Lobes of *labellum* ramified on the outside: ramifications short and of uniform length, some of them bifid or trifid at the apex.

Posterior corners of *pronotum* projecting from posterior margin.

Spinulose ridges on *anterior tibiæ* close together.

A. Inner lobe of *maxillæ* spinulose, the terminal spines strong, blunt.

Labrum with a round emargination. Lobes of *labellum* broadly rounded; the spines of the comb lobate at their points.

Sockets of *first pair of coxæ* externally open.

BARGUS, nov. gen.

Danish species:—1. *B. erraticus*, Er., r. 2. *B. opacus*, Er., m. fr. 3. *B. pallipes*, Gravenh., fr. 4. *B. ratellus*, n. sp., m. fr. 5. *B. terebrans*, n. sp., m. fr. The two new species resemble *B. pallipes*, but are shorter and thicker, the teeth of their mandibles strong and powerful, and placed close behind the point, whilst in *pallipes* they are small and removed from the point; the posterior corners of the pronotum are perceptibly salient in the new species, obtuse in *B. ratellus*, rectangular in *B. terebrans*; the colour of the antennæ and legs is deeper in the two new species, particularly in *B. ratellus*. The latter differs from *B. terebrans* by possessing a small but distinct depression on the top of the head, which is wanting in the latter, and by the elytra being closely and finely punctated in *B. ratellus*, whilst their puncture is much coarser in *B. terebrans*.

B. Inner lobe of *maxillæ* without spines, ending with a brush of bristles. Lobes of *labellum* elongated, pointed.

a. Sockets of *anterior coxæ* externally open.

Terminal part of *mandibles* with one tooth behind the apex.

Labrum deeply bifid. Tooth of the comb serrate.

ASTYCOPS, Thomson.

Danish species:—1. *A. talpa*, Gyllb., m. fr. 2. *A. subterraneus*, Er., fr.

b. Sockets of anterior pair of coxæ closed.

Terminal part of mandibles with two teeth behind the apex.

Anterior margin of labrum straight. Teeth of the comb with blunt points.

HESPEROPHILUS, Steph.

Danish species:—1. *H. arenarius*, Payk., fr.

II.

The manner in which Erichson, in his work 'Naturgeschichte der Insekten Deutschlands,' has treated of the numerous small Clavicornia has afforded a new starting-point for investigations of the often very difficult natural history of these animals. His principal object being to reduce to order the confused mass of material by settling the species, it was but natural that he should be more successful in distinguishing and separating than in combining. It is therefore to be expected that future more penetrating investigations of the structure and development of these Coleoptera, and more strictly scientific comparisons, will in some cases result in the principal systematic value being attributed to points now less regarded or overlooked, and in essential changes in his classification. The last four families more particularly, Byrrhii, Georyssii, Parnidæ, and Heteroceridæ, exhibit so close a relationship in all essential features, especially in the structure of the mouth, and in all stages of their development, that it is more than probable they will have to be regarded merely as subdivisions of one and the same family, each expressing a peculiar modification of the same fundamental type; for it will be found that all those characters which distinguish these families from one another are merely expressive of the different requirements of movement and respiration in different kinds of localities and different media. In *Byrrhus* we find this Coleopterous type developed for life on land, in shady and moist places, and for feeding on moss. In other genera we find an incipient modification calculated for wetter localities. Still within the pale of *Byrrhi* we meet with *Limnichius*, living on the shore itself, and *Syncalypta*, which is enabled, by club-shaped bristles on the back, to carry about a protecting shield of mud. In *Georyssus** we see the same type

* With regard to the character "prosternum membraneum," on which Erichson lays so much stress as being peculiar to *Georyssus*, it must be observed that the prosternum of these Coleoptera is as hard as any other part of their skeleton; but it is very narrow, owing to the manner in which the head is retracted, and consists only of a narrow, arched, transverse band, which, besides, on account of its hidden position, does not acquire

adapted for a similar life, the beetle wandering about on the shore, protected entirely from the sun and hidden from its enemies by means of a portable roof of clay. *Heterocerus* obtains the same protection by tunnelling the shore, whilst *Parnus* and *Elmis* represent still more decided modifications for living in water, the former crawling about the water-plants under the surface, whilst the latter clings to the under surface of the stones on the bottom. It is one of the most striking examples of typical unity coupled with extreme biological adaptation for different modes of life, that in all these animals the structure of the mouth remains almost entirely the same, even in the smallest details, not only in *Heterocerus* and *Parnus*, but even in the larvæ of *Heterocerus* and *Elmis*. All these Coleoptera are distinguished by the peculiar structure of the mandibles, which, both in imagos and in larvæ, are constructed as pincer-shaped grinding-instruments carrying several teeth on their terminal part. The larvæ possess two maxillary lobes. Hitherto much stress has been laid on their external shape, which is very varying; but this view will have to be abandoned here as everywhere. Even the larva of *Cytilus* is entirely different from that of *Byrrhus* in appearance, being much more like the larva of *Silpha*, though the imagos are so very much alike.

Heterocerus and allied genera occupy exactly the same position with regard to the other Coleoptera we have mentioned as *Bledius* occupy amongst Staphylini, *Scaritini* amongst Carabidæ, *Cebriones* amongst Elateridæ. They exhibit the fossorial modification of the type, are the moles of the family, and form a special group (Heterocerini), which, according to the structure of the mouth and of the antennæ, is distributed into several genera, the characters of which will be explained further on. H. von Kiesenwetter has supplied excellent materials for the difficult distinction of the species, to which we offer some further additions. The principal characters of the group are as follows:—

When the head is pushed forwards, the closed mandibles work both as a wedge and as a shovel. These latter are proportionally long, their upper surface somewhat hollow, the outer margin bent upwards, and with a tooth on the very edge; the terminal part is protruding, carries four teeth, and is (in the males of some species, particularly in large and powerful specimens) prolonged and curved upwards; the inner lobe is greatly developed, with a free apex and the inner margin furnished with spines forming a comb; the molar tooth is very large and grooved; the

the dark colour of the other integuments. When the head is bent in, the prosternum is covered up by the organs of the mouth, the trochanters of the first pair, and the mesosternum.

labrum is long, hard, rounded in front, the edge slightly emarginate in the middle, with four strong, short, thick and blunt spines on each side. The maxillæ and labium are elongated and narrow; the palpifer of the maxillæ reaches beyond the root of the palpi, forming a protruding point; the maxillary lobes are hard; the anterior angles of the mentum very salient; the lingua is cordate, hard, and spinulous; the stipites of the labial palpi very small, and coalesced with one another as well as with the lingua. The basal joint of the antennæ can be laid into a groove in front of the eye; the club is serrated, arched, calculated for being coiled round the eye. Prothorax narrowed behind, its sides extended so as to form an angle on each side (hitherto erroneously described as the hind corner); the prosternum possesses a short *procursus labialis*. The legs are constructed for digging, all three pairs of about the same size and shape; the coxæ are transverse; the trochanters support the femora, which are spindle-shaped; the tibiæ broad, with a comb of spines; the spurs long and curved; the feet thin, long-haired, four-jointed, the claws very thin. The body is in general cylindrical, rather flat or vaulted, oblong, with parallel or round sides. The hairy covering double, consisting of an inner coat to which the air clings, and an outer coat of longer bristles standing out from the body; both layers vary according to the closeness and moisture of the soil in which the animal has its home, being finer and closer in those which live in clay, coarser and stiffer in those which dig in sand, those which live in mixed soil presenting intermediate modifications.

These short observations may suffice as an introduction to the following synopsis of Danish species; but there is one rather remarkable point in the structure of these Coleoptera which deserves more special attention.

Erichson pointed out (*Naturg. d. Ins. Deutschl.* iii. 539) the existence of a peculiar arched ridge on each side of the first (externally visible) ventral segment, and a similar straight and sharp ridge on the inner side of the third pair of femora, which he interpreted as constituting an organ of sound, as indeed it is. It seems, however, that in suggesting this interpretation, Erichson was led rather by a happy instinct than by a careful examination of these parts; for he does not give any account of those peculiarities of structure which really enable the animal to make a sound by means of this apparatus; and those parts to which he draws attention have in fact nothing at all to do with the production of the creaking sound. He says that in some species, the lateral part of the arched ridge is distinctly transversely grooved in both sexes or only in the males*, whilst

* Referring to the descriptions of the species, we find that the lateral

in others it is entirely smooth all over in both sexes; and this is really the appearance presented when the parts are observed through an ordinary pocket magnifier. But whilst, on the one hand, it seems impossible that the friction of the two ridges against one another could produce a sound in those species where they are described as entirely smooth (supposing always the description to be correct), a careful examination shows, on the other hand, that the lateral part of the ridge on the abdomen, which Erichson evidently looks upon as the source of the sound, cannot by any means be concerned in its production. It lacks two essential conditions, being neither in a favourable position nor furnished with transverse grooves sufficiently fine. The creaking sound produced by many insects depends on a very rapid and powerful friction of a very thin edge against a grooved surface, the fine transverse striæ of which catch hold of and again let go the edge. The thinner the edge, the finer the striæ, and the greater the velocity of the movement, the higher is the note; and if the velocity and strength of the movement are small and the grooves coarse, no sound, or a mere low rattling noise, can be produced. But that lateral part of the abdominal ridge which, in some species, under a moderate power, shows transverse grooves is placed so far forward that the ridge on the femur could touch it only when the leg is stretched out, moved by its tensors, when the movements would not by any means be strong or quick enough; and its direction is, moreover, such that the grooves could not alternately catch and let go the ridge on the femur. Besides, these grooves are so distant from each other, so coarse, and so deficient in sharpness, in comparison with the striæ on the creaking-apparatus of other Coleoptera, that even on that account they cannot be regarded as sources of sound. Even in animals so large as *Necrophori* and *Cerambyces*, the striæ on the surface of the creaking-apparatus are so extremely close and minute that they show interferential colours*, and are distinctly observable only by the assistance of a very strong magnifier. The structure does not come out clearly till the parts are examined under the microscope by strong side light and a magnifying-power of 50–100 times. If the creaking-apparatus of *Heterocerus* deserves that appellation, the striæ must be expected to be still more minute, and the surface would appear smooth

part of the ridge is described as grooved in both sexes of *H. marginatus*, *intermedius*, and *lævigatus*, grooved in the male but smooth in the female of *H. fossor*, *femoralis*, *fuscus*, and *hispidatus*, smooth in both sexes of *H. parallelus*, *obsoletus*, and *sericans*.

* On the creaking-apparatus of *Necrophori*, v. *Naturhistorisk Tidskrift*, ser. 2. vol. i. (1844), pp. 61, 69; and on that of *Cerambyces*, *Nat. Tid.* ser. 3. vol. ii. p. 494 [*Ann. & Mag. Nat. Hist.* vol. xv. pp. 191, 192].

to the naked eye or even under an ordinary pocket magnifier. Now this is precisely the state of the case. The ridge on the femur is not rubbed by the action of the tensors against the outer lateral part of the ridge, which in some species shows a few coarse transverse grooves (a sort of introduction, as it were, to the structure of the true apparatus), but it is rubbed, by the powerful action of its flexors, against the inner part of the arched ridge, which forms exactly a segment of a circle, the point of the coxa being the centre and the femur the radius, and which, though apparently smooth in all species and both sexes, is covered with transverse striæ as regular, close, and minute, in proportion to the size of the animals, as in any of the larger insects just mentioned. Of course this is not observable except by means of the microscope, by side light and a suitable magnifying-power: it is best seen by a power obtained by using a proportionally strong eye-piece, if the instrument allows it. It is still better to choose specimens for the examination which have just gone through their transformations, and in which the integuments, having not yet acquired their deep colouring, are semipellucid. The first ventral segment should be cut off, carefully separated from the soft parts, cleansed with solution of caustic potash, and examined, under a strong magnifying-power, by transmitted side light, which, of course, ought to be directed along the arched ridge, across the transverse striæ. The preparation repays the trouble, as nothing can be more elegant than the aspect of the striæ, which cover the whole arch in the cases where this, by a low power, appears entirely smooth all over, but only the inner larger portion of it in those cases where the pocket magnifier shows transverse grooves on the outer or lateral part of the arch. Whilst, according to the account given in '*Naturg. d. Ins. Deutschl.*,' these latter species would appear to have the most developed creaking-apparatus, the reverse is the case, as it is the apparently smooth part of the arch which produces the sound, not the coarsely grooved part.

It follows that several of the characters for species and sexes which Erichson thought to find in this creaking-apparatus lose very much of their value; but it presents one peculiarity, hitherto overlooked, which more than makes up for the loss, and is of great utility in distinguishing closely allied species. The fore end of the arch, which generally exhibits a few coarser transverse grooves, is the broader of the two; and these two circumstances indicate clearly enough that the friction is calculated to commence at that end and continue inwards, when the femur is inflected, towards the lower or posterior extremity of the arch, which is more and more attenuated, and generally ends at the posterior margin of the segment. But in some species

(amongst the Danish in *H. sericans*, *intermedius*, *Physites aureolus* and *Augyles hispidus*) the arch is continued as an excessively thin and sharp recurring ridge, as far as the apex of the posterior coxæ, thus completing a larger section of the circle. Intermediate forms between this and the common structure do not seem to occur.

DANISH SPECIES.

HETEROCERUS, F.

Antennæ 11-jointed, the club abruptly separate; third and fourth joints very small.

Maxillary lobes spinulous.

Inner lobe of *mandibles* membranaceous, with membranaceous comb.

A. Lateral angles of *pronotum* rounded, without marginal groove.

Inner lobe of *mandibles* slightly emarginate in the middle.

Body oblong, with parallel sides, flatly vaulted.

Pronotum in the male broader than the elytra, in the female of the same breadth as these.

a. Arches of *creaking-apparatus* ending in the posterior margin of the first ventral segment.

1. *H. femoralis* (Kiesenw.), fr.

b. Arches of *creaking-apparatus* recurring from the posterior margin of the first ventral segment towards the apex of the third pair of coxæ.

2. *H. sericans* (Kiesenw.), m. fr.

B. Lateral angles of *pronotum* with deep marginal groove.

a. Lateral angles of *pronotum* rounded.

Inner lobe of *mandibles* with a sharp indentation in the middle.

Body oblong, with parallel sides, flatly vaulted.

Pronotum in the male as broad as elytra, in the female narrower.

Arches of *creaking-apparatus* ending in the posterior margin of the first ventral segment.

3. *H. obsoletus* (Curt.), fr. 4. *H. lævigatus* (Panz.), m. fr.

5. *H. fuscus* (Ksw.), fr.

b. Lateral angles of *pronotum* pointed.

Body oblong, rounded, rather high vaulted, almost the same in both sexes.

* Arches of *creaking-apparatus* ending in the posterior margin of first ventral segment.

6. *H. marginatus*, Ksw.

* Arches of *creaking-apparatus* recurring towards the posterior coxæ.

7. *H. intermedius*, Ksw., r.

PHYRITES, nov. gen.

Antennæ 11-jointed; the club increasing gradually from the third joint.

Maxillary lobes spinulous.

Inner lobe of *mandibles* bifid, the lower division membranaceous, with membranaceous comb, the outer division horny, with fringed margin, and carrying five or six very thick horny spines.

1. *P. aureolus*, n. sp. (Oblong, rounded sides, highly vaulted; hairy

covering thin, coarse, the hair standing out from the body, brown, in the elytra partly golden, forming three narrow, serrated, golden transverse bands; the outer layer of hairs very long, close, and black; teeth of mandibles very powerful; lateral angles of pronotum pointed, margined; elytra coarsely punctured, without coloured markings on the integument itself; abdomen underneath with a broad, dark-red margin; arches of creaking-apparatus recurring towards posterior coxæ. $3\frac{3}{4}$ –4 mil. lim.), r.

AUGYLES, nov. gen.

Antennæ 10-jointed; club abruptly commencing, third and fourth joints very small.

Maxillary lobes furnished with bristles.

Inner lobe of *mandibles* membranaceous, with membranaceous comb.

1. *A. hispidulus*, Ksw., fr.

III.

Although the representatives of our indigenous genera of Scaritini, *Clivina* and *Dyschirius*, abound everywhere, our knowledge of their natural history seems still open to not unimportant additions. On a previous occasion* I drew attention to several peculiarities in the structure of the mouth not hitherto noticed—for instance, the convenient character for distinction between these two genera, that the anterior margin of the clypeus is merely slightly emarginate in *Clivina*, but bi- or tridentate in *Dyschirius*; and in a paper on the new genera *Niletus* and *Ochyropus* †, I have pointed out that both *Niletus* and *Clivina*, *Dyschirius*, *Oxygnathus*, and *Oxystomus* amongst Scaritini, possess a sharp, hard, horny spine between the claws—a true onychium, the possession of which was formerly looked upon as a principal character of certain Lamellicornia, but which really occurs in many Coleoptera. To these we shall add two other remarks. The inner lobe of the maxillæ in *Dyschirius* is almost straight, and *truncate* at the apex, though it is often described as pointed, owing to some of the terminal spines being mistaken for the apex of the lobe. But in *Clivina* (*fossor*) the lobe terminates, as in other Carabi, with an inwardly bent hook. In *Dyschirius* the two bristles of the lingua are divergent, whilst in *Clivina* (*fossor*) they stand so close together as to look like one thick bristle. The anterior margin of the palpifer is rounded in *Dyschirius*, with finely serrated edge, whilst in *Clivina* it presents an obtuse angle with undulated edge.

In examining the organs of the mouth in a great number of specimens of *Dyschirius*, I observed that in many individuals

* Danmarks Eleutherata, i. p. 110, tab. 4. fig. a, i.

† Naturhistorisk Tidsskrift, Række 2. vol. ii. (1846–49), 346; vide Ann. & Mag. Nat. Hist. vol. x. p. 379.

the terminal joint of both pairs of palpi presented a rather peculiar structure. In dry specimens this betrays itself by the joint being somewhat broader than usual; and on the under surface a deep spoon-shaped cavity is observable. In fresh specimens, or such as have been boiled for examination, the hard chitinous integument seems to be wanting in this spot, and to be replaced by a soft membrane, closely covered, as if it were paved, with small black polygonous chitinous warts, pretty regularly disposed in quincunx. It can scarcely be doubted that this is an organ of sense, a secondary palparium; and a dissection of the internal sexual organs shows that the individuals possessing this peculiarity are all males. Hitherto no external marks of distinction between the sexes were known; but these supplementary inferior palparia are found in the males of all species of *Dyschirius* and in many exotic species of *Clivina*, though they are wanting in the males of *Clivina fossor*.

The characters available for the distinction of species are not very many. Originally authors were almost confined to the variations of the external teeth on the tibiæ; Erichson added (Käfer d. Mark Brandenburg) the varying extension of the marginal striæ of the elytra; in 'Danmarks Eleutherata' I pointed out some additional characters derived from the shape of the clypeus; whilst Thomson, in 'Skandinaviens Coleoptera,' drew attention to the marginal striæ of the pronotum, which sometimes are wanting, and, where they exist, extend to a varying distance from the posterior corners. Two new characters may be derived from the different size of the supplementary palparia on the maxillary palpi of the males, and from a small difference in the outline of the ligula (or, rather, fulcrum ligulæ). By combining these characters, the species may be grouped with satisfactory precision. But within the pale of each of these groups the species are so closely connected that it is exceedingly difficult to distinguish them except by a set of characters which are not always as sharp as could be desired; and one is often tempted to look upon many reputed species as mere local variations. But this same uniformity is observable also in other genera of Scaritini, and is, upon the whole, of frequent occurrence in Arthropoda which dig or burrow in the ground, within such genera as have a very wide geographical distribution. If, then, those species of *Dyschirius* which dig their tunnels on the shores of the Ganges, or in the salt-moors of Tranquebar, and along the rivers of America, when carefully examined, differ as little from our indigenous species as these latter do from one another, we must be content to leave the matter as it is, in spite of the dearth of specific characters.

DANISH SPECIES.

DYSCHIRIUS.

A. *Superior palparia* on both pair of palpi of the male very large, extending over the whole length of the joint.

a. *Clypeus* tridentate. *Ligula* extended at the apex, with pointed corners. *Marginal striæ* of *pronotum* continued past the second pair of bristle-points. *Marginal striæ* of *elytra* continued to the base of the latter. External teeth of *anterior tibiæ* pointed. *Pronotum* round. *Elytra* ovate.

1. *D. thoracicus*, Fabr., fr. 2. *D. obscurus*, Gyllh., fr.

b. *Clypeus* bidentate. *Ligula* gradually attenuated, with round apex. *Marginal striæ* of *pronotum* terminating in the second pair of bristle-points. *Marginal striæ* of *elytra* ceasing at the shoulder. External teeth of *anterior tibiæ* pointed. *Pronotum* oblong, round. *Striæ* of *elytra* deeply punctate, smooth towards the apex.

3. *D. teneus*, Dej., fr. 4. *D. salinus*, Er., fr.

c. *Clypeus* bidentate. *Ligula* gradually acuminate, with round apex. *Marginal striæ* of *pronotum* wanting. *Marginal striæ* of *elytra* ceasing at the shoulder. External teeth of *anterior tibiæ* obtuse.

5. *D. gibbus*, Fabr.

B. *Superior palparia* on the labial palpi very large, extending over the whole length of the joints, those on the maxillary palpi reduced to a small spot behind the apex of the joint.

Clypeus bidentate. *Ligula* gradually acuminate, with round apex. *Marginal striæ* of *pronotum* continued beyond the second pair of bristle-points. *Marginal striæ* of *elytra* ceasing at the shoulder. External teeth of *anterior tibiæ* indistinct. *Pronotum* oblong.

6. *D. inermis*, Curt., r. 7. *D. politus*, Dej., m. fr. 8. *D. impunctipennis*, Daws. (Geod. Brit. 29. 6 = *arenosus*, Putz., *lævistriatus*, Fairm. & Laboulb.), fr.

VII.—Description of a new Australian Tortoise (*Elseya latisternum*). By Dr. J. E. GRAY, F.R.S. &c.

IN the 'Annals and Magazine of Natural History' for 1863, vol. xii. pp. 98 & 246, I described a species of *Chelymys* under the name of *Chelymys dentata*. In that paper I proposed to divide the genus into two sections, the one having and the other being destitute of a nuchal shield. In the collection from North Australia there are two specimens of the animal in spirits, which show that the animals of the *Chelymydes* without a nuchal shield differ greatly from those of the typical *Chelymys*; and they are particularly interesting (as forming a passage between the *Hydraspides* of Australia and South America) in having a pair of beards in the front of the chin, a warty upper surface to the neck, and scaly temples—all characters absent in most of the Australian species, but generally present in those genera of the