

ruins of ancient cities, and under the foundations of old walls, or else led into the fissures of natural rocks.

In the wooded districts we also noticed two or three species of Dormice or Palm-rats, all with tails more or less bushy, which eluded us.

The specimen which I exhibit of the *Eliomys melanurus* of Wagner (Abh. bay. Ak. Wiss. iii. p. 176, pl. ii. fig. 1), belongs to the only species obtained in my visit to Moab with which I had not previously met.

We obtained two specimens, one among the ruins of Um Rasas, standing in a treeless waste, the other at the old Roman city of Ziza. They were both trapped in their runs, near the mouth of a hole in the old wall. When let loose in a box, *Eliomys* is a very beautiful and interesting creature. The face, with the two broad black lines running to behind the ears, bordered with a fringe almost white on either side, and the large and moving ears, is most winning; and the tail as it moves slowly is curled up over its back, like a Squirrel's; but in running it is carried behind it. Altogether it is very squirrel-like in its movements. There is no difference in markings between the sexes; we procured one example of each. One of these is in my collection; the other is in the possession of its captor, the Rev. Mowbray Trotter, of Sheffield.

I much regret that I am unable to throw any further light on the habits of this rare and interesting creature; but the locality where our specimens were found confirms the account given by Wagner, that it inhabits holes in the ground. It is somewhat curious that no structural difference of any importance can be detected between it and its arboreal congeners. So far as I know, only two specimens are known to have existed in collections before we met with it in Moab. These were the types of Wagner's description, brought from the Sinaitic peninsula by Von Schubart; and as Wagner's illustration is rude and uncharacteristic (the animal being represented on a branch of a tree), one of our examples has been figured in the accompanying drawing (Plate VI.) in a more natural attitude.

February 6, 1877.

Osbert Salvin, F.R.S., V.P., in the Chair.

The Secretary read the following report on the additions to the Society's Menagerie during the month of January 1877.

The total number of registered additions to the Society's Menagerie during the month of January was 46, of which 27 were by presentation, 17 by purchase, and 2 were received on deposit. The total number of departures during the same period, by death and removals, was 76.

Dr. Günther read a memoir on the Tortoises collected by Commander Cookson, R.N., during the recent visit of H.M.S. 'Peterel' to the Galapagos Islands.

Mr. Howard Saunders exhibited a specimen of the Panay Sooty Tern (*Sterna anæstheti*¹), which had been obtained on the British coast on a light-ship, probably either at the mouth of the Thames or of the Medway.

This was stated to be the first notice of the occurrence of this bird within British limits.

Mr. Sclater called attention to the original and unique specimen of his *Manucodia comrii* (P. Z. S. 1876, p. 459), now belonging to the collection of the Marquess of Tweeddale, the President of the Society, which, since it was described and figured, had undergone a most efficient "remake" in Mr. Bartlett's able hands.

The curly feathers of the head, were now much more apparent and better developed than shown even in the woodcut given with the original description, and formed standing ridges over each eye. The tail was not flat, as would appear from the figure (pl. xlii.), but "boat-shaped" as in some of the American Grakles (*Quiscalus*), *i. e.* with the median tail-feathers elevated above the lateral. The two middle tail-feathers were very peculiar in construction, being shorter by $\frac{3}{4}$ of an inch than the next pair, and having the inner webs twisted round over the outer, so as to show their under surfaces.

The following papers were read :—

1. On *Phylloscopus borealis* and its Occurrence in Norway.

By ROBERT COLLETT, C.M.Z.S., Conservator of the Zoological Museum of the University of Christiania &c.

[Received Jan. 15, 1877.]

In the summer of 1876, when visiting for the third time during the last six years the province of Finmark, mainly with the object of studying fishes and marine invertebrata, I resolved on devoting a few days to excursions along the forest-clad slopes of the rivers that flow into the great Porsanger, Laxe, Tana, and Varanger fjords. Among the more southern of the vertebrate species occurring here in considerable numbers, I hoped to light upon forms not hitherto observed in those regions (the most northerly of our country), and further elucidate the question as to what influence their occurrence in different degrees of latitude exerts on their outward structure and general habits. These parts of Finmark having never before been visited by any naturalist, it struck me as not impossible that I might

¹ See P. Z. S. 1876, p. 664.

fall in with some of the eastern species that are found inhabiting the shores of the White Sea, but which hitherto have not been observed in Norway.

My surmise proved correct; for sooner than I had anticipated, on one of the first of my excursions on the Porsanger Fjord, in the beginning of July, I met with *Phylloscopus borealis* in several localities on the banks of the rivers emptying into that fjord.

On the 4th of July, when traversing (in company with my friend Mr. Landmark, Inspector of Salmon Fisheries, at that time engaged in investigating the rivers of that region) one of the extensive and comparatively luxuriant birch-forests on the slopes of one of those rivers, my attention was attracted by a song wholly unknown to me, and which I at once set down as that of one of the many species of eastern *Sylvidae*.

I had soon secured two individuals, both male birds; and having at hand Meves's paper about his journey in Northern Russia, I immediately recognized them as belonging to the species described by Blasius, in "Naumannia" for 1858, as *Phylloscopus borealis*; and we saw and heard several others at the same place.

A few days later, when strolling along the banks of one of the other rivers, I again observed this species in several places, in a tract about ten English miles in extent, and again shot two, also males, but was not able on my comparatively rapid progress through this part of the country to obtain a female. Hereabouts we heard, I should think, ten individuals, all of them singing, and consequently all males. On the 21st of July I first succeeded in shooting a female, in the vicinity of the Pasvig-elv, South Varanger, about 200 English miles east of the locality where I first met with the bird.

In the last-mentioned locality I observed several pairs; but the season being so far advanced, many of the males had probably ceased singing; and the species doubtless occurred in more places than those where I observed it. My time on each occasion having been limited, I did not succeed in obtaining either the nests or eggs; the latter perhaps had been hatched previous to my arrival in Finmark, or, may be, were in process of incubation.

Phylloscopus borealis consequently occurs throughout a considerable portion of Finmark in most localities suitable to its habits; probably therefore not further north than 70° 20'. Its distribution in Norway extends from the rivers on the confines of Russia to the birch-woods in the vicinity of the Porsanger fjord, or directly east of the North Cape; and the distance from that fjord to Alten on the west coast being not more than 20 English miles, it will very probably be found to inhabit the luxuriant birch-forests clothing the banks of the Alten Elv.

Phylloscopus borealis affects exclusively the loftiest and most luxuriant birch-forests in the vicinity of rivers or lakes; and as it never occurred when the growth was sparse or stunted, I soon learned to tell from the appearance of the locality whether it was inhabited by the little songster. The soil in these birch-woods was always tolerably fertile, and the vegetation luxuriant, reaching, as a rule, up

to the knees ; the most conspicuous plants were *Geranium sylvaticum*, *Chamaenerion angustifolium*, *Melampyrum*, *Myrtillus nigra*, various species of *Gramineæ*, &c.

In such localities several pairs were often found breeding, not far apart ; and sometimes I could hear two, and even more males singing simultaneously. As a rule, however, they were somewhat scattered.

It invariably shunned localities where the soil was wet and spongy, selecting, in the forests it affects, comparatively dry and elevated spots, which it inhabits in company with *Phylloscopus trochilus*, *Cyanecula suecica*, *Turdus iliacus*, *Fringilla montifringilla*, and *Linota linaria*, likewise *Parus cinctus* and *P. borealis*.

The song of the male birds rendered them more easy of detection than the females, which were probably just then sitting, or feeding the nestlings. Notwithstanding the season was far advanced, they sang frequently and for a considerable time together, not only in the middle of the day, but late in the evening and early in the morning ; nay, on one occasion, I heard one singing in the middle of a rainy night (this individual was one of those preserved.)

The song in summer is consequently not confined to any particular time of day. It consists of a but-one-syllable note, *zee, zee, zee, zee*, rapidly reiterated a dozen times in succession, the commencing strain bearing some resemblance to that of *Sylvia curruca* or *Emberiza citrinella* ; then succeed one or two disconnected hissing sounds, *tseers, tseers*, a trifle lower in tone than the main song, but still audible at a considerably greater distance than the corresponding tones of *Phylloscopus collybita* (after its two-syllable song), which can only be distinguished in its immediate proximity.

The song is repeated several times, after which come intervals of greater or less duration when it is silent. The hissing sound was also uttered when the bird was frightened, and was the only note I heard from the female. The calling note (*hveet*) of *Ph. collybita* and *Ph. trochilus* was never uttered by *Ph. borealis*. Once only did I hear another and far lower song, which I at first mistook for that of *Parus cinctus*, and which bore a striking resemblance to the usual note of that species, the closing syllable being somewhat drawn out.

One I heard singing in this manner was shot and preserved ; it was imitating, in all probability, the song of *Parus cinctus*, a habit characteristic of another of the singing birds of Finmark, *Acrocephalus schænobænus*.

As late as the 22nd of July the males were in full song in the vicinity of the Pasvig-Elv, South Varanger.

Though not, strictly speaking, shy, these birds exhibit, as a rule, greater wariness than *Ph. trochilus*, and if scared, would not always allow you to get within shot. They were remarkably brisk in their movements, scudding to and fro through the leafy tree-tops in pursuit of insects, and were rarely seen on the lower branches or in close proximity to the ground. They generally sing while fluttering from branch to branch, precisely as the other species of *Phylloscopus* do.

The localities they inhabit being exclusively such as swarm with mosquitos, and the summer of 1876 having been unusually pro-

ductive of those insects, my investigation of their general habits was rendered extremely difficult. It was absolutely impossible to keep still a moment, the veil not only affording insufficient protection against their continuous attacks, but being in other respects obstructive to minute observation.

The food, too, of *Ph. borealis*, at this season of the year, would seem to be wholly taken from these countless myriads; and the ventricles, in all the specimens examined were crammed with these insects. There are at least half a dozen species of these mosquitos, all more or less numerous, though some outnumber the others in particular localities.

On one occasion (July 22) I may have been close to a nest, on the Pasvig Elv, near Lake Tschoalme-javre, South Varanger. Both the parent birds exhibited unmistakable signs of alarm; but here, too, the mosquitos prevented me from finding the nest. A female shot in another locality on the same river had large incubation-spots.

I prepared in all 5 specimens, 4 of which were males. Both sexes were, in regard to colour of plumage, precisely alike. A very slight difference was seen in some of the males, the dorsal feathers being in some darker than in others, and the eye-stripe in such specimens was a trifle whiter.

They measured as follows:—

	Total length. millim.	Wing. millim.	Tail. millim.	Tarsus. millim.	Gape. millim.
♂	132	70	52	20½	15¼
♂	67	50		
♂	67	48½	20	15½
♂	135	71	50	20½	16
♀	123	63	44½	20	15

The female would thus appear to be somewhat smaller than the males, a deduction in accordance with Mr. Meves's measurements of a number of specimens obtained at Kopatjevskaja, south of Archangel, on the 8th and 9th of August, 1869 (Oefv. Kongl. Vet. Akad. Förh. 1871, p. 758), whereas, on the other hand, there was a singular and almost invariable discrepancy between the Russian and Finmark specimens, the latter appearing to have been all somewhat larger than those from Archangel. Middendorff has before observed that the back of specimens taken in the middle of the summer, when the plumage is somewhat worn and faded, has lost a little of its vivid green colour and has acquired a greyer tint; this was likewise the case with all the Finmark specimens, which, besides, scarcely retained a trace of the whitish yellow spots at the extremities of the wing-coverts that in autumn and early spring give to the wings a yellowish band. The first primary in one specimen was a trifle shorter than the coverts, in the others of the same length, or very little (1 millim.) longer.

The synonymy and general distribution of the species I shall refrain from dwelling upon here, my friend Mr. Dresser purposing, I understand, to treat upon that subject at large in his great work



J. Smit del. et lith.

M & N Hanhart imp.

PLECTROPTERUS NIGER.

'A History of the Birds of Europe;' it appears, however, from the latest observations, that its distribution extends from the North Cape through the whole of Northern Russia and Siberia, and in an easterly direction as far as Russian North America. Those which annually make their appearance in the birch-woods of Finmark for the purpose of breeding take an easterly course, their passage to and from that locality being through Northern and Eastern Russia. This is the case too with several others of the smaller land birds of eastern origin that breed in Finmark—for instance *Anthus cervinus*, *Otocorys alpestris*, and *Plectrophanes lapponica*, which never, or at least very seldom, cross the southern parts of Norway on their passage; the same observation applies to the colonies of *Acrocephalus schœnobæus* and *Cyanecula suecica*, which breed in Finmark, and perhaps to the majority of land birds of passage breeding in those regions.

It is highly probable therefore that *P. borealis* crosses Western Europe on its passage hither; and the specimens obtained on the island of Heligoland, which enabled Professor Blasius to correct the erroneous designation formerly given to this species, must therefore in all probability be regarded as the result of those occasional visits to Western Europe which are paid from time to time by East-European and North-Asiatic species.

2. Notice of an apparently new Species of Spur-winged Goose of the Genus *Plectropterus*. By P. L. SCLATER, M.A., Ph.D., F.R.S., Secretary to the Society.

[Received February 5, 1877.]

(Plate VII.)

On former occasions¹ I have done my best to establish before the Society the distinctness of *Plectropterus rueppelli*, as I have proposed to name the bare-necked East-African form of the Spur-winged Goose, from the ordinary *P. gambensis*, which has a much wider range. Of both of these species we have at the present time specimens living in the Society's Gardens²; but we have also a pair of birds which, so far as I can judge from an examination of the living examples, clearly belong to a third species of this genus.

On June 6th of last year we received from Lieut.-General A. V. Cunyngham, Commandant of H.M. forces at Cape Town, two evidently adult birds of this genus, which appear to be quite distinct from either of the above-named forms. Their general appearance, as will be seen from the coloured drawing by Mr. Smit which I exhibit (Plate VII.), is rather that of *P. gambensis*, inasmuch as they have not the prominent frontal knob, nor bare spaces on the

¹ See P. Z. S. 1859, p. 131, and 1860, p. 38.

² Namely:—*Plectropterus gambensis* ♂, presented by C. B. Mosse, Esq., May 6, 1867; *Plectropterus gambensis* ♀, received in exchange, Aug. 13, 1868; and *Plectropterus rueppelli* ♂, presented by Mons. J. M. Cornély, C.M.Z.S., Sept. 28, 1876.

sides of the neck, which render *P. rueppelli* so easily distinguishable. But, in place of the conspicuous white throat and neck which are found in both of the previously known birds, the black colour of the belly is continued in *Plectropterus niger* (as I propose to designate the present form) up to the chin; and the white colour on the body in front is confined to a small space on the mesial line of the lower abdomen. The white of the back and scapulars in *P. niger* has also a greenish lustre pervading it which is not observable in the other species. This colour passes into a bronzy purple on the wings. The size is rather larger than that of our *P. gambensis*. The bill is bright red with the tip whitish, the iris black, the legs and feet of a duller red.

The two specimens received are believed to be both of the male sex; they are nearly alike, except that one individual has rather less white on the mesial line of the belly than the other.

In answer to my inquiries, General Cunyngham kindly informs me that he received these birds from Zanzibar; so that that part of the S.E. African coast is probably the true habitat of this species.

I will now say a few words as to the distinctness of the two other species of the genus (*P. gambensis* and *P. rueppelli*), which, though admitted, somewhat unwillingly, by Finsch and Hartlaub¹, is denied by Heuglin², the most recent authority on East-African ornithology. Here, in London, we know full well that the view that *P. rueppelli* is only the adult male of *P. gambensis* is quite untenable. We have had a male of *P. gambensis* in our Gardens ever since May 1867 which shows no symptoms whatever of acquiring the frontal knob and bare neck of *P. rueppelli*. In 1864, this bird paired with a female of the same species placed in company with it; and the female laid eggs, but did not hatch them out. Since then another female, received in 1868, has been placed in his company; so that we have at present what must be undoubtedly a fully adult pair of *P. gambensis*. I will ask any naturalist to compare these birds with the example of *P. rueppelli* (probably a male) obtained from the Antwerp Gardens, and most kindly presented to us last summer by M. J. M. Cornély, and to say whether it is possible to regard the species as otherwise than distinct.

What De Sousa's *Plectropterus sclateri* (Jorn. de Sc. de Lisboa, vol. ii. p. 157, 1860) may be, I cannot say. It has certainly nothing to do with the *P. niger* of our Gardens.

3. On the Mechanism of the Intervertebral Substance, and on some Effects of the Erect Position of Man. By A. H. GARROD, M.A., Prosecutor to the Society.

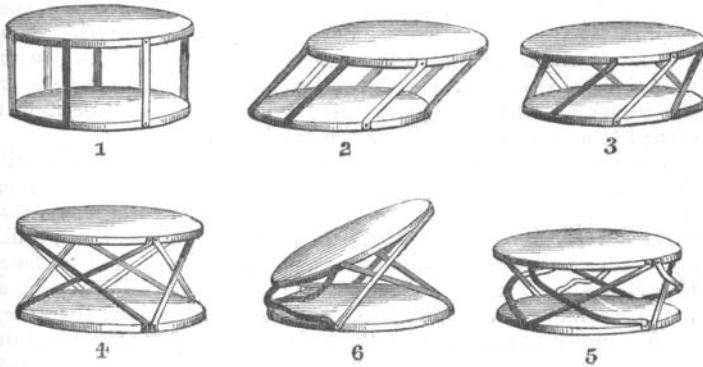
[Received January 17, 1877.]

In all works on human anatomy the structure of the disks of fibro-elastic tissue which intervene between the bodies of the verte-

¹ Vögel Ost-Afrika's, p. 801. ² Ornithologie Nord-Ost-Afrika's, p. 1275.

bræ, are described as being composed of a central elastic cushion with a laminated fibrous investment, the individual fibres of which, instead of running straight from the lower edge of one vertebra to the upper edge of the one below it, are arranged obliquely, those of one layer crossing those of the next at a considerable angle. That this is an accurate statement of the condition which exists no one will doubt. Of its mechanical advantages, however, I have nowhere found any explanation.

If the fibres, instead of crossing had run parallel, and at right angles to the surfaces which they joined (fig. 1), it is evident that the median elastic pad would have efficiently retained the vertebræ at a distance from one another under ordinary circumstances. But in the act of jumping, for instance, when the feet have just reached



the ground, the momentum acquired by the head and upper extremities would compress the elastic pad, and diminish the distance between each two vertebræ. At this moment, if the upper part of the body had the least tendency to obliquity in its downward movement, the relaxed outer fibres of the intervertebral substance would allow the body of the upper vertebra to slide upon the one below it, (fig. 2), and so diminish the capacity of the spinal canal, as well as the general stability of the column. A forcible attempt to rotate the body upon the spine would, under similar conditions, be also attended by compression of the elastic pad, and considerable rotatory gliding of the vertebræ on one another (fig. 3).

These difficulties are entirely surmounted by the existing mechanism (fig. 4), as may be most satisfactorily demonstrated by the employment of a model composed of two circular disks of wood bound together, with an interval between them, by tapes of similar lengths arranged obliquely and crossing one another, attached to opposite points on the margins of the disks. So connected, no gliding of any kind of the disks upon one another can be produced, and the only movements possible are their approximation either at all points, or at any part where compression is employed (figs. 5 and 6).

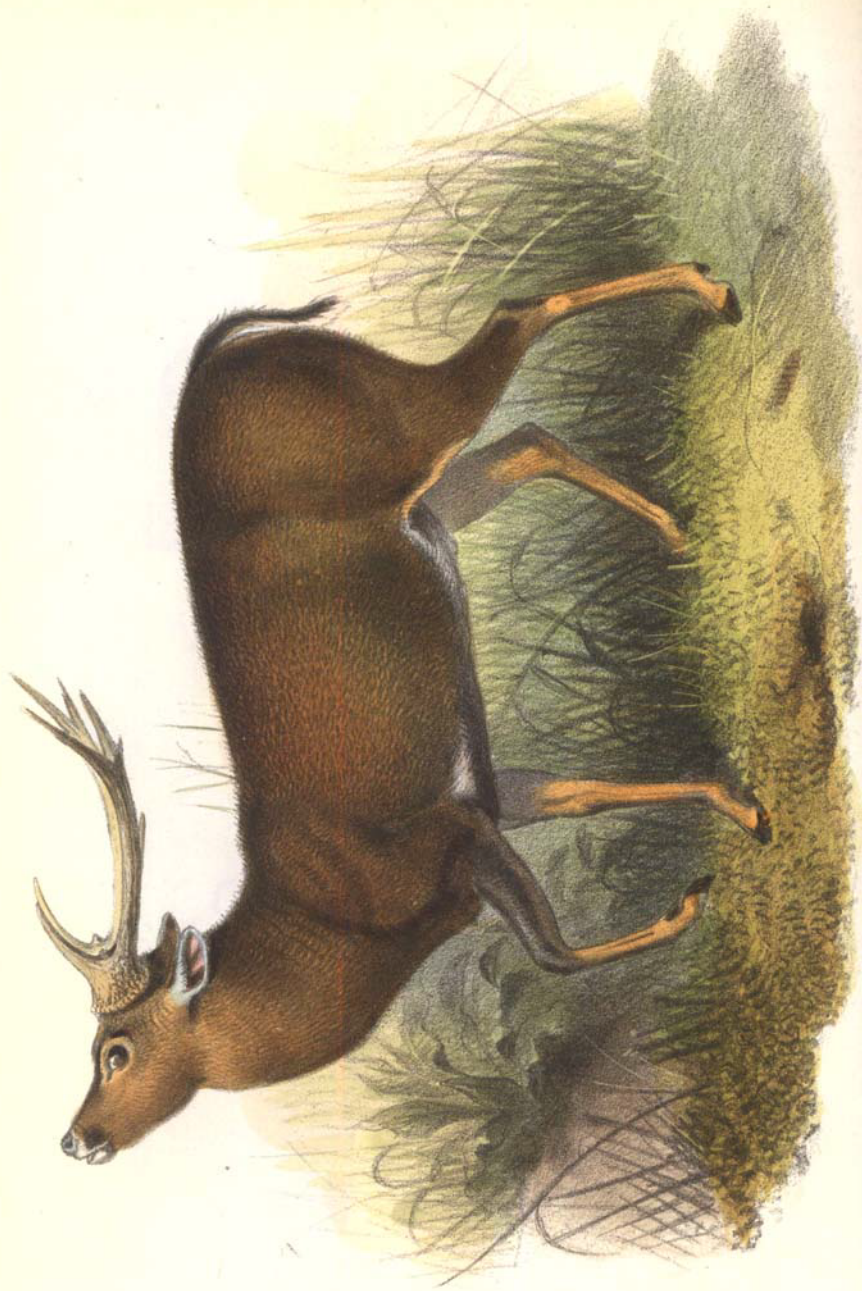
It may not be out of place for me here to draw attention to one or two points which are associated with the erectness of the carriage of man, in contradistinction to the horizontal and oblique attitudes assumed by lower animals.

The simple curve, concave ventrally, of the vertebral column of the higher Apes was most certainly shared by the human progenitor. In the young child it is found to exist. In its attempts to assume the upright carriage this progenitor must, equally certainly, have thrown the centre of gravity of its body directly above the hips, to do which it was necessary to bend the spine backwards. On account, however, of the thoracic region being rendered rigid by the attachment of its cage of ribs, and the sacrum being unmodifiable from its ankylosis, this flexion of the spine could only occur in the neck and loins; consequently the spinal flexures in man may be explained upon the assumption that the dorsal and sacral ventral concavities are the simular curves of the ancestral type, retained on account of the mechanical obstructions to their removal, whilst the ventral convexities of the yielding cervical and lumbar regions are the means by which the centre of gravity in the erect position is carried to a point directly above the hip-joints.

This assumption of a vertical attitude by a creature originally differentiated for a horizontal position of its body, has produced but marvellously slight inconvenience. If it had resulted in many, man could scarcely have survived. There are one or two, however, which are most clearly traceable to this cause, including the painful tendency to prolapse, antifixion, and retroflexion of the uterus in women, as well as crural hernia in both sexes, and inguinal hernia in the male.

In mammalian animals with the body horizontal the weight of the uterus is transmitted to the abdominal walls, at the same time that the round and broad ligaments prevent it from leaving the pelvic region. In the Sloths and Bats these ligaments are still more called into play, on account of the peculiar attitudes assumed by them. No more satisfactory mechanism could be desired. But in the human species the condition is very different. The uterus is situated almost directly above the vagina; and the entire absence of any ligaments to suspend it, place it in a position of the greatest mechanical disadvantage, especially when congested and depressed by stays. Unsupported, it frequently bends forward or backwards, or even drops into the cavity of the vagina, and there finding nothing to obstruct it, becomes completely prolapsed. Similarly in inguinal hernia, the abdominal walls being abnormally extended in connexion with the lumbar curve, the tendency to rupture in the region of the inguinal canal must be greatly increased, as it must likewise be by the downward tendency of the viscera.

P.Z.S. 1877. PL. VII.



J. Wolf del. J. Smith lith.

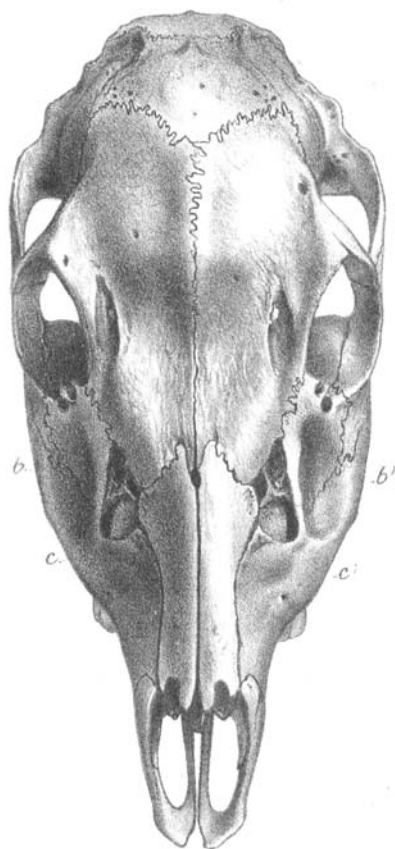
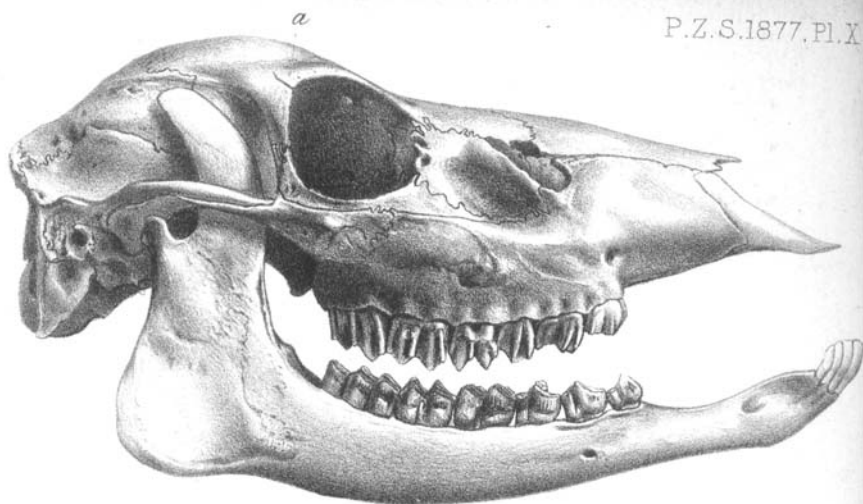
M. & N. Harshart imp.

P. Z. S. 1877. Pl. IX.



J. Smit del. et lith.

M. & N. Harbar. imp.



J. Smit lith.

Hanhart imp.

SKULL OF CERVUS NIGRICANS, ♀.

4. On the Deer of the Philippine Islands, with the Description of a new Species. By SIR VICTOR BROOKE, Bart., F.Z.S.

[Received January 22, 1877.]

(Plates VIII.-X.)

With perhaps the exception of the Simple-horned Deer of South America comprising the subgenus *Coassus*, there is no group of existing Cervidæ concerning which our knowledge is so inexact and so fragmentary as that relating to the small Rusine Deer of the Philippine Islands. With the desire of remedying this defect as far as possible, I have for some years paid particular attention to the subject, and during several visits to Continental Museums have enjoyed (thanks to the great courtesy of their conservators) ample opportunities of studying the materials bearing upon it which they contain.

I regret that the result of my investigations is not more satisfactory; and it is solely in the hope that an exposure of the nakedness of the land may attract the attention of future naturalists travelling in the Philippines to the subject that I venture to lay the following notes before the Society.

CERVUS PHILIPPINUS. (Plate VIII.)

1820. *Cervf des Philippines*, Desm. Mamm. p. 442, note 1.

1821-24. ———, Cuv. Oss. Foss. (ed. ii.) vol. iv. p. 46.

1827. *Cervus philippinus*, Ham. Sm. Griff. An. Kingd. vol. iv. p. 147, vol. v. p. 33.

1844. ———, Sund. Pec. in Kongl. Vet. Handl. 1844, p. 179.

1855. ———, Puch. Rev. et Mag. Zool. 2nd ser. tom. vii. p. 49.

1857. ———, Puch. Rev. et Mag. Zool. tom. ix. p. 481, pl. 15.

1866. *Cervus mariannus*, Fras. P. Z. S. 1866, p. 367.

Description.—*Adult male*. Hair of moderate length and rather harsh. General colour rich ruddy brown, darkest on the back and lightest on the neck. Forehead and cheeks rufous fawn-colour; dark (almost black) streaks commence over each eye, and, blending together, form a band running down the centre of the face, which is separated from the dark moustache-like mark bordering the muzzle by a narrow track of pale fawn-colour. Breast and belly uniform brown. Tarsal gland plainly marked by a rufous spot. Ears of moderate size, covered externally by short close-set hair. Horns remarkably rough and massive; a powerful long brow-antler, and one short tine directed inwards. Height at shoulder about 27".

Skull. Total length 11·3. Anteorbital fossa very deep, suddenly pressed in anteriorly to the orbit, and occupying the entire facial plate of the malar. Facial portion of skull compressed laterally, and deeply from above downwards.

The skull of this species is an exact miniature of that of *Cervus aristotelis*.

Skeleton. Fourteen pairs of ribs. Cervical vertebræ remarkably large.

Female. In external coloration differs in no way from the male.

Young. Of a uniform brown without spots.

Hab. Island of Luzon, Philippines.

The Philippine Deer is a very stout-built, short-limbed, powerful animal, in carriage and general appearance closely resembling the common Sambur (*Cervus aristotelis*).

Literary History.

1820. M. Dussumier obtained a young male in Luzon which he sent to Paris; the animal died *en route*. Desmarest gives a short notice of the arrival of this specimen in Paris (Mamm. p. 442, note 1), where the specimen is still preserved in the Musée d'Histoire Naturelle (No. 409 in the Catalogue of the Museum).

1827. Hamilton Smith, in Griffith's 'Animal Kingdom' (*vide supra*), describes this specimen and names it *Cervus philippinus*. He considered the species allied to the Muntjacs.

1836-37. In the stores of the Musée d'Histoire Naturelle at Paris there are several skins undoubtedly referable to *Cervus philippinus*. These specimens were obtained during the voyage of the 'Bonite.' Eydoux and Souleyet, while they describe and figure their indefinite species, *Cervus pseudaxis* (Voy. de la Bonité, vol. i. p. 64, pl. 12), are entirely silent respecting the Philippine Deer, of which species they had collected such ample materials.

1844. Prof. Sundevall (*vide supra*) places the species amongst the Rusine Deer. He points out for the first time the absence of hair on the posterior surface of the metatarsal phalanges.

1851. Capt. Diguët presented a male and female of this species to the French Academy of Sciences. The specimens had been obtained at Manilla.

1855. The female obtained by Capt. Diguët having died in the previous year, Pucheran, in the 'Revue et Magasin de Zoologie' (*vide supra*), published a very careful and detailed description of the specimen, which he correctly refers to *Cervus philippinus*.

1857. Capt. Diguët's male having died in 1856, Pucheran continued his observations on the species (*vide supra*), which he considered to differ decidedly from *Cervus mariannus*.

1866. Mr. Louis Fraser exhibited and figured (P. Z. S. 1866, p. 367) the horns of a Deer killed near the village of Bosa-Bosa, in Luzon. These horns, as far as it is possible to judge from a drawing, appear in no way to differ from those of *Cervus philippinus*. I therefore think Mr. Fraser was premature in his decision that they were referable to *Cervus mariannus*.

1875. Some years ago I observed a Deer in the Zoological Gardens at Berlin which appeared to me irreconcilable with any species with which I was acquainted. Upon mentioning my difficulty to Mr. Selater he considered the matter worthy of attention, and succeeded

last year in effecting the transfer of the specimen from Rotterdam to the Society's Menagerie, where it is still living and in perfect health (Plate VIII.). An attentive examination of the animal since its arrival in London has convinced me that it is safely referable to *Cervus philippinus*, and that the richness of coloration, in which alone it differs from the Continental specimens of that species, is owing to the deterioration which these latter have suffered during the many years of exposure to light to which they have been unavoidably submitted. The dark facial markings so strongly shown in the living animal are either very faintly visible or absent in the stuffed specimens; but in one of the flat skins, from the voyage of the Bonite, in the Paris Museum, these dark markings are very distinct. The antlers carried by the animal at the time Mr. Wolf's drawing was made were slightly abnormal, as is so frequently the case with deer in confinement. The woodcut published in the Society's 'Proceedings,' 1866, p. 367, shows faithfully their normal form.

List of specimens examined.

Paris.

- | | |
|----------------------------------|--------------------------------|
| a. ♂ jun., type. | Mounted specimen and skeleton. |
| b. ♂ adult. (Diguët's specimen). | Ditto. ditto. |
| c. ♀ adult. (Diguët's specimen). | Ditto. |
| d, e. ♀ ♀ adult. et jun. | Ditto. |

Leyden.

- f, g. ♂ ♂ adult. and jun. Mounted specimens.

Berlin.

- h. ♂ adult. Mounted specimens.

London.

- i. ♂ adult. Living in Society's Menagerie.

CERVUS MARIANNUS.

1820. *Cervus mariannus*, Desm. Mamm. sp. 669, p. 436.

1821-24. — — —, Cuv. Oss. Foss. (ed. 2), vol. iv. p. 45.

1824. *Cervus Mariannes*, Quoy & Gaim. Voy. de l'Uranie, Zool. p. 32.

1827. *Cervus mariannus*, Ham. Sm. Griff. An. Kingd. vol. iv. p. 115, and vol. v. p. 311.

1844. — — —, Sund. Pec. in Kong. Vet. Handl. p. 179.

Although, as I shall presently show, I have but little doubt that *Cervus mariannus*, Desm., and *Cervus philippinus*, Ham. Smith, are specifically identical, I have considered it expedient for the present to leave the question open and to keep the references to their literary history separate.

The attention of future collectors in the Philippine and Marianne Islands will thereby be better aroused to the appreciation of one of the several desiderata, which can only yield to their zeal and energy.

Literary History.

1817-1820. During the voyage of the 'Uranie' round the world, specimens were obtained of a small deer, which is stated by Quoy

and Gaimard, the naturalists of the expedition (Zool. Voy. de l'Uranie, p. 33, 1824), to have existed in immense numbers on Guam, the largest of the Marianne Islands. They thus write respecting this animal :—

“ Une petite espèce de cerf axis, qui a été apportée des Philippines, a tellement multiplié, que l'on ne connoît pas de lieu qui en contienne proportionnellement davantage ; car il existe à Guam plus de mille de ces animaux. On nourrit de leur chair les équipages des navires qui touchent à cette île, et le nôtre n'eût presque pas d'autres vivres pendant le temps que nous y demeurâmes. . . . Le faon est fauve, et n'a point de taches comme celui d'Europe, à quelque âge qu'on le prenne.”

They describe the island of Guam thus :—“ Cette île n'a que quarante lieues de tour. Son sol est élevé, montueux, en partie volcanique et en partie formé de calcaire madréporique. Les montagnes, qui ont toutes suivi l'action de feu, sont arides et peu boisées. . . . Cet archipel n'a qu'un mammifère qui ne lui ait pas été apporté.”

1820. In his ‘Mammalogie’ (p. 436), Desmarest confers the name *Cervus mariannus* upon the species observed by Quoy and Gaimard in the island of Guam. In his short notice Desmarest only mentions two specimens, a stuffed male and a fawn.

1821–24. In the second edition of his ‘Ossemens Fossiles’ (p. 45), Cuvier mentions, in addition to the types of Desmarest's description, the skull of a male, also brought from Guam by Quoy and Gaimard. Cuvier says that he was “ presque tenté de rapporter à cette espèce, à cause de la forme très-semblable du crâne, un individu jeune rapporté de Manille par M. Dussumier ” (= the specimen upon which Hamilton Smith subsequently established his species *Cervus philippinus*). The absence of canines in the specimens from the Mariannes, and their presence in the Philippine specimen, induced Cuvier, however, to suspend his judgment in the matter. He particularly remarks with regard to the skull obtained by Quoy and Gaimard, “ le frontal est relevé longitudinalement entre les cornes, et a en avant des orbites, vers la base du nez, deux convexités longitudinales fort remarquables.”

1827. Hamilton Smith in Griffith's ‘Animal Kingdom’ figures the stuffed male above mentioned, and describes it and the fawn, retaining for them Desmarest's name *Cervus mariannus*.

Observations.

In the Musée d'Histoire Naturelle at Paris there is still preserved the fawn (414 a in Cat.) which formed one of the types of Desmarest's original description. The adult male, which all authors describe as having been in an exceedingly bad state of preservation, is no longer contained in this museum ; but in the Musée d'Anatomie I have observed a skull which I believe to have belonged to this specimen (No. 1345 in Cat.). The close resemblance of the horns in this specimen to Hamilton Smith's plate, and the occipital bones

having been sawn through in the manner adopted by taxidermists, leave but little doubt in my mind as to the correctness of this opinion. Another skull in the Musée d'Anatomie (No. 1559 in Cat.) is, I think, the second skull mentioned by Cuvier. In addition to these skulls, there are in the same museum three skulls collected by Hombron and Jacquinot in Guam.

In these five skulls in the Musée d'Anatomie, and in the immature stuffed specimen in the Musée d'Histoire Naturelle at Paris consists as far as I have been able to ascertain, the entire well-authenticated material referable to the deer of the Marianne Islands which is contained at this present moment in European museums. Compared with the skull of the male obtained by Diguët in Luzon (the only authenticated skull of an adult *Cervus philippinus* which I have as yet discovered), the skulls of the deer of the Marianne Islands present in my opinion no characters in common in which they differ from the Luzon specimen. Each of the five skulls exhibits remarkable individual peculiarity, the difference between the two most dissimilar being greater than that existing between some of the skulls and that of Diguët's specimen. Similar individual cranial peculiarities are shown in a large series of skulls of *Cervus aristotelis* collected on the Neilgherry Hills, in Southern India, in my own collection.

The great convexity at the junction of the frontals and nasals mentioned by Cuvier and Pucheran, and considered as of specific value by the latter, is shown in great excess by one of the Marianne skulls, less decidedly by another, and scarcely, if at all, by any of the remaining three.

The presence or absence of canines is, as has been shown by Pucheran in the case of both the Marianne and the Luzon Deer, dependent more or less on the age of the animal, these teeth being generally lost shortly after the animal attains full maturity.

As regards Quoy and Gaimard's immature specimen, it resembles in every important particular a specimen (♀ of list, p. 53) of similar age bred in the Jardin des Plantes from the specimens collected by Diguët in Luzon.

The evidence therefore lies, I think, clearly in favour of the opinion that the deer of the Marianne Islands was originally imported from Luzon; but in the present state of our knowledge respecting this group of deer I think it would be premature to express a decided opinion upon the subject. It is fully possible that it was from some other part of the Philippines that the Mariannes were stocked with deer, and that the Philippines possess, in addition to such comparatively widely distinct species as *Cervus philippinus* and *Cervus alfredi*, representative species, for which, notwithstanding their lesser degree of specific distinction, zoologists may find it necessary to retain distinctive titles.

The following Table contains the measurements of a skull and horns preserved in the British Museum (655 ♂ in Cat.). No history is attached to this specimen, which has been for many years in the collection. It bears a striking resemblance to that described by

Left horn of *Cervus mariannus*. Specimen in the British Museum.*a*, side view; *b*, front view.

Cuvier as having “en avant des orbites deux convexités fort remarquable.” The left horn of this skull is represented in the drawing now exhibited.

	inches.	metre.
Total length of skull in straight line.....	11·8	0·300
Distance from point of præmaxilla to point of nasals .	1·7	0·042
Length of præmaxillæ	2·6	0·065
„ nasals	3·8	0·095
From anterior rim of orbit to free extremity of præmaxilla	6·2	0·155
From upper extremity of nasals to fronto-parietal suture	5	0·125
Across maxilla 1" anterior to orbit	3·6	0·090
„ 2" „ „	3·3	0·083

	inches.	metre.
Extent of upper premolars	1·6	0·040
„ „ molars	2	0·050
„ lower premolars	1·1	0·027
„ „ molars	2·3	0·058
Length of horns	18	0·455
„ brow-antler	10	0·253
Circumference of burr	7·5	0·190
„ „ beam	5	0·125

CERVUS NIGRICANS, sp. nov. (Plates IX. & X.)

1870. *Cervus mariannus*? Sclat. P. Z. S. 1870, p. 279.

Adult female.—*External characters*. Hair of moderate length, rather coarse. General colour blackish brown, slightly tinged with rufous. Entire face, upper parts of the neck, and shoulders almost black. Limbs from the carpal and tarsal joints downwards bluish grey-brown. Belly rufous brown. Under lip and inside of thighs white. Tarsal gland plainly marked by a spot of yellowish white hair. Ears oval, decidedly small, almost quite naked externally. Muzzle coriaceous, ample, its upper border running directly across from the upper angles of the nares, which it completely surrounds inferiorly.

Skull (Plate X.).—*General form*. Portions of the frontals and parietals forming the roof of the cranial cavity boldly convex, both in a lateral and antero-posterior direction; facial portion rather short, depressed and much widened laterally as far as the anterior premolar, from which point forwards the facial portion of the skull is reduced in a marked manner both in width and length.

Anteorbital fossa of moderate depth, situated in the anterior portion of the facial plate of the lacrymal.

Anteorbital vacuity of moderate dimensions. Malar divided by a longitudinal suture¹ into two subequal parts (Plate X. *a*). Præmaxillæ remarkably small, their greatest length very little exceeding that of the upper molar series. Occipital condyles large. Auditory bullæ small, their external surface irregular, with a long pointed laterally compressed styloid process. A large depression for the tympanohyal, which is not completely enclosed by the definite vaginal process which depends from the floor of the prolonged external auditory meatus.

Squamous portion of the squamosal remarkably low.

Teeth very large; the diameter of each of the upper molars in a transverse direction exceeds its longitudinal diameter. Upper and under molars with very small cylindrical supplementary columns. Canines absent.

Skeleton.—14 pairs of ribs.

	inches.	metre.
Height at the shoulder	24	0·610
Length from point of shoulder to ischium . .	27	0·685

¹ It is possible that this suture is an individual and not a specific character.

	inches.	metre.
Length of ear, inside ¹	3·2	0·080
Breadth of ear	1·9	0·048
Length of tail exclusive of hair	3	0·075
Total length of skull in straight line	9	0·230
Distance from point of præmaxillæ to point of nasals	1·4	0·035
Length of præmaxillæ	1·8	0·045
Length of nasals	2·5	0·064
From anterior rim of orbit to free extremi- ty of præmaxillæ	4·6	0·115
From upper extremity of nasals to fronto- parietal suture	3·2	0·081
Across maxillæ 1'' anterior to orbit (Pl. X. <i>b b'</i>)	3·2	0·081
Across maxillæ 2'' anterior to orbit (Pl. X. <i>c c'</i>)	2·4	0·060
Extent of upper premolars	1·7	0·043
Extent of upper molars	1·7	0·043
Extent of lower premolars	1·3	0·033
Extent of lower molars	1·9	0·048
Length of humerus	6·6	0·168
„ ulna	7·3	0·185
„ radius	5·5	0·140
„ metacarpal cannon bone	4·7	0·120
„ femur	7·8	0·195
„ tibia	8·2	0·205
„ metatarsal cannon bone	5·6	0·140

Hab. Philippines (exact island?).

Comparison with allied species.

Cervus nigricans in its general external form, crouching Agouti-like carriage, short naked ears, flattened and wide face, more closely resembles *C. alfredi* than any known species. In its lighter build and uniform dark brown colour it is easily distinguished from *C. alfredi*, which it is spotted at all ages.

From *C. philippinus* the new species differs in the form of the face, which in *C. philippinus* is laterally compressed and deep from above downwards. The length of the præmaxillæ and the width across the maxillæ anterior to the orbits (Plate X. *b b'*, *c c'*) bear a very different relative proportion to the cranial measurements in the two species. In *C. philippinus* the ears are of fair proportional size and externally covered with hair. The colour of the new species is much darker than that of *C. philippinus*.

It may be useful to mention here that *C. porcinus* differs from all the typical Rusine deer in the possession of large inflated auditory bullæ, and that *C. aristoteles* and its representative species *C. equinus* (Malacca, Borneo), *C. swinhooi* (Formosa), *C. philippinus* (Luzon), and (?) *C. alfredi* and *C. nigricans* differ from *C. hippelaphus* (Java)

¹ This measurement is taken across the concavity of the ear-conch, and does not include that portion of the external ear situated inferior to the opening.

and its representative species *C. moluccensis* (Celebes) and *C. peronii* (Timor) in the former having the outer, the latter the inner tine of the terminal fork the longest. Exceptions to this rule are not unfrequently to be found in finely developed antlers of *C. aristotelis*; but in specimens of the horns of immature stags of all species the outer line is invariably the longest or most massive.

Observations.

In the Museum of Leyden there is a deer preserved which is, I think, decidedly referable to the male of this species. Professor Schlegel was unable to give me any exact information respecting the specimen. In its dark colour, very short and naked ears, and general form it exactly resembles the female above described, and contrasts strongly with the fine male *Cervus philippinus* in the same Museum. The horns closely resemble those of *Cervus philippinus*; they possess a stout brow-antler and one short tine directed inwards.

The female from which the figure (Plate IX.) and above description were taken, was received by the Society from the Philippines in 1870, no more exact locality being given, and was noticed by Mr. Selater in the 'Proceedings' for that year, p. 279. Mr. Selater referred the species with doubt to *Cervus mariannus*. Upon its death, which took place about a year ago, the specimen passed into my private collection, where it is at present preserved. A male hybrid was produced between this animal and the male *Cervus alfredi*. In external appearance the young animal resembled the mother more than the father, being, so far as I can recollect, very indistinctly spotted, and of a very dark brown.

CERVUS ALFREDI.

1870. *Cervus alfredi*, Selat. P. Z. S. 1870, p. 381, pl. xxviii.

1871. ———, Selat. P. Z. S. 1871, p. 478.

1872. ———, Selat. P. Z. S. 1872, p. 24.

Adult male. Hair soft, of moderate length. General colour rich dark brown, with here and there a slight ruddy tint; cheeks and occiput pale brown; lower jaw and throat dirty white. Neck and shoulders anteriorly uniform dark brown. Posterior parts of shoulders, back, and sides distinctly marked at all seasons of the year by yellowish white spots. Breast and belly yellowish white. Limbs externally, above the carpal and tarsal joints, uniform brown, internally dirty white; below the carpal and tarsal joints, pale brown. Ears and tail short, the former almost naked externally.

Horns not greatly exceeding the head in length, a short brow-antler, and very short tine directed inwards.

Height at the shoulder about 25".

Adult female. In coloration resembles the male.

Young. Spotted from the time of their birth.

Hab. Philippines (Luzon?).

Observations.

Mr. Selater originally described this well-marked and interesting

species from a male presented to H.R.H. the Duke of Edinburgh by a Spanish gentleman at Manilla; and in the following year the Society received in exchange a female of the same species which was said to have come from the Philippines. The exact island inhabited by this species remains, however, an open question. The skin and skeleton of the type of the species are preserved in the British Museum (76. 2. 30. and 1681 *a*); unfortunately the bones are in such bad condition that I have found it impossible to form a clear idea of the cranial characters; but, so far as it is possible to judge from this single specimen, the skull of *Cervus alfredi* resembles that of *Cervus nigricans* much more closely than it does that of *Cervus philippinus*.

Specimens examined.

- a.* ♂ adult., type. Brit. Mus.
- b.* ♂ jun. Zool. Soc. Menagerie.
- c.* ♀ adult. Zool. Soc. Menagerie.

5. Description of twelve new Species and a new Genus of
Rhopalocera from Central America. By F. DuCANE
GODMAN and OSBERT SALVIN.

[Received January 26, 1877.]

The following species of Butterflies appear to us to be undescribed. Figures of all of them have been prepared, and will be published at a future time in a work on which we are now engaged. In the mean time we issue these preliminary descriptions to enable us to inscribe the proper names on our Plates.

DANAINÆ.

1. EUTRESIS THEOPE.

♂. Exp. 3·7 in. Closely allied to *E. hyperia* (Dbd. and Hew. Gen. Diurn. Lep. i. p. 112, Suppl. plate, f. 2), but differing from that species in the general tint of the orange red of the wings being duller, in having the whole of the central portion of the posterior wings semi-transparent; the dark markings of the central portion of the anterior wings are more restricted, and the dark margin of the hind wings much narrower.

Hab. Costa Rica. Mus. nostr. et H. Druce.

2. NAPEOGENES HEMIMELÆNA.

♀. Exp. 2·3 in. Allied to *N. peridia*, Hew. (Ex. B. i. Ith. 4, f. 20), but differing in having the two middle of the four bands of yellow spots of the anterior wings blended into one large spot, and another smaller one lying between the second and third median branches. On the hind wings the large yellow apical patch of *N. peridea* is reduced to two minute spots, and the marginal row of yellow spots is much smaller than in that species.

Hab. Panama, Lion-Hill Station. Mus. nostr.

Besides the single specimen in our collection we have only seen one other, a male, in that of Dr. Staudinger of Dresden.

3. *ITHOMIA ALCMENA*.

♀. Exp. 2·1 in. Allied to *I. artena*, Hew. (Ex. Butt. Ith. viii. f. 48), and having the same neuration of the hind wing as the female of that species, differing, however, in coloration, the dark margins of the wings being much broader and blacker; the black quadrate spot covering the base of the cell is placed at a more obtuse angle to the costa, the extracellular white spot following the same angle as the black one; near the distal ends of the median and radial interspaces are obsolete white spots not seen in *I. artena*, but not infrequent in other *Ithomia*. The borders of the wings beneath are deep rufous; and at the apical angle of all are minute white spots.

Hab. Guatemala; Choctum in Northern Vera Paz. Mus. nostr.

4. *ITHOMIA PUSIO*.

♂. Exp. 1·7 in. Allied to *I. lyra*, Salv., and *I. andronica*, Hew., differing from the latter in the apex of the anterior wings having only a narrow black border, inside of which up to the extracellular white spot on the wing is diaphanous. In *I. andronica* white spots are enclosed in the dark apex of the wing. As in *I. andronica*, the dark spot covering the base of the cell is triangular and not subrectangular as in *I. lyra*. The ♀ (exp. 1·85) resembles the male in colour, differing in the sexual divergence of the neuration usual in the *Hymenitis* section of *Ithomia*.

Hab. Nicaragua, Chontales (*Belt and Janson*). Mus. nostr.

We have long hesitated to describe this *Ithomia*, owing to its similarity to *I. andronica*; but having now seen a large number of specimens we consider its distinctness sufficiently apparent.

5. *ITHOMIA ZYGIA*.

♂. Exp. 2·7 in. Anterior wings semitransparent dark brown; costa, outer and inner margins, a spot in middle of the cell, another at the extremity, and the median and discoidal branches black; a large spot near the end of the cell and two curved bands of spots crossing the apical half of the wing, the outermost following the curve of the margin, semitransparent yellow; two small white spots near the apex; posterior wings semitransparent, fulvous, yellower in the cell, and towards the apex a broad black margin enclosing three white spots, that at the apex being the smallest; underside as above, the white marginal spots being more conspicuous. Female similar to the male as to the position of the markings, but darker, the white spots on the marginal border of the hind wings larger, central portion of hind wings, and middle of inner margin of fore wings, rich tawny.

Hab. Chiriqui. Mus. nostr. et H. Druce. Allied to *I. gonussa*, Hew.

SATYRINÆ.

6. *PIERELLA INCANESCENS*.

♂. Exp. 2·8; ♀ 3·15. Allied to *P. helvina*, Hew. (Ex. Butt. Het. t. 1. f. 4), the colours being similarly distributed. The black

transverse markings of the wings are all less distinct; and that crossing both wings beyond the end of the cell of each in the present species passes in the hind wing considerably beyond the end of the cell. The ocelli near the apical angle of the hind wings are larger, and the red colour of the same is more extended, leaving only a comparatively narrow black border. From *P. ocreata*, Salv. and Godm. (Ann. Nat. Hist. ser. 4, vol. ii. p. 143), the present insect differs in the absence of the conspicuous white markings of the hind wings, as well as in the position of the bands common to both wings, and other minor characters.

Hab. Nicaragua, Chontales (*Belt, Janson*); Costa Rica (*Van Patten, Endres*); Chiriqui and Veragua (*Arcé*); Panama, Chepo (*Arcé*). Mus. nostr.

7. OXEOSCHISTUS GIGAS.

♀. Exp. 3·5 in. Outer margin of both wings dentated somewhat as in the genus *Dædalma*. Apex of anterior wings truncate, outer margin concave, the upper radial elongated and carrying a well-defined emargination. Above brown; anterior wings with a submarginal row of five white spots, and two other spots, one between the median branches, the other between the first median branch and the submedian nervure; posterior wings with a broad tawny margin intersected by the dark nervules, and having a black spot about the middle of the median interspace. Beneath, anterior wings as above, with the apex tinged with tawny, and irregularly marked with whitish spots; hind wings deep tawny; a row of ocelli between the median and radial nervules, that between the median branches largest and bipupillated, two ocelli between the submedian nervure and the first median branch; a number of irregularly-shaped silvery spots in the vicinity of the ocelli, and four similar ones arranged across the middle of the cell from the costa to the submedian nervure; an indistinct pale submarginal band between the ocelli and the outer margin.

Hab. Guatemala, Aceytuno. Mus. nostr.

HELICONINÆ.

8. HELICONIUS FASCIATUS.

♂. Exp. 3·5 in. Closely allied to *H. ismenius*, Latr. (Humb. and Bonpl. Obs. Zool. ii. p. 125, t. 41. f. 5, 6), which it appears to replace on the Isthmus of Panama. The black spot in the middle of the cell unites with the black apical portion of the anterior wing; and the posterior wings are crossed by a well-defined band extending from the apex to the inner margin.

Hab. Isthmus of Panama (*M'Leannan*). Mus. nostr.

NYMPHALINÆ.

BOLBONEURA, gen. nov.

Anterior wings short, costa rounded, outer margins with a slight emargination. Posterior wings rounded, anal angle not produced. Palpi

long, projecting far beyond the head, as in the genus *Nica*. Costal and median nervures of the anterior wing swollen towards their bases, almost as in the costal nervure of the genus *Cystineura*. General coloration as in the genus *Epiphile*.

Type *Temenis sylphis*, Bates (Ent. Monthl. Mag. i. p. 113).

Hab. Mexico and Guatemala. Mus. nostr.

9. EUBAGIS IMMARGINATA.

♂. Exp. 1·7 in. Above uniform *Eubagis* green; the anterior wings without black spots or dark outer margin; posterior wings with a black margin, and a single black spot in the interspace of the median branches. Beneath, the markings almost exactly correspond to those of *E. postverta* (Cr.), the colour between the ocelli of the posterior wings being darker than in the above species.

Hab. Nicaragua, Chontales (*Belt, Janson*). Mus. nostr.

10. EUNICA MIRA.

♀. Exp. 2·45 in. Anterior wings with the apex pointed, the costa and outer margin uniformly convex; margin of the hind wings rounded. Anterior wings deep purple black, with a greenish tinge, beyond the cell an interrupted band of paler greenish hue crosses the wing from the costa to inner angle, outside of which is a band of whitish passing from the costa to the middle of the outer margin; posterior wings deep brown, outer margin pale; dark submarginal spots near the apical angle. Beneath, both wings distinctly variegated with black spots and bands on a blue-green ground, apex of the anterior wings and margin of the posterior wings whitish, the former crossed by a line of black spots; the posterior wings have a line of fulvous spread over the region of the median nervure, the inner margin being of the same colour.

Hab. Veragua (*Arcé*). Mus. nostr.

This remarkable species, of which at present we have only received one damaged female specimen, belongs to the group containing *Eunica sophronisba* (Cr.), but is abundantly distinct from that species, both in the coloration and the pointed apex of the anterior wings. The male remains to be discovered.

11. EUNICA EXCELSA.

♂ Exp. 2·95 in. Similar to *E. cinara*, Hew. (Ex. Butt. *Cybd.* t. i. f. 2), as to the markings of the undersurface; but above, instead of the smalt-blue of both wings being of a uniform tint, the hind wings are suffused towards their outer margin with glittering greenish blue, as in *E. venusia*, Feld. (Voy. Nov., Lep. p. 407, t. 52. f. 3), and *E. aspasia*, Feld. (Wien. ent. Monat. v. p. 104). From the last-named species it differs in the greater extent of the smalt-blue of the anterior wings and in the paler ground-colour of the posterior wings beneath; the glistening blue of the latter wings above is also greener and more refulgent.

Hab. Chiriqui (*Arcé*). Mus. nostr.

12. *EUNICA CÆRULA*.

♂. Exp. 2·4 in. Allied to *E. tatila*, H.-Sch. (Aussereurop. Schm. f. 69–72), ex Haiti, but differing in the greater extent and more purple tinge of the blue of the wings, which in Haitian specimens (agreeing fairly with H.-Schäffer's plate) is of a paler tint. Beneath, the posterior wings are deeper brown, and the markings much less distinctly defined.

Hab. Guatemala. *Mus.* nostr.

6. Account of the Zoological Collection made during the visit of H.M.S. 'Peterel' to the Galapagos Islands. Communicated by Dr. ALBERT GÜNTHER, F.R.S., V.P.Z.S., Keeper of the Zoological Department, British Museum.

[Received January 29, 1877.]

(Plates XI.–XIII.)

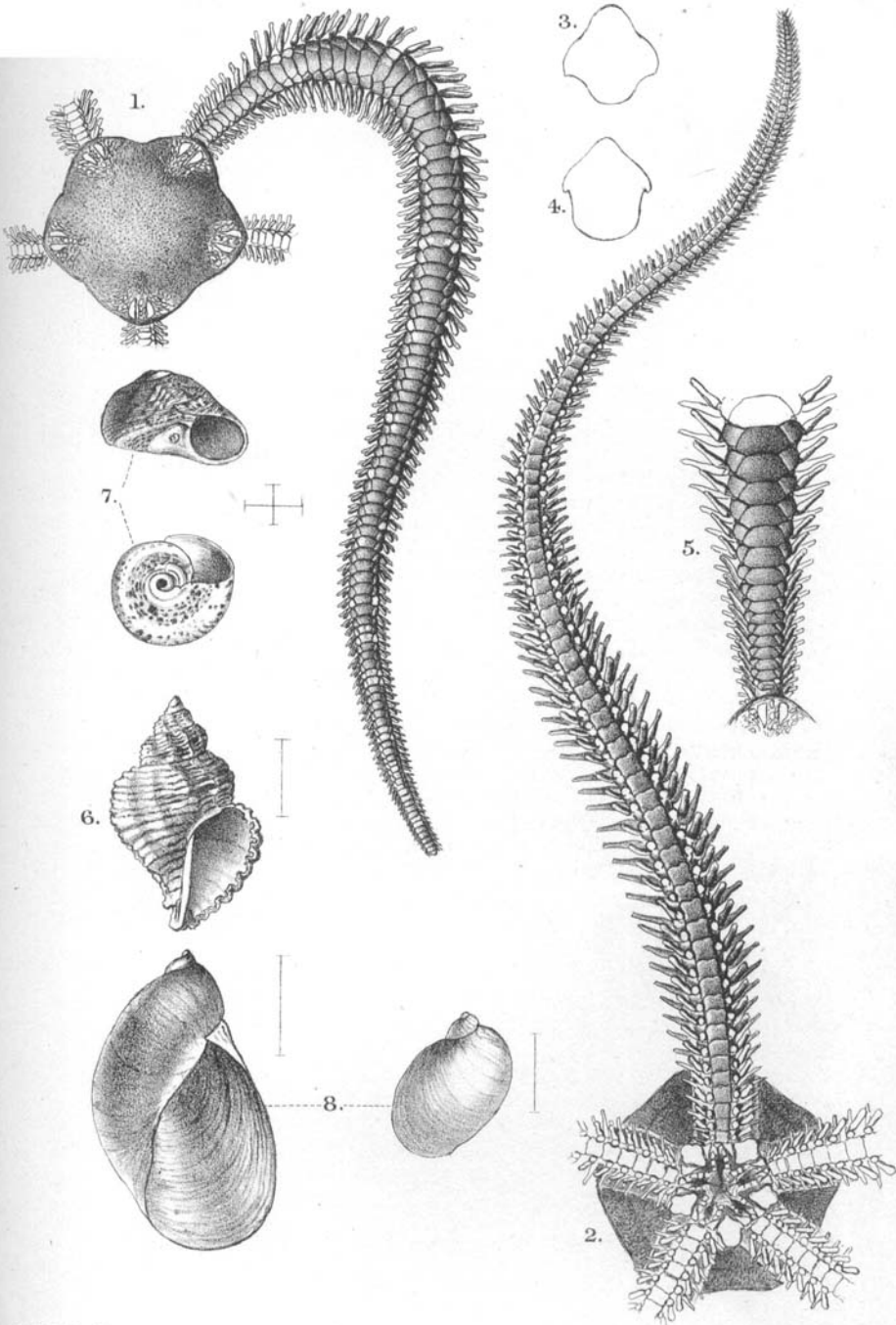
The circumstances under which the zoological collection¹ described in this paper was obtained are, shortly, the following. By direction of Rear-Admiral the Hon. A. A. Cochrane, who then commanded the Pacific Station, Commander W. E. Cookson proceeded in H.M.S. 'Peterel,' in June 1875, for a short cruise in the Galapagos archipelago. His whole stay was limited to a fortnight, in which time he landed on Charles and Abingdon Islands, and at Tagus and Iguana Coves in the Albemarle Islands. These, at least, were the localities where Commander Cookson, assisted by Staff-Surgeon Bett, collected the zoological objects which, by direction of Admiral Cochrane, have been deposited in the British Museum.

Valuable as this contribution to our knowledge of the Galapagos fauna is, it serves at the same time to show how incomplete is our acquaintance with one of the zoologically most interesting stations. But for Commander Cookson's timely visit, the Abingdon Tortoise would, in all probability, have disappeared, unknown as if it had never existed, or leaving only some fragments of its osseous frame. Perhaps we may hope that the success which attended Commander Cookson's search may encourage others to complete the work commenced by Fitzroy and Darwin.

For the convenience of the student of this fauna, it seemed desirable to keep together in a connected form the notices of the various parts of the collection which have been examined and determined by the staff of the Zoological Department.

My thanks are due to Mr. McLachlan, F.L.S., for the notice of the *Libellulæ*.

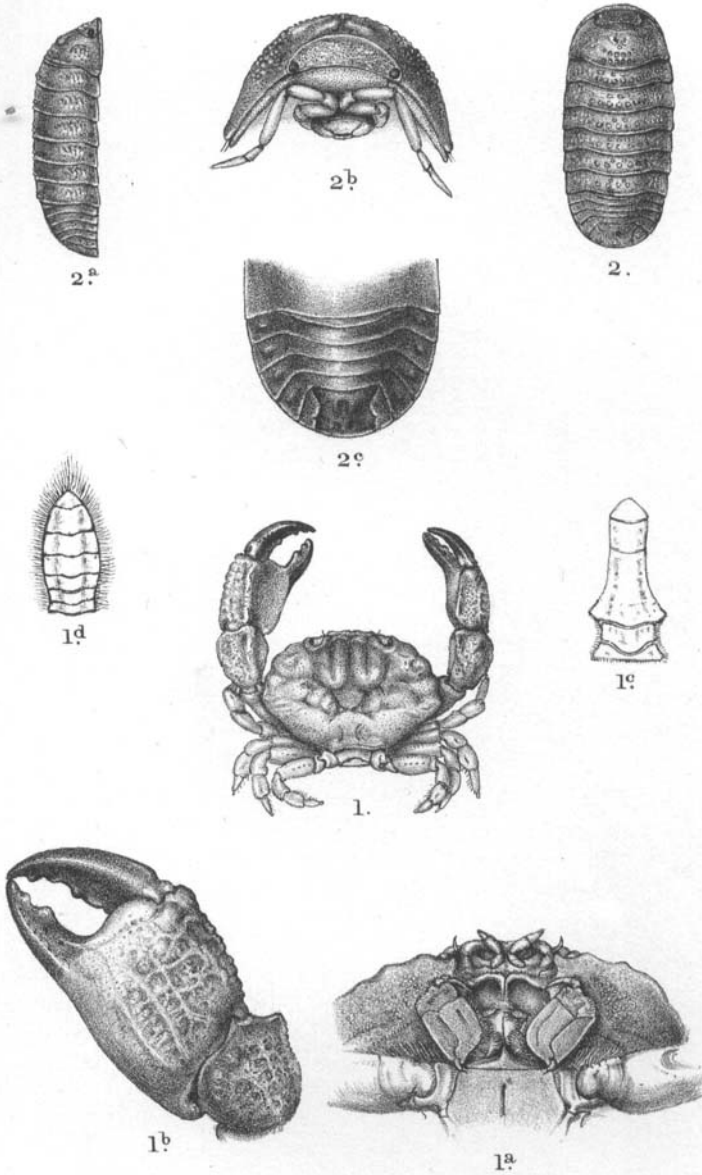
¹ Referred to at meetings of the Zoological Society last year; see P. Z. S. 1876, pp. 178, 422, 520.



E.A. Smith del.

Mintern Bros. imp.

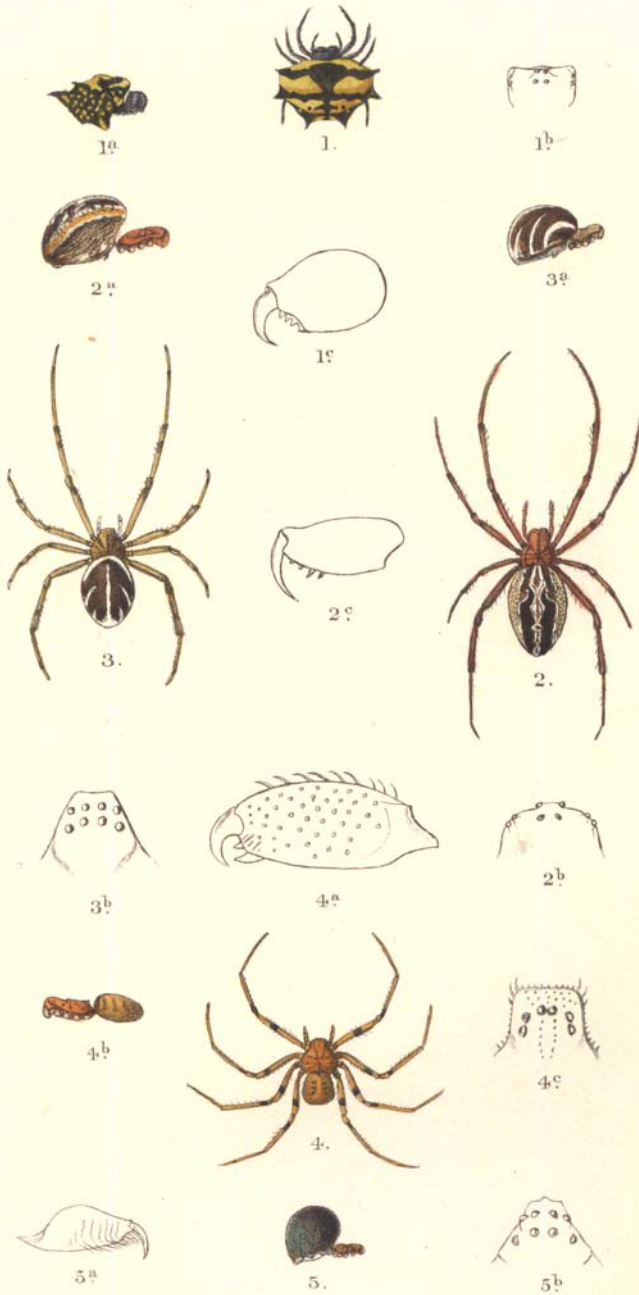
1-5, OPHIONEREIS ALBOMACULATA. 6, RHIZOCHILUS PARVUS.
7, TROCHUS COOKSONI, 8, SUCCINEA BETTII,



C. Berjeau lith.

Mintern Bros. imp.

1, LEPTODIUS COOKSONI.
2, CUBARIS GALAPAGOENSIS.



E.A. Smith.

Mintern Bros. imp.

SPIDERS OF THE GALAPAGOS.

I. BIRDS. By R. BOWDLER SHARPE.

The specimens were thirteen in number, and preserved in spirits of wine. They were obtained on Charles and Albemarle Islands, the two of the group of which we appear to know least; indeed, from the latter island one species only, *Mimus parvulus*, is recorded by Mr. Salvin in his important memoir recently published (Trans. Zool. Soc. vol. ix. pp. 447-510). Commander Cookson obtained also a *Geospiza* on that island. The species of *Dendroica* is widely spread over the archipelago, and was previously known from Charles Island; but the existence of a *Pyrocephalus* in this locality is confirmed for the first time.

The exploration of Tower and Hood Islands is still a great desideratum: their birds are reported to be peculiar; but not a single example of them has as yet reached European collections.

It is very remarkable that (as Commander Cookson reports) the birds continue to be as tame as in former times, especially in Charles and Chatham Islands, which have been so long inhabited; the small birds of all kinds are so tame that they are easily knocked down with a switch, some of the men being able to kill numbers of doves in this manner.

1. *MIMUS PARVULUS*.

Mimus parvulus (Gould); Salvin, *l. c.* p. 472.

A single specimen from Albemarle Island, measuring as follows—total length 8·4 inches, culmen 0·9, wing 3·95, tail 4·0, tarsus 1·3. Considerable differences exist between the bird now sent and the typical and unique specimen in the British Museum. It is much greyer, and the head is varied with ashy-brown margins to the feathers; the hinder neck is conspicuously lighter, the white sides of the neck converging and forming a half-collar; the rufous rump is very distinctly indicated, the upper tail-coverts being also shaded with rufous, all the feathers mottled and having brown centres; wing-feathers dark brown, all broadly tipped with white, these tips somewhat shaded with rufous on the inner secondaries and greater coverts; tail-feathers dark brown, edged with grey, the feathers all shading off into a white tip, broader on the inner web, the outer feather externally edged with whitish; lores and ear-coverts dark brown, slightly shaded with grey; a very distinct white eyebrow; cheeks and under surface of body pure white, the fore neck and breast distinctly spotted with triangular marks of brown.

Professor Sundevall is inclined to unite all the Galapagoan Mocking-Thrushes into one species; but Mr. Salvin points out that *M. trifasciatus* is a distinct species without doubt. In this I agree with him, the large size and very distinct endings to the wing-coverts and tail-feathers, and above all the broad edgings of brown to the breast-feathers, serving to separate it. But as regards the distinctness of *M. melanotis* and *M. parvulus*, Mr. Salvin is more in doubt; and I believe, with him, that "a larger series of specimens would show that the differences (in size alone) would gradually disappear."

The specimen sent by Commander Cookson exhibits a previously undescribed plumage of these insular *Mimi*; it is most probably a young individual.

2. *DENDRÆCA AUREOLA*.

Dendræca aureola (Gould); Salvin, *t. c.* p. 473.

Three specimens from Charles Island, representing an old female, a young male, and a young female. The young male bird is in an interesting plumage, having the under surface yellow, the throat white with a few yellow feathers intermixed, while on the breast the reddish streaks are just beginning to appear.

3. *GEOSPIZA FULIGINOSA*.

Geospiza fuliginosa (Gould); Salvin, *t. c.* p. 482.

Three young specimens from Albemarle Island, whence no *Geospiza* has as yet been recorded. Two are nestlings, the smallest being uniform creamy buff below, and having very broad rufous edgings to the wing-coverts and quills. The specimen appears to be full-grown, and measures as follows—total length 3·9 inches, wing 2·4, tail 1·7, tarsus 0·8. The Albemarle species would appear from these dimensions to be *G. fuliginosa*, as they are too big for *G. parvula*, and there is also a specimen of a young *G. fuliginosa* from Indefatigable Island (*Habel*) in the British Museum, with the plumage of which the Albemarle skin agrees very well indeed.

4. *PYROCEPHALUS NANUS*.

Pyrocephalus nanus (Gould); Salvin, *t. c.* p. 492.

No specimens of these Ruby-crowned Flycatchers have been before recorded from Charles Island, though Dr. Habel says that the species was found on all the islands visited by him. Commander Cookson has sent five specimens, two of which, now that they are made into skins, are yellowish where the adults are red; this is probably owing to the action of the spirit upon the plumage, and does not point to the specific distinctness of the Charles-Island bird. A young male in changing plumage shows a decided shade of red appearing on the under surface.

II. REPTILES. By ALBERT GÜNTHER.

The two species of Tortoises (*Testudo microphyes* from Albemarle, and *Testudo abingdonii* from Abingdon Island) will be fully described and figured in the author's forthcoming work on Gigantic Land Tortoises.

Only five species of Lizards are known from the archipelago, of all of which specimens were obtained by Commander Cookson. For a full description and figures I refer to the excellent paper recently published by Dr. Steindachner ("Die Schlangen und Eidechsen der Galapagos Inseln," Festschrift der zool.-bot. Ges. Wien, 1876, 4to). Their distribution in the archipelago is as follows:—

1. *LIOCEPHALUS GRAYI* (Bell) = *Craniopeltis bivittata* (Ptrs.) according to Steindachner.

Chatham (*Darwin*).

Charles (*Darwin*).

Albemarle (*Cookson*, *Steindachner*).

James (*Steindachner*).

Indefatigable (*Steindachner*).

Jervis (*Steindachner*).

Abingdon (*Cookson*).

2. *LIOCEPHALUS PACIFICUS* (Steind.).

? Indefatigable (*Habel*).

Bindloe (*Habel*).

Abingdon (*Cookson*).

3. *AMBLYRHYNCHUS CRISTATUS* (Bell).

Generally distributed.

Commander Cookson states that the rocks at Iguana Cove were thickly covered with *Amblyrhynchi*. He found them in numbers at the other places he visited, but nowhere else so numerous and so large in size. Here they were found to weigh from 20 to 22 lb., against 12 to 14 from other localities.

4. *CONOLOPHUS SUBCRISTATUS* (Bell).

Albemarle (*Darwin*, *Cookson*¹, *Steindachner*).

James (*Darwin*).

Barrington (*Darwin*).

Indefatigable (*Darwin*).

5. *PHYLLODACTYLUS GALAPAGENSIS* (Ptrs.).

Charles (*Cookson*).

III. FISHES. By ALBERT GÜNTHER.

Of the twelve species enumerated below, five are new to the fauna of the Galapagos archipelago, viz. *Sargus unimaculatus*, *Argyriosus setipinnis*, *Hemiramphus unifasciatus*, *Clupea libertatis*, and *Balistes mitis*.

1. *CENTROPRISTIS PSITTACINUS* (Val.). Charles Island.

2. *SERRANUS OLFA* (Jen.). Charles Island.

Jenyns (*Zool. Beagle*, p. 9, pl. 4) drew up his description from a dried skin which evidently is much distorted. Therefore it appears to be proper to give a new description from a specimen preserved in spirits, 17 inches long.

D. $\frac{11}{16}$. A. $\frac{3}{10}$.

Body compressed, of moderate height, its greatest depth being

¹ Only a mandible, from Iguana Cove.

equal to the length of the head and rather more than one third of the total length (without caudal). Upper profile sloping in a moderately strong curve from the commencement of the dorsal to the end of the snout. Lower jaw the longest. The teeth are in strong card in both jaws, the upper jaw with an outer series of stronger ones; one pair of canine teeth above and below, much stronger than any of the other ones. Vomerine and palatine teeth in narrow short bands. The diameter of the eye is one half the length of the snout, and two thirds of the width of the interorbital space. The maxillary, when the mouth is closed, reaches to behind the middle of the orbit. *The structure of the nostrils does not differ from that of the other species of the genus*: there are externally on each side two openings, a small anterior, and large posterior; they are separated by a narrow bridge of skin, which, in dried examples, would be very liable to shrink or disappear altogether. At the bottom of the posterior opening are the two apertures described by Jenyns which lead into the interior of the nasal organ.

The præoperculum is rather more than rectangular, the basal margin nearly straight and horizontal, the ascending margin finely denticulated with a shallow sinuosity above the angle. Operculum with a flat triangular spine.

Scales nearly smooth, lateral line not very conspicuous.

Dorsal spines slender, the second being the longest, its length contained twice and one fourth in that of the head. The length of the first spine is four ninths of that of the second, the third, fourth, fifth, and sixth spines gradually decreasing in length. Caudal sub-truncated. Body uniform dark brown. Head and fins yellow.

3. *SERRANUS HUMERALIS* (C. V.).

= *S. albomaculatus* (Jen.). Charles Island.

4. *PRISTIPOMA CANTHARINUM* (Jen.). Charles Island.

5. *CHRYSOPHRYS TAURINA* (Jen.). Charles Island.

Very closely allied to *Ch. calamus*.

6. *SARGUS UNIMACULATUS* (Bl.). Charles Island.

This fish is to be added to the list of species occurring on both sides of the Isthmus of Panama. Hitherto it was known from the Atlantic coasts of Tropical America (including the West Indies) only.

7. *DOYDIXODON FREMINVILLII* (Val.). Charles Island (Post-Office Bay). Albemarle Island (Iguana Cove).

The number of dorsal rays varies from 15 to 17; that of the anal rays appears to be more constant, namely 12. With regard to the distribution of this fish on the Pacific side of the American continent, and the alleged presence of teeth on the palate, see Zool. Record, iv. p. 160.

8. *ARGYRIOSUS SETIPINNIS* (Mitch.). Charles Island (Post-Office Bay).

9. *HEMIRAMPHUS UNIFASCIATUS* (Ranz.). Charles Island (Post-Office Bay).

This is one of the fishes which appear to extend within the tropics almost round the globe; hitherto it has not been brought from the West coast of Africa.

10. *CLUPEA LIBERTATIS* (Gthr.). Charles Island (Post-Office Bay).

11. *TETRODON HERALDI* (Gthr.). Charles Island (Post-Office Bay).

12. *BALISTES MITIS* (Benn.). Charles Island (Post-Office Bay).

IV. MOLLUSCA. By EDGAR SMITH.

The shells collected by Commander Cookson are all from Charles Island. They belong to twenty-two species, the majority of which were previously known to have been found in the archipelago, though we were ignorant in some instances of the island on which they had been obtained. Six of the species are additions to this fauna, three of them being apparently undescribed.

A. *Marine Species.*

1. *PURPURA PATULA*, Linn.

Both the normal form of the species and the variety (*P. columellaris*, Lamarck) occur at Charles Island. Some of the typical specimens with thin lips have the spire quite elevated, indeed quite as much so as certain of the variety with the thickened and strongly dentate labrum. One of the latter form is quite a curiosity, on account of its diminutive size and solidity, being only an inch in length and yet quite adult.

2. *PURPURA CALLAOËNSIS*, Gray.

The single specimen from Charles Island differs from all Peruvian examples I have seen in having four stout lirations within the aperture, which do not reach to the margin of the labrum; and the four transverse ridges which usually encircle the body-whorl of this species are very well developed. The specimens in the Cumingian collection are stated to have come from the Galapagos Islands, according to a ticket preserved with them; but Reeve quotes Callao Bay as the home of the species.

3. *ENGINA CROCOSTOMA*, Reeve.

This species has been found at Panama; and the Philippine Islands were given by its author as the habitat.

4. RHIZOCHILUS (CORALLIOPHILA) PARVUS, sp. nov. (Plate XI. fig. 6.)

Testa parva, fusiformi-ovata, vix rimata, alba; anfractus circiter 7, convexiusculi, longitudinaliter plicati, plicis obliquis 10-11 validis, et liris spiralibus rugosis fortibus (in anfr. penult. 5-6, in ultimo circa 18, alternatim majoribus) cincti; apertura cæruleo-alba, pyriformis, ad basim canalem brevem aliquanto recurvum jungens, longitudinis totius $\frac{1}{2}$ paulo superans; labrum crenulatum, intus denticulatum.

Longit. $10\frac{1}{2}$ millim., diam. fere 6.

This pretty species is of a short fusiformly-ovate shape, entirely white; the whorls are spirally lirate, two of the lirations on the upper whorls being stouter than the others; and those on the last are regularly alternately large and small, the stout ones being twice as thick as the latter. The aperture is bluish white, pyriform, and prolonged into the basal channel, which is somewhat recurved; the columella is straightish, thinly callous, smooth and shining; the labrum is strongly crenulated on the margin and armed within with about ten lirations, which do not extend far within the aperture.

Although there are not any very striking peculiarities in this little shell, still it does not satisfactorily agree with any other species. For its size the spiral ribs are remarkably stout, and are more conspicuous than the oblique plications.

5. COLUMBELLA FUSCATA, Sowerby.

Panama, Mazatlan, West Columbia, and Peru are other localities where this species has been found.

6. LATIRUS VARICOSUS, Reeve.

It is curious that the single specimen obtained by Commander Cookson is in exactly the same worn condition as the shells originally described.

7. LATIRUS TUBERCULATUS, Broderip.

Also found on the west coast of Central America.

8. MITRA (STIGATELLA) TRISTIS, Swainson.

This species is also quoted from Mazatlan, Panama, and St. Elena, West Columbia.

9. CONUS NUX, Broderip.

10. CIRITHIUM MACULOSUM, Kiener.

11. CALYPTRÆA, sp.

There are two small specimens of a species of this genus in the collection, probably the young stage of *C. tortilis*, Reeve, or *C. alveolata*, A. Adams, both of which are described as inhabitants of these islands. One of them has taken up its abode in the shell of a dead *Fissurella*, and has curiously extended the margin of its shell through the apical hole.

12. HIPPONYX GRAYANA, var., Menke.

A young shell, apparently belonging to this species, differs from the normal form in being much more coarsely radiately costated; and consequently the crenulation of the basal margin is considerably more conspicuous.

13. RISSOMA STRICTA, Menke.

The single specimen from the Galapagos Islands agrees very closely with the description given by Menke (*Zeitschrift für Malakozoologie*, 1850, p. 177). The labrum is very greatly thickened, and the transverse liration is strongly developed around the lower half of the body-whorl. The whorls are ten in number, and have about twenty smooth ribs, which are slightly flexuous on the last. Fig. 25, on plate iii. of Schwartz von Mohrenstein's monograph of the genus, gives a very good representation of this species.

14. TROCHUS (OMPHALIUS) COOKSONI, sp. n. (Plate XI. fig. 7.)

Testa valde umbilicata, suborbiculata, levissime conoidea, fusco roseoque variegata, lineis albidis nigro articulatis obscure picta; anfractus $4\frac{1}{2}$, sublævigati, convexiusculi, striis spiralibus paucis tenuibus insculpti; ultimus superne convexus, infra suturam leviter depressus, ad peripheriam complanatus, idcirco biangulatus, basi subplanus, tenuissime spiraliter striatus, circa umbilicum sulco haud profundo aratus; umbilicus albus, profundus, callo albido, ad basim columellæ dentem formante circumdatus; apertura suborbicularis; columella arcuata, anfractui callo juncta.

Diam. maxima 8 millim., minima 7, alt. 4.

This shell is deeply umbilicated, elevately orbicular, convex above, only slightly conical and flat beneath; the last whorl is flattened at its middle; and this produces a double angulation, which, however, is not very conspicuous; there is also a faint depression a little below the suture. The coloration of this species is not very definite; the upper surface is blotched irregularly with pink and brown, and some spiral, articulated lines, the base is a trifle paler; the only sculpture consists of fine spiral striations, which are most conspicuous on the base; the callus which surrounds the umbilicus is whitish, and terminates in a faint tooth on the columella, and is bordered by a shallow sulcus in the whorl. The columella terminates above in a callosity which extends upward some distance on the whorl, and also spreads out within the aperture.

T. occultus of Philippi, bears a faint relationship to this form, but is more conoid and more strongly sculptured.

15. FISSURELLA OBSCURA, Sowerby.

16. CHITON (LOPHYRUS) GOODALLII, Broderip.

17. CHITON (LOPHYRUS) SULCATUS, Wood.

18. *ARCA*, sp.

Two small shells, probably the young of a larger species, seem most nearly allied to *A. gradata*, Brod. & Sowb.; they are rather more finely reticulated than is usual with that species, but in form, and the position of the umbones, they agree very well.

B. *Terrestrial Species.*19. *BULIMUS NUX*, Broderip.

The specimens of this species collected by Commander Cookson are very coarsely striated, and much darker in colour than those described by Broderip. They are striped longitudinally with a mixture of slate-colour and brown, with here and there some pale streaks; and some specimens have a distinct pale band around the middle of the body-whorl; and the four apical whorls are bluish black.

This species is considerably variable in form, some examples being much more elongate than others.

The following measurements show how great is the variation in length. One shell is 20 millims. long and 10 in diameter, and another very short one has a length of only 16 millims. and yet is the same width as the longer specimen.

20. *BULIMUS UNIFASCIATUS*, Sowerby.21. *BULIMUS ESCHARIFERUS*, Sowerby.

This species is quoted by Reeve as having been found at Chatham Island by Darwin. The Charles-Island shells are considerably larger than those from the above locality, and also coarser in sculpture, some of them displaying spiral granose or rugose striation as in *B. rugulosus* of Sowerby, from the same islands; and, indeed, they appear to be an intermediate variety or connecting link between the two species, both as regards size and sculpture. The largest specimen measures 19 millims. in length, and $7\frac{1}{2}$ in width.

22. *SUCCINEA BETTII*, sp. nov. (Plate XI. fig. 8.)

Testa ovata, superne aliquanto acuta, tenuissima, diaphana, flavo-cornea, versus apicem rubescens, irregulariter arcuatim striatula, nitens; anfractus 3, penultimus parvus convexus, ultimus maximus, inflatus; apertura ovata, superne angustata vix obliqua; columella obliqua, parum arcuata, tenuissime callosa; peristoma simplex regulariter arcuatum.

Long. 13 millim., diam. maxima 8, aperturæ longit. 10 millim., diam. $5\frac{3}{4}$.

Var. *Testa brevior.*

This species is most nearly allied to *S. rubicunda* Pfeiffer, which was described as coming from the island of Masafuera, off the coast of Chili. From it the present species differs in consisting of half a whorl more. This difference is quite apparent when the spires of the two species are regarded with the mouth of the shell towards the eye. The penultimate and apical whorls of the Galapagos species

will be seen to be considerably more elevated than in *rubicunda*. The colour of the latter is rather paler, except the apex, which is perhaps a trifle deeper in tint.

V. CRUSTACEA. By EDWARD J. MIERS.

But little attention has hitherto been paid to the Crustaceans of the Galapagos archipelago, except as regards the *Oxyrhyncha* (*vide* Bell, Zool. Trans. ii. p. 39 *et seq.* 1841); and Commander Cookson's collection contained four species only, two of which are well known and widely distributed, the two others being undescribed.

1. LEPTODIUS COOKSONI, n. sp. (Plate XII. fig. 1.)

Carapace smooth, transverse, scarcely at all convex, surface everywhere finely punctulated, the punctulations more crowded upon the anterior part. Frontal margin with the median fissure distinct, obscurely 4-lobed. The frontal, gastric, and antero-lateral regions areolated, the areolets and intervening fissures well defined. Antero-lateral margins obtuse and rounded, the tooth at the external orbital angle and the first marginal tooth quite obsolete, the three following teeth having the form of obscure rounded lobes. Posterior to the last tooth or lobe of the antero-lateral margin are two or three short, obscure, transverse lines. Anterior legs very strong, granulated; wrist and upper and outer surface of hand with numerous raised reticulating lines; a blunt tooth at the antero-internal angle of the wrist, and a slight ridge on the upper and inner margin of the hand, terminating posteriorly in a tubercle. Fingers black. Ambulatory legs short, smooth, and without hairs, except on the tarsi, which are closely tomentose. Abdomen of ♂ 5-, of ♀ 7-jointed. Length of carapace of ♂ about $\frac{7}{12}$ in. Breadth $\frac{11}{12}$ in.

Hab. Charles Island.

A single, apparently adult male is in the collection, and a female, much smaller. Their colour (in spirits) is dark reddish brown. This species has altogether the external aspect of a *Xanthodius*, but has not any trace of the ridge upon the palate, the character upon which the genus was founded by Stimpson. It is to be noted that in *Xanthodius* this ridge is not produced to the anterior margin of the buccal area, and, therefore, does not completely define the branchial channel; so that in fact the genus *Xanthodius* occupies an intermediate position between the Chlorodiinæ, in which the palatal ridge is entirely absent, and the Oziinæ, in which it is fully developed.

2. GRAPSUS PICTUS.

Pagurus maculatus, Catesby, Nat. Hist. Carolina, ii. pl. xxxvi. fig. 1 (1743).

Grapsus pictus, Latr. Hist. Nat. Crust. vi. p. 69 (1803): M.-Edw. Hist. Nat. Crust. ii. p. 86 (1837).

Hab. Charles Island.

One specimen of this species, an adult male (length $2\frac{2}{3}$ in., breadth

3 in.), is in the collection. It occurs in nearly all the warmer temperate and tropical seas of the globe.

The specimen from Charles Island resembles in all respects specimens of *G. altifrons*, Stimpson (Ann. Lyc. Nat. Hist. New York, vii. p. 230, 1860), in the collection of the British Museum, from Cape St. Lucas, California, presented by the Smithsonian Institution. This species cannot be regarded as distinct from *G. pictus*, as the characters given are by no means constant or restricted to Western-American specimens.

3. REMIPES PACIFICUS.

Remipes pacificus, Dana, U.S. Expl. Exp. xiii. Crust. i. p. 407, pl. xxv. fig. 7 (1852).

Hab. Charles Island.

One specimen was obtained.

This species was described by Dana from specimens collected at the Fiji and Sandwich Islands; its occurrence at Cape St. Lucas, California, has since been recorded by Stimpson; and specimens from the last-mentioned locality, presented by the Smithsonian Institution, are in the collection of the British Museum. There are also specimens in the collection from the New Hebrides, Fiji, Navigators', and Samoa Islands, the coast of Australia, the Philippines, and Mauritius.

I think it not improbable that this species may be identical with the *Remipes testudinarius* of Latreille (Gen. Crust. et Ins. i. p. 45), described and figured by Milne-Edwards (Hist. Nat. Crust. p. 206, pl. xxi. figs. 14-20), from Australia.

4. CUBARIS GALAPAGOËNSIS, sp. n. (Plate XII. fig. 2.)

Convex, narrow-oblong, minutely punctulated, and strongly granulated. Head narrow-transverse, with two or three small granules near its posterior margin. Eyes very small, black. First segment of the body with two larger sigmoid elevations on its dorsal surface, near its anterior margin, the granulations less regular and more numerous than on the succeeding segments; the six succeeding segments with a transverse series of about six regularly placed granules near the posterior margin, and two or three in front of them, on each side of the middle line a group of larger granules; towards the lateral margins the granules again become uniseriate. Segments of the tail with but one or two small granules towards the lateral margins; last segment concave on the sides, wider at its proximal than at its distal extremity, and with three small granules on its upper surface. Antennæ with the penultimate about half the length of the last joint. Colour iron-grey, segments with paler margins and patches on each side of the middle line.

Hab. Charles Island.

A single specimen is in the collection. This species is distinguished from most of its congeners by the strongly granulated segments of the body. In *C. cubensis*, De Saussure (Mém. Soc. Phys. et Hist. Nat. Genève, xiv. (2) p. 481, pl. v. fig. 42, 1858), the segments

are granulated on each side, but the transverse series of submarginal granules are wanting.

VI. MYRIOPODA and ARACHNIDA. By A. G. BUTLER.

MYRIOPODA.

1. SCOLOPENDRA COMPLANATA.

Scolopendra complanata, Newport, Ann. & Mag. Nat. Hist. 1st ser. xiii. p. 99.

One example, Charles Island.

ARACHNIDA.

1. ANDROCTONUS AMERICUS.

Androctonus americanus, Linnæus, Syst. Nat. 2, p. 1038. no. 4.

One example, Charles Island.

2. LYCOSA INDOMITA.

Lycosa indomita, Nicolet, Gay's Hist. Fis. de Chili, Aran. pl. 2. fig. 12 (1854).

One example, Charles Island.

Previously known from Chili.

3. THERIDION CAROLINUM, n. sp. (Plate XIII. figs. 3, 3^a, 3^b.)

♀. Cephalothorax testaceous, cordiform, truncate in front, caput ascending, about half the width of the pectoral region, separated by an oblique depressed line on each side, and having a central longitudinal brownish line; eyes amber-coloured with black margins, arranged in two very slightly convex rows across the anterior part of the caput; the four central eyes forming a nearly regular square, the posterior pair being larger; the lateral pairs placed obliquely; abdomen ovate, black, with a dorsal longitudinal moniliform band, and three converging oblique lateral stripes (not reaching the central band) whitish; legs ochraceous, setose; tibiæ banded with brown, palpi rather slender, testaceous, brownish at the tips; maxillæ and falces testaceous; pectoral plate scutiform, testaceous in the middle, brown on each side; ventral surface of abdomen with a broad longitudinal irregular whitish band, and a marginal streak of the same colour on each side. Length 7 millims; relative length of legs 1, 4, 2, 3.

One example, Charles Island.

4. LATRODECTUS APICALIS, n. sp. (Plate XIII. figs. 5, 5^a, 5^b.)

♀. Cephalothorax shining piceous, cordiform, truncate in front, caput ascending, separated by a strongly defined depressed oblique line on each side; anterior eyes blackish, posterior amber-yellow, arranged in two convex rows on the front of the caput; the four central eyes forming a nearly regular quadrangle, the posterior pair being larger; the lateral pairs placed rather further back and

obliquely; abdomen ovate, shining, piceous, with bronzy reflections, densely setose; a dorsal longitudinal ill-defined carina, and on either side a series of about five punctures; an apical white-tipped irregular orange spot; legs shining, piceous, setose; proximal extremities of tibiæ and the metatarsi slightly reddish; maxillæ and falces dark olivaceous; pectoral plate scutiform, dark olivaceous; ventral surface of abdomen olivaceous at the base, a central laterally excised large orange spot. Length 9 millims.; relative length of legs 1, 4, 2, 3.

Four examples, Charles Island.

This species seems most nearly to approach *L. formidabilis* of Nicolet. Two of the examples are much paler than the type, their abdomens having a greyish appearance.

5. *EPEIRA COOKSONII*, n. sp. (Plate XIII. figs. 2, 2^a, 2^b, 2^c.)

♀. Cephalothorax reddish tawny, with three (central and lateral) longitudinal brown stripes, elongate cordiform, truncated in front, nearly flat, with a deep depression behind the head; eyes arranged on the front margin of the caput, the four central ones forming an elongate quadrangle upon a central prominence, the lateral pairs placed further back at the anterior angles of the cephalothorax, very small; abdomen velvety black, with a beautiful longitudinal sceptre-like band, and dotted lateral stripes, gold, the inner margins of the lateral stripes indicated by an interrupted sinuated golden line; legs reddish tawny, the distal extremities of the tibiæ, metatarsi, and tarsi blackish, the femora and tibiæ sprinkled with black bristles, the metatarsi and tarsi clothed with black hairs; palpi ochraceous, setose, with blackish terminal joint; falces mahogany-red, maxillæ and labrum deep castaneous, bordered with ochraceous; pectoral plate subpyriform, pentagonal, piceous, with a longitudinal central testaceous streak; ventral surface of abdomen velvety black, castaneous at the base, streaked at the sides with undulating lines of silvery hair; four large central pale ochraceous spots, in the centre of which is a whitish spot; a red spot on each side of the region of the spinners. Length 16 millims.; relative length of legs 1, 4, 2, 3.

Nine examples, Charles Island; six specimens, Albemarle Island.

Var. abdomen olivaceous, markings whitish.

One specimen, Albemarle Island.

This beautiful species is most nearly allied to *E. oaxacensis* of Keyserling, the figure of which would almost answer for it; but the description of the coloration does not at all agree with it.

6. *GASTERACANTHA INSULANA*. (Plate XIII. figs. 1, 1^a, 1^b, 1^c.)

Gasteracantha insulana, Thorell, Öfvers. Vetensk. Akad. Förhandl. xvi. p. 302. no. 8 (1859, edit. 1860); Eug. Resa, Zool. Arachn. p. 17 (1868).

Seven specimens, Charles Island, one specimen, Albemarle Island.

This very handsome species was originally described as from the Galapagos Islands.

7. THOMISOIDES UTRIFORMIS, n. sp. (Plate XIII. figs. 4, 4^a, 4^b, 4^c.)

Cephalothorax cordiform, truncate in front (the caput nearly straight at the sides), orange-tawny, pilose, with marginal and radiating lines of short black setæ; eyes pale olive-hyaline, the central pair close together on the centre of the anterior margin of the caput, lateral pairs tolerably wide apart, placed on the lateral anterior margins of the caput, slightly obliquely; abdomen trapezoidal, excavated in front, transversely wrinkled and bisinuate behind, pilose, sordid ochraceous, clothed in front with coarse black setæ, a series of depressions on each side; legs testaceous, banded with grey, with longitudinal series of short black setæ; palpi testaceous, setose; falces castaneous, setose; maxillæ and labrum castaneous; pectoral plate testaceous, circular, slightly truncated in front and behind; abdomen below olive-brown, paler at base. Length 9 millims.; relative length of legs 2, 1, 3, 4.

One specimen, Charles Island.

Most like *T. rubripes* of Nicolet.

VII. COLEOPTERA. By C. WATERHOUSE.

GEODEPHAGA.

SELENOPHORUS GALAPAGOËNSIS, G. R. Waterh.

The type of this species, found by Mr. Darwin and described as "*piceus*," is evidently immature, as the two specimens just received from Commander Cookson (unfortunately also both females) are almost black above, but very slightly æneous when viewed obliquely. The larger specimen measures $4\frac{1}{3}$ lines.

Hab. Charles Island (*Darwin* and *Cookson*).

HYDRADEPHAGA.

EUNETES OCCIDENTALIS, Er.

Six examples, which agree very well with the brief description of this species.

Hab. Charles Island (*Cookson*).

ACILIUS INCISUS, Aubé, var.

Three examples. The male agrees perfectly with that of *A. incisus*. The female differs in having the thorax more punctured, and in having the elongate punctures on the elytra much stronger and more close than in any examples of *incisus*; and the punctures, although diminishing in strength and density, extend nearly to the apex.

As considerable difference is admitted to exist in this respect in *A. circumscriptus*, the specimens from Galapagos must, I think, be considered mere varieties of *A. incisus*.

Hab. Charles Island (*Cookson*).

PALPICORNIA.

TROIPISTERNUS LATERALIS, Fab.

This species has already been recorded from the Galapagos, and appears to be common there.

Hab. Charles Island (*Darwin* and *Cookson*).

NECROPHAGA.

ACRIBIS, gen. nov.

Head large, broad, convex above; epistoma slightly produced, narrow; antennæ about as long as the head, 1st joint rather elongate, 2nd short obconic, 3rd as long as the 2nd and more slender, 4th to 7th becoming gradually shorter, 8th nearly globular, the 9th, 10th, and 11th forming a large ovate compressed club. Intermediate legs retractile; posterior femora partially covered by the posterior margin of the metasternum. Basal segment of the abdomen large, the 2nd and 3rd very short.

Closely allied to *Clambus*, which it resembles in general form.

ACRIBIS SERRATIVENTRIS, sp. n.

Subglobosus, niger, nitidus, discrete subtilissime punctulatus; capite subtus antennisque piceo-testaceis; elytris apice obtuse rotundatis; abdomine piceo, segmentis marginibus minute serratis. Long. $\frac{2}{3}$ millim.

Build of *Clambus minutus*, but smaller and not so much narrowed posteriorly. Shining black. Head large, very broad and very convex, angular at the sides, emarginate on each side of the base of the epistoma at the insertion of the antennæ. Thorax ample, the whole surface marked with fine transverse scratches, and sparingly and very finely punctured (as are also the head and elytra), each puncture bears a short fine black hair; the posterior angles are broadly rounded. Scutellum triangular, short, and very broad. Elytra convex, but less so posteriorly, a little longer than broad, not much narrowed towards the apex, which is broadly rounded.

Underside. — Head beneath pitchy testaceous. Thorax below deeply excavated for the reception of the head in repose. Intermediate legs, when retracted, completely hidden by the posterior portion of the mesosternum. Metasternum a little shorter than the basal segment of the abdomen, with its posterior margin slightly flexuous in the middle. Posterior femora rather large, well separated from each other at their bases; tibiæ about $\frac{2}{3}$ the length of the femora: posterior tarsi as long as the tibiæ, rather stout. Abdomen pitchy, the margins paler, the margins of the 1st to 4th segments serrate or, rather, minutely toothed like a comb; the basal segment, as well as the sterna, are distinctly and moderately thickly pencilled.

Hab. Charles Island (*C. Darwin*).

PHALACRUS DARWINII, sp. n.

Oblongo-ovalis, convexus, piceo-niger, nitidissimus; antennis pe-

dibusque obscure testaceis; elytris punctorum seriebus duabus, singulis stria suturali, antice abbreviata, impressis. Long. $1\frac{1}{2}$ millim.

Nearly black; the head pitchy. Thorax (when seen under a microscope) sparingly punctured. Elytra with an impressed sutural stria, only visibly punctured when seen under the microscope; parallel to this stria is a row of punctures, a little further removed from the stria than the stria is from the suture; there is a second row of punctures, but it is not quite so distinct as the first.

Hab. Charles Island (*C. Darwin*).

MALACODERMATA.

MELYRIDÆ.

ABLECHRUS, gen. nov.

Eyes entire, not very prominent. Antennæ inserted in front of the eyes, of 9 joints, the 1st joint short obconic; the 2nd as long as broad; 3rd as long as the first, a little rounded at its base; 4th and 5th as long as the 3rd, subcylindrical; the 6th and 7th a little shorter; the 8th one third longer than broad, narrowed at its extreme base; the 9th joint one third longer than the 8th, elongate-ovate, subacuminate at the apex. Thorax convex, transverse, rounded at the sides and behind. Elytra at their base not broader than the thorax, but somewhat suddenly widened below the shoulders, ample posteriorly, rounded at the apex.

This insect closely resembles *Ebæus thoracicus* in form; the structure of the antennæ, however, is quite different, and unlike any genus of Melyridæ with which I am acquainted. Its position would be near *Ebæus*.

ABLECHRUS FLAVIPES, sp. n.

Æneus, nitidus, vix pubescens; thorace transverso, cum elytris sat crebre evidenter punctato, his thorace fere triplo longioribus, basi thorace haud latioribus, postice ampliatis, apice rotundatis; antennis flavo-testaceis, articulis tribus apicalibus infuscatis; pedibus flavis. Long. 2 millim., lat. 1 millim.

General form that of *Ebæus thoracicus*, but smaller and relatively a trifle shorter; thorax rather convex, a little narrowed in front, very finely margined at the sides and posteriorly, distinctly and rather thickly punctured. Scutellum distinct. Elytra at their base not broader than the thorax, but immediately becoming broader and rounded posteriorly. Legs yellowish; the posterior tibiæ slightly curved; apex of tarsi slightly infuscated.

Hab. James Island (*C. Darwin*).

HETEROMERA.

STOMION GALAPAGOËNSIS, G. R. Waterh.

Three examples were brought by Commander Cookson.

AMMOPHORUS COOKSONI, sp. n.

Oblongus, ater, vix nitidus; capite lato, planato, crebre fortiter longitudinaliter ruguloso-punctato: thorace quam caput $\frac{1}{4}$ latiore, latitudine quam longitudo $\frac{1}{5}$ majore, sat convexo, confertim fortiter punctato, antice posticeque oblique angustato, lateribus medio subparallelis, angulis anticis subacutis prominulis, posticis acutiusculis vix divaricatis; elytris basi thorace haud latioribus, postice paulo ampliatis, convexis, fortiter late sulcatis, sulcis seriebus punctorum magnorum transversim impressis, interstitiis angustis cariniformibus, nitidis; humeris denticulo acuto armatis; pedibus brevibus obscure piceis, tibiis asperatis. Long. 3 lin., lat. $1\frac{1}{3}$ lin.

This species is closely allied to *A. obscurus*, G. Waterh., but is relatively broader. The 4th to the 11th joints of the antennæ are very strongly transverse; the forehead is more strongly punctured; and the interspaces are inclined to form rugulæ, especially near the eyes. The thorax is more strongly punctured, about $\frac{1}{5}$ broader than



long (whereas in *A. obscurus* it is only as broad as long); the sides are more sinuous. The costæ of the elytra are more pronounced, and the channels are more slightly punctured. The legs are shorter somewhat and rough.

Hab. Charles Island.

Brit. Mus.

PHYTOPHAGA.**HALTICIDÆ.****DOCEMA, gen. nov.**

Antennæ approximate at their base. Claws simple. Cotyloid cavities for the anterior coxæ open. Prothorax marked posteriorly with a transverse impressed line, not bounded on each side by the short longitudinal impression. Posterior femora not reaching to the extremity of the elytra. Basal joint of the posterior tarsi as long as the two following joints taken together; the 2nd and 3rd joints about as long as broad.

The position of this genus appears to me to be next to *Graptodera*.

1. DOCEMA GALAPAGOËNSE, G. R. Waterh.

Haltica galapagoënsis, G. R. Waterh. Ann. and Mag. N. H. 1845, xvi. p. 39.

Hab. Charles Island (*C. Darwin*).

2. LONGITARSUS LUNATUS, sp. n.

Ovalis, convexus, piceo-testaceus, nitidus; thorace convexo, paulo latiore quam longiore, postice parum angustato, fere lævi; elytris basi thorace vix latioribus, medio rotundato-ampliatis, crebre evidenter punctatis, lunula communi picea notatis.

Long. $1\frac{3}{4}$ millim.

Closely resembles *L. ballotæ*, Marsh., in form and general appearance. The antennæ are nearly the same; but the second joint is a little more pear-shaped; and the third is as long as the second, but more slender. The thorax is a trifle less broad, and not visibly punctured. The elytra are very convex, much rounded at the sides, broadest across the middle, the shoulders almost completely effaced; the surface is somewhat uneven, which makes the punctuation less distinct; and the punctures are rather closer and finer than in *L. ballotæ*; a lunate pitchy band is placed across the middle.

Hab. Charles Island (*C. Darwin*).

GALERUCIDÆ.

DIABROTICA LIMBATA, sp. n.

Nigra, nitida; thorace pallide flavo; elytris piceis, obsolete costatis, inter costas irregulariter biserialim striato-punctatis, apice lævi, marginibus flavis; antennis basi pedibusque obscure testaceis, tarsis fuscatis. Long. 2 lin.

Head shining black. Thorax scarcely broader than long, a little narrowed towards the base, pale yellow, with two well-marked depressions on the disk. Elytra pitchy; at their base not quite twice as broad as the thorax, rather broader behind, obsoletely costate towards the sides, with double irregular lines of distinct (but rather fine) punctures between the costæ; the apex nearly smooth; the margins pale yellow, the yellow part widening at the apex. Legs yellowish, the knees and tarsi slightly dusky.

Hab. James Island (*C. Darwin*).

The following are the species of Coleoptera known to me to have occurred in the Galapagos Islands.

1. Albemarle Island.

Corynetes rufipes, *Fabr.*

2. James Island.

Notaphus galapagoënsis, *G. R. Waterh.*

Dermestes vulpinus, *Fabr.*

Ablechrus darwini, *C. Waterh.*

Corynetes rufipes, *Fabr.*

Ammophorus bifoveatus, *G. R. Waterh.*

Anchonus galapagoënsis, *G. R. Waterh.*

Diabrotica limbata, *C. Waterh.*

Scymnus galapagoënsis, *G. R. Waterh.*

3. Chatham Island.

Creophilus villosus, *Grav.*

Bostrichus uncinatus, *Germ.*¹

Ammophorus galapagoënsis, *G. R. Waterh.*

Pedonæces pubescens, *G. R. Waterh.*

4. Charles Island.

Selenophorus galapagoënsis, *G. R. Waterh.*

Eunectes occidentalis, *Er.*

Acilius incisus, *Aubé.*

Tropisternus lateralis, *Fabr.*

Acribis serrativentris, *C. Waterh.*

Phalacrus darwinii, *C. Waterh.*

Stomion galapagoënsis, *G. R. Waterh.*

Ammophorus cooksoni, *C. O. Waterh.*

Ormiscus variegatus, *G. R. Waterh.*

Otiorhynchus cuneiformis, *G. R. Waterh.*

Docema galapagoënsis, *G. R. Waterh.*

5. The particular island not specified.

Feronia calathoides, *G. R. Waterh.*

Feronia insularis, *Bohem.*

Feronia galapagoënsis, *G. R. Waterh.*

Amblygnathus obscuricornis, *G. R. Waterh.*

Copelatus galapagoënsis, *G. R. Waterh.*

Philhydrus, *sp.*

Copris lugubris, *Bohem.*

Oryctes galapagoënsis, *G. R. Waterh.*

Physorhinus galapagoënsis, *G. R. Waterh.*

Stomion helopoides, *G. R. Waterh.*

Stomion lævigatum, *G. R. Waterh.*

Ammophorus obscurus, *G. R. Waterh.*

Pedonæces galapagoënsis, *G. R. Waterh.*

Pedonæces morio, *Bohem.*

Phaleria manicata, *Bohem.*

Eburia amabilis, *Bohem.*

VIII. HYMENOPTERA and DIPTERA. By FRED. SMITH.

The Hymenoptera collected by Commander Cookson are referable to two species. Three other species collected by Mr. Darwin during the Voyage of the 'Beagle,' specimens of which were quite recently deposited in the British Museum by G. R. Waterhouse, Esq., may be added on this occasion.

¹ The "*Apate*" mentioned by Mr. Waterhouse, *Ann. and Mag. Nat. Hist.* 1845, xvi. p. 36.

1. *CAMPONOTUS SENEX*, Smith, Cat. Hymenopt. part vi. p. 47.
From Charles Island (*W. E. Cookson*).

2. *CAMPONOTUS PLANUS*.

Worker. Length, $1\frac{3}{4}$ line. Black, with the legs, antennæ, and mandibles ferruginous; thinly sprinkled with pale glittering hairs. Head slightly shining, oblong, a little wider than the thorax, with the eyes prominent and situated high at the sides near the vertex. Thorax rounded anteriorly, flattened above, and gradually narrowed to the metathorax, which is truncate behind; the sutures dividing the pro-, meso-, and metathorax only slightly impressed. Abdomen ovate, semiopaque; the node of the petiole incrassate, narrow, the sides nearly parallel, rounded above.

Charles Island (*C. Darwin*).

3. *CAMPONOTUS MACILENTUS*.

Worker. Length, $2\frac{1}{4}$ lines. Pale ferruginous, with the legs pale testaceous, smooth and shining, and having a few erect scattered pale hairs. The head wider than the thorax, oblong, with the eyes large, ovate, and black; the vertex slightly emarginate behind. Thorax compressed and much narrowed behind, convex above. Abdomen wider than the head, and oblong-ovate. The scale of the petiole wedge-shaped and rounded above.

Charles Island (*C. Darwin*).

4. *AGRIOMYIA VAGANS*.

Female. Length 2 lines. Head and thorax rufo-piceous; abdomen pale ferruginous, smooth and shining. Head oblong, the vertex rounded behind; the mandibles and antennæ paler than the head. Thorax a little longer than the head, deeply strangulated between the pro- and metathorax; the former rounded in front and very convex; the metathorax abruptly truncated obliquely; the legs rufo-piceous, with the tarsi and the articulations pale testaceous; the tibiæ paler than the femora and spinose exteriorly. Abdomen oblong, cylindric, and one third longer than the head and thorax, mottled with dark rufo-piceous stains; the second segment with three or four transverse impressed lines; the apex acute.

On comparing this insect with females of the different genera into which the genus *Thynnus* has been divided, it appears from its general structure to belong to the genus *Agriomyia* of Guérin.

Charles Island (*C. Darwin*).

5. *XYLOCOPA MORDAX*, Smith, Trans. Ent. Soc. Lond. 1874, p. 294, ♀.

Male. Length 8 lines. Ochraceous, the ocelli and mandibles black, the latter with a yellow spot at their base; the clypeus with a rufo-fuscous longitudinal line in the middle; the antennæ fuscous above; the pubescence fulvous. The mesothorax smooth and shining on the disk, as is also the scutellum; both nearly impunctate, having only a few very fine punctures: the mesothorax blackish on each

side and closely punctured. Wings fulvo-hyaline, their nervures dark ferruginous; the femora rufo-piceous, palest towards their apex; the pubescence on the thorax and legs fulvous. The apical margins of the segments of the abdomen rufo-piceous; the pubescence fulvous.

Albemarle Island, Charles Island (*W. E. Cookson*).

Of DIPTERA, Commodore Cookson collected two species in Charles Island, one being the *Musca ochricornis* of Wied., the other apparently new—

SYRPHUS ALBOMACULATUS.

Length 4 lines. The front covered with silvery tomentum, as well as the posterior margin of the head behind the eyes. The thorax of a metallic blue-green; the scutellum rufo-piceous, with its posterior margin pale testaceous. Wings hyaline and splendidly iridescent; the nervures dark fuscous. The legs rufo-piceous, with the anterior tibiæ, the base of the intermediate and posterior pair, and also the tips of the femora pale rufo-testaceous. Abdomen blackish brown, smooth and shining; at the base of the second and third segments laterally a large white isosceles-triangular macula.

IX. NEUROPTERA. By R. McLACHLAN.

Only two species collected; both are Dragonflies, belonging to the subfamily *Libellulina*.

1. PANTALA HYMENÆA.

Libellula hymenæa, Say, Journ. Acad. Philad. vol. viii. p. 19.

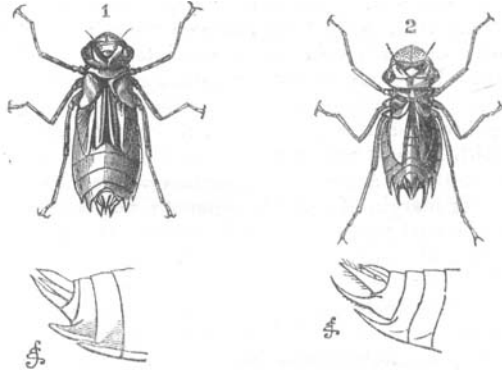
Pantala hymenæa, Hagen, Neurop. N. Amer. p. 142.

One individual. In the 'Neuroptera of North America,' Hagen records this only from Indiana, Western Texas, and Mexico. Later on, in his "Synopsis on the *Odonata* of America" (Proc. Bost. Soc. Nat. Hist. vol. xviii. May 1875), he adds Illinois and Cuba as localities. In the 'Entomologist's Monthly Magazine,' vol. xi. p. 92 (September 1874), I noted that Mr. G. F. Mathew, R.N., found the species at Payta, Peru, and says of it:—"This fine species occurred along the sea-coast. I cannot imagine where the larvæ fed, as there was no fresh water within many miles of Payta, and rain is almost unknown there. Just above high-water mark, in some places, there were large patches of a species of *Mesembryanthemum*; and these dragonflies were always to be found hawking above them." I possess an example from Chili. There can be little doubt that the species is migratory, though not to the same extent as its congener *P. flavescens*, which is found almost all over the world.

2. TRAMEA, sp. ?

Three individuals. As these examples are in bad condition, and having regard for the difficulties that surround the group, I do not venture to describe them, although they possibly pertain to a new species, of large size (almost as large as *Pantala hymenæa*), and with

only a very small dark anal spot on the hinder wings, in this latter character differing from most of the species of Central America.



There are also two "nymph"-forms, which I was at first inclined to consider only conditions of one species, but which I am now convinced represent the nearly mature condition of two; and it may be that they pertain to the *Pantala* and *Tramea* respectively.

The larger form (*Pantala*?) (fig. 1) may be described as follows:—

Length, 23 millims. Body above (excepting the eyes and anal processes) uniformly opaque, pulverulent, brownish grey; beneath, dingy yellowish and shining. Eyes yellowish. Mask of labium elongate, its anterior edge forming a triangle with obtuse apex. Mandibles very large and prominent, standing out much in advance of the front of the head, their interlocked edges with about eight rather blunt teeth; very convex externally, forming (with the mask) a gibbous projection. Head above with a large and deep triangular depression behind the region of the ocelli. Pronotum with rounded hinder margin. Anterior rudimentary wings very narrow, lanceolate, extending to the hinder suture of the sixth abdominal segment; posterior broad in the anal portion, rather longer than the anterior. Abdomen short and broad, a small black triangular spot in the middle of the hinder suture of each ventral segment; the alate marginal portion very broad if viewed from beneath. Eighth segment produced at the sides into a strong flattened acute tooth, furnished with small distant spines on the edge. Ninth produced into a much longer and broader curved tooth, broadly triangular at its base, also with small spines on its edge. The form of the anal valves &c., is as follows:—Median dorsal process long and very strong, its sides dilated and triangular at base, the upper edge forming a sharp keel. Lateral superior processes slender and much shorter. Lateral inferior processes long, lanceolate, and very acute, scarcely shorter than the median dorsal process, slightly curved. All the anal processes shining, and dingy yellowish. Legs slender, not especially long, concolorous with the body; but on the femora and tibiæ there are indications of broad fuscous rings, and the intermediate and posterior tarsi are blackish.

The smaller "nymph" (*Tramea*?) (fig. 2) is only 19 millims. long. Uniformly very shining, brown, with a tinge of blackish above; pale greyish yellow beneath. Eyes deep black. Mouth-parts even still more prominent than in the form above described: mandibles thickly sprinkled with small blackish dots; the interlocked edges without visible teeth. Head above with an oblong depression behind the region of the ocelli, with a lateral extension on each side, dilated, and forming broad shallow pits, in which the antennæ are inserted. Pronotum with a broad yellowish median band; its posterior edge raised and rounded. Anterior rudimentary wings narrow, extending over the hinder margin of the 7th segment; posterior very broad at the base in the anal portion, network distinct, the apices extending to beyond the middle of the 8th segment. Abdomen very short and broad; each ventral segment with two small blackish spots, having a tendency to form two lines on the terminal segments; alate lateral portions extremely broad; 5th and 9th segments each produced laterally and posteriorly into a lanceolate acute process, with fine spines on the outer edge, that on the 8th extending to about the apical margin of the 9th, that on the latter equally long, and extending beyond the anal processes. Median dorsal anal process lanceolate, strong, curved downward, its dorsal edge with long blackish spines towards the apex. Lateral superior processes slender and spiniform, blackish at the tips, as long as the dorsal. Lateral inferior processes much longer, stronger, and nearly straight, furnished with long and strong black spines, inferiorly at the base with long yellowish spiniform hairs. Legs much longer than in the form above described, more slender, pale brownish, but with a faint blackish line on the femora and tibiæ externally, and with blackish tubercles on their edges, whence arise short yellowish spines.

This "nymph" is evidently in its last stage before the exclusion of the imago. The neururation of the hind wings is distinct; and the position of the triangle warrants the belief that it pertains to *Tramea*.

Upon comparing these "nymphs" with those of two familiar European species, viz. *Plathemis depressa* and *Diplax striolata*, the most striking feature is the greater prominence of the mouth-parts, the longer and more slender legs, and the absence of the dorsal dentate crest on the abdomen. *P. depressa* has the angles of the apical segments not produced into processes; but in *D. striolata* the processes are very evident, and approach the forms here described.

X. LEPIDOPTERA, ORTHOPTERA, and HEMIPTERA.

By A. G. BUTLER.

The following list contains not only the species collected by Commander W. E. Cookson, but also some Hemiptera discovered by Charles Darwin, Esq., during the visit of the "Beagle," and recently deposited in the British Museum.

Among the species most worthy of note may be especially mentioned a beautiful little moth (*Cydosia sylpharis*, n. sp.) obtained by Commander Cookson, and certainly the most splendidly coloured form of that genus yet described.

LEPIDOPTERA.

1. *DEIOPEIA ORNATRIX*, var.

Noctua ornatrix, Linnæus, Syst. Nat. ii. p. 829.

One specimen, Albemarle Island, June 23, 1875.

This is the less heavily marked form of the species, also taken in the Galapagos Islands by Darwin.

2. *CYDOSIA SYLPHARIS*, sp. n.

Primaries dark metallic green; an abbreviated subcostal longitudinal streak, a much longer longitudinal submedian streak, an interrupted longitudinal internal streak, a basicostal litura, several costal spots, a large oblique subapical spot, and a congregation of dots upon the disk towards the external angle silvery white; a spot above the end of the cell, and a second at external angle, bright golden; secondaries hyaline whitish, the veins brown; the borders brownish grey, diffused internally; discoidal cell and area beyond it greenish iridescent; thorax metallic green, spotted with white; body bronzy, greenish towards its anal extremity, white at the sides, primaries below shining brown, secondaries hyaline, with the veins and borders brown; pectus brown, spotted with white, anterior coxæ golden; venter bronzy green, with a central series of large white spots; expanse of wings 1 inch 2 lines.

One example, Albemarle Island, June 23, 1875.

This and the preceding species, although sent in spirit, are in very fair condition.

There are also in Commander Cookson's collection two larvæ of a *Sphinx* moth, two of a Geometer, and a pupa of (apparently) a *Pyralide*, from Charles Island.

ORTHOPTERA.

1. *PANCHLORA SURINAMENSIS*.

Blatta surinamensis, Linnæus, Syst. Nat. ii. p. 687.

Charles Island (2 adult, 2 immature).

2. *PERIPLANETA AMERICANA*.

Blatta americana, Linnæus, Syst. Nat. ii. p. 687.

Charles Island (2 adult examples).

3. *AGRÆCIA COOKSONII*, n. sp.

♀. Above piceous or black, mottled with testaceous; head almost uniformly black; frons castaneous, testaceous at the sides; mandibles black, castaneous at the base; under surface of the body testaceous; oviduct testaceous, its outer half blackish along the margins.

Head dull, nearly smooth, rather broader than the prothorax, an obtuse prominence between the antennæ; antennæ about twice the length of the body; eyes very prominent; frons shining, punctured in the middle; mandibles deeply grooved externally; thorax rugose, with lateral carina; wings undeveloped; abdomen obovate, dorsally

carinate, terminal appendages above short, curved, subpyriform; oviduct much compressed, very acute, curved upwards, not so long as the abdomen; anterior coxæ with a short anterior external fusiform spine; anterior femora with three increasing denticles towards the distal extremity of their infero-interior margin; tibiæ with seven pairs of short acute spines along their inferior margins; middle coxæ without spine; posterior femora with four denticles; posterior tibiæ with ten pairs of short acute spines. Length of the body 11 to 20 lines, oviduct 5 to 7 lines.

Three examples, Charles Island; two examples, Albemarle Island, June 23rd.

The type is from Charles Island; it is the largest and most nearly adult example sent; the smaller examples are much paler.

4. *ACRIDIUM MELANOCERUM*.

Acridium melanoceram, Stål, Eug. Resa, p. 326.

Five examples, Charles Island; three examples, Albemarle Island.

5. *ACRIDIUM LITEROSUM*.

Acridium literosum, Walker, Cat. Derm. Salt. iv. p. 620.

Two examples (one immature), Charles Island.

6. *VATES*? sp. (larval form).

Two examples, Charles Island.

HEMIPTERA.

1. *SCIOCORIS GALAPAGOËNSIS*, n. sp.

Olive-brown, depressed, densely punctured; head rounded and slightly narrowed in front, slightly notched in the middle of its anterior margin, angulated in front of the eyes, rounded behind, about as long as the thorax; thorax deeply excavated in front, depressed at the sides; scutellum longer than the head and thorax together, linguiform; corium of hemelytra extending beyond the end of the scutellum, the pellucid area being consequently extremely small; abdomen reddish brown, clouded with blackish; legs rather slender, testaceous, all the femora with a black internal spot: length 4 lines.

One imago, Charles Island (*W. E. Cookson*).

There is also what I believe to be an immature form of this species; but it is too little developed for accurate determination.

2. *ANASA OBSCURA*.

Anasa obscura, Dallas, Cat. Hemipt. p. 505.

Three examples, Galapagos Islands (*Darwin*).

The particular island is not specified.

3. *NYSIUS MARGINALIS*.

Nysius marginalis, Dallas, Cat. Hemipt. p. 556.

Charles and James Islands (*Darwin*).

This appears to be a common species. It is described by Stål (Eug. Resa, p. 252) as *Cymus galapagensis*; but the form of the head, with its extremely prominent eyes, seems to agree far better with *Nysius*.

4. *MIRIS LINEATA*, n. sp.

Form and size of *M. ruficornis*; pale flesh-colour or pinky white; femora of legs testaceous; head oblong, subconical, abruptly conical in front, about two thirds the length of the thorax; the latter widening hindwards; scutellum cordiform, nearly as long as the head; a central longitudinal well-defined carina from the front of the head to the apex of the scutellum, bordered on each side by a grey line, a grey streak also running from the back of the eyes to the hinder margin of the thorax; abdomen rose-colour, with a central longitudinal carmine line which extends to the anal extremity, and with a lateral similar line which terminates at the antipenultimate segment; hemelytra longer than the abdomen, longitudinally plicate; base of antennæ, and tibiæ of legs, hairy: length $5\frac{1}{2}$ millimetres.

Two examples, Charles Island (*Darwin*).

Mr. Darwin obtained three examples of the larval condition of what is apparently an allied species from James Island.

5. *CAPSUS SPOLIATUS*.

Capsus spoliatus, Walker, Cat. Hemipt. Heteropt. vi. p. 112. n. 254.

Charles and James Islands (*C. Darwin*).

6. *CAPSUS NIGRITULUS*.

Capsus nigrutilus, Walker, Cat. Hemipt. Heteropt. vi. p. 112. n. 255.

Charles Island (*C. Darwin*).

Walker's type is quite black, but apparently not naturally so; two other examples recently obtained, but also collected by Mr. Darwin, are tawny, with bright castaneous spots on the outer margins of the hemelytra.

7. *CAPSUS QUADRINOTATUS*.

Capsus quadrinotatus, Walker, Cat. Hemipt. Heteropt. vi. p. 113. n. 256.

Charles and James Islands (*C. Darwin*).

Evidently a common species.

8. *CAPSUS DARWINI*, n. sp.

Head conical, broader than long; thorax trapezoidal, convex, nearly twice as wide behind as it is long; scutellum rectangularly triangular, slightly longer than the thorax; hemelytra considerably longer than the abdomen; antennæ about the length of the entire body. Colour testaceous, antennæ blackish towards the tips; head, thorax, and corium of hemelytra above, and the sides of pectus below, longitudinally streaked with parallel black lines; membrane with two black spots on the costa, the first at the apex of the corium, and

the other halfway between the latter and the apex of the membrane : length of body $2\frac{1}{2}$ millimetres, of entire insect with the wings closed 4 millimetres.

Three specimens, Charles Island (*C. Darwin*).

A very pretty and well-marked species.

9. *MONANTHIA CYTHARINA*, n. sp.

Filiform, general aspect and coloration of *M. debilitata*.

Head pyramidal, white, the central area longitudinally subcylindrical, with a central carina, reticulated with brown ; thorax much wider than long, with compressed angular lateral wings, subsinuate in front, centre of anterior margin deeply excavated, three well-defined longitudinal keels, the central one straight, the two lateral ones concave ; brown, with white borders and keels, the whole surface reticulated with darker brown ; scutellum cordiform, brown, with darker reticulations, a central longitudinal white keel ; basal half of hemelytra broad and externally strongly convex ; apical area narrower and less convex ; each hemelytron with a longitudinal fusiform area enclosed by a keeled margin, from the base to the middle ; central area brown, with the keels and a central Λ -shaped marking white ; costal borders white, with a quadrate spot near the base and several at apex dark brown ; the whole surface reticulated with dark brown ; legs and antennæ testaceous : length 3 millimetres.

One specimen, James Island (*C. Darwin*).

HEMIPTERA HOMOPTERA.

1. *ISSUS VARIUS*.

Issus varius, Walker, Cat. Homopt. ii. p. 372.

James and Charles Islands (*C. Darwin*).

2. *ISSUS ROSTRIFER*, n. sp.

Head conical, rostriform when viewed laterally, leaf-like above, with a marginal and a central longitudinal ridge ; pronotum considerably wider than long, convex in front, concave behind, with a prominent tubercle behind the antero-interior angle of each eye ; meso- and metanotum narrow, irregular, with a central longitudinal carina ; scutellum triangular with sinuated sides, and narrow marginal ridge ; abdomen laterally compressed, somewhat depressed at base, so that the scutellum, seen laterally, forms with the metanotum a projecting tubercle ; tegmina semicircular, reticulated ; colour testaceous, head above brightest in tint : length 3 millimetres.

Charles Island (*C. Darwin*).

3. *DELPHAX SUBSTITUA*.

Delphax substitua, Walker, Cat. Homopt. ii. p. 354. n. 21.

Charles and James Islands (*C. Darwin*).

4. *DELPHAX VICARIA*.

Delphax vicaria, Walker, Cat. Homopt. ii. p. 355. n. 23.

Charles and James Islands (*C. Darwin*).

5. DELPHAX SIMULANS.

Delphax simulans, Walker, Cat. Homopt. ii. p. 355. n. 24.
Charles and James Islands (*C. Darwin*).

6. DELTOCEPHALUS OBLIQUUS.

Acocephalus obliquus, Walker, Cat. Homopt. iii. p. 851. n. 23.

7. JASSUS PLANUS, n. sp.

Above sordid testaceous; pronotum in front, and head, ochraceous, the latter with a greyish spot in the centre of the ocelli; tegmina pale testaceous, hyaline; pectus and venter pale testaceous; rostrum and legs sandy yellow; eyes brown; ocelli black: head very broad, exceedingly short from the vertex hindwards, convex in front, concave behind; thorax convex in front, the sides converging, subsinuate, and ending in a truncate slightly convex line behind; scutellum triangular, all the sides slightly sinuate; tegmina extending considerably beyond the abdomen, rather narrow, distinctly convex in front; rostrum extending to the second pair of coxæ, broad and angulated at base, its basal article centrally tumid; hind tibiæ with about seven external strong spines: length of body 3 millimetres, including the tegmina $4\frac{1}{2}$ millimetres.

One example from Charles Island (*C. Darwin*).

8. JASSUS LUCIDUS, n. sp.

Shining mustard-yellow; tegmina whitish, transparent; wings white; head broad, exceedingly short from the vertex hindwards, convex in front, concave behind; thorax transverse, much broader than long, very convex in front, less so behind; scutellum triangular; tegmina extending considerably beyond the body, rather narrow, slightly convex in front; rostrum nearly as in preceding species, but narrow at base; hind tibiæ densely spined: length of body about $2\frac{1}{2}$ millimetres, including the tegmina about $3\frac{1}{2}$.

One example, James Island (*C. Darwin*).

The specimen being somewhat damaged, I have been unable to take absolutely definite measurements.

9. JASSUS STRIOLARIS, n. sp.

Head testaceous, above with a central and lateral longitudinal line and a spot on each side between them, black; frons with a central line and the ocelli black; thorax black, with two central dots in front, and two U-shaped markings on the posterior half, testaceous; scutellum testaceous; tegmina black, with longitudinal testaceous veinings; body below black; legs testaceous: structure as in *I. planus*; length of body 3 millimetres, including the tegmina $4\frac{1}{2}$ millimetres.

Charles Island (*C. Darwin*).

XI. ECHINODERMATA. By EDGAR SMITH.

I. ECHINI.

1. CIDARIS THOUARSII, Val.

2. TOXOPNEUSTES SEMITUBERCULATUS, Val.

II. ASTERIIDÆ.

3. *HELIASTER MICROBRACHIA*, Xantus.

III. OPHIURÆ.

4. *OPHIOTHRIX SPICULATA*, Leconte.5. *OPHIONEREIS ALBOMACULATA*, sp. nov. (Plate XI. figs. 1-5.)

Disk somewhat pentagonal, finely scaled, the scales in the region of the radial shields larger than elsewhere; radial shields very small, narrow, pointed within, not far apart, the inner sides nearly straight, outer curved, white with the outer tips blackish; oral shields shaped like a short spear-head, the point being obtuse, and towards the mouth and the handle broad and short, the madreporic shield a little larger and of a somewhat different form; side oral shields irregularly triangular, small, situated on the sides of the orals, the outer angle touching the first very small ventral arm-plate, the lower end not nearly reaching to the apex of the oral shield; mouth-papillæ 6-8 on each mouth-angle, subequal, the outermost one generally the largest; arms about six times as long as the width of the disk, broadest about an inch from it, and towards it gradually attenuating; upper plates irregularly quadrangular, the sides converging outwardly; the outer edge is consequently narrower than the inner, and straight; the supplementary plates on each side about half as large as the central ones; lower arm-plates square, with the angles rounded; 4 spines on about the first twelve side arm-plates, 3 on the rest; the lowest is a little the smallest, the central one the largest (2 millims. in length), the uppermost broad, compressed and truncate at the apex; the single tentacle-scale is large and subcircular. The colour of the disk (in alcohol) dark olive, almost black, varied with white near the radial shields; arms above of the same dark tint as the disk, with white spots at intervals of a few segments, and towards the end of the arms the plates on each side of those which are white or which are white-spotted are almost black; lower arm-plates purplish brown, tentacle-scales a little paler; arm-spines dark olive with pale lips.

Diam. of disk 13 mill.; width of the first dorsal arm-plates including the supplementary ones 2 millims., of the fifteenth 3 millims.

Hab. Charles Island.

This species is remarkable in having the middle portion of the rays considerably broader than the base; the first lower arm-plate is very small, being only about one fourth the size of the next and situated between the side mouth-shields. The white spots on the upper surface of the arms are generally on the outer edges; but towards the end of the arms they meet, thus forming transverse white bands; and on each side of them the adjoining plates are much darker than the roots of the arms, in fact almost black, thus giving a very striking variegated aspect to them.

EXPLANATION OF THE PLATES.

PLATE XI.

- Figs. 1-5. *Ophionereis albomaculata*, p. 92.
 6. *Rhizochilus parvus*, p. 70.
 7. *Trochus (Omphalius) cooksoni*, p. 71.
 8. *Succinea bettii*, p. 72.

PLATE XII.

- Fig. 1. *Leptodius cooksoni* ♂, nat. size, p. 73.
 1 a. Front, antennal, and orbital region, and buccal cavity, showing absence of palatal ridge, enlarged.
 1 b. Hand of male; enlarged, twice nat. size.
 1 c. Abdomen of male; enlarged.
 1 d. Abdomen of female; enlarged.
 2. *Cubaris galapagoensis*; enlarged, three times nat. size, p. 76.
 2 a. Lateral view in outline.
 2 b. Front of head showing antennæ; enlarged, six times nat. size.
 2 c. Terminal segment, do.

PLATE XIII.

- Fig. 1. *Gasteracantha insulana*, Thorell, nat. size, p. 76.
 1 a. Profile of the same.
 1 b. Caput, with eyes, showing their position.
 1 c. Single falx, showing arrangement of teeth.
 2. *Epeira cooksonii*, Butler, nat. size, p. 76.
 2 a. Profile of the same.
 2 b. Caput, with eyes.
 2 c. Single falx.
 3. *Theridion carolinum*, Butler; enlarged, twice nat. size: p. 75.
 3 a. Profile of the same.
 3 b. Caput, with eyes.
 4. *Thomisoides utrififormis*, Butler, nat. size, p. 77.
 4 a. Single falx of the same.
 4 b. Profile.
 4 c. Caput, with eyes.
 5. *Latrodectus apicalis*, Butler, profile, nat. size: p. 75.
 5 a. Single falx of the same, showing the want of teeth.
 5 b. Caput, with eyes.

7. Description of a New Species of *Lobiophasis* and a New Species of *Pitta* from the Lawas River, N.W. Borneo.
 By R. BOWDLER SHARPE, F.L.S., F.Z.S., &c., Senior Assistant, Zoological Department, British Museum.

[Received February 6, 1877.]

When my friend Mr. Ussher was appointed Governor of Labuan, the first thing that I naturally asked him, was to try and get additional specimens of the *Lobiophasis bulweri*. I have received several letters from him, announcing the successive failures of his attempts to obtain more examples of this bird; but at last I heard from him that, although the collector whom he had sent to the Lawas river had not met with the longed for Pheasant, he had procured a pair of an apparently new species, which I might expect to see before long.

On the arrival of the specimens, I perceived at once several indications of the novelty of the Pheasant; and on showing them to Dr. Sclater and Mr. Gould, they agree with me that we have in these birds a second species of the genus *Lobiophasis*, which I propose to call

LOBIOPHISIS CASTANEICAUDATUS, sp. n.

♂. *L. similis* *L. bulweri* sed paullo major, pileo plumifero et cauda castanea distinguendus: long. tot. 22, culm. 1·6, alæ 11·0, caudæ 7·5, tarsi 3·35.

♀. *Ochracescenti-brunnea*, plumis omnibus nigro vermiculatis undulatis: pileo vix cristato: collo undique pallide ochracescenti-fulvo, concolori: gula pallide fulva: corpore reliquo subtus rufescenti-ochraceo, obscure fusco vermiculato, abdomine imo cimerascenti lavato: remigibus nigro et ochraceo extus distincte vermiculatis, secundariis rufescentibus, minutius undulatis: cauda saturate castanea, obscure nigro vermiculata: long. tot. 20, culm. 1·6, alæ 9·85, caudæ 7·6, tarsi 2·6.

Hab. Borneo, in ripis fluminis "Lawas" dicti.

The chestnut tail of this bird, which is evidently quite adult, seems to suggest the impossibility of its being the same as *L. bulweri*; and it is to be noted that the Malay hunter who procured both the original specimen of Bulwer's Pheasant and the present species did not imagine that the two birds could be the same. I must confess that the smaller size of the wattles and the plumed head induced me to consider this new bird as being probably *L. bulweri* in an intermediate stage, perhaps in the second year. No such difference, however, in the plumage of any Pheasant is known as yet; and after consulting with the eminent authorities above mentioned, I have ventured to describe it as distinct.

Along with this Pheasant Governor Ussher sent a *Pitta*, which is undoubtedly new to science, and which I designate as

PITTA USSHERI, sp. n.

P. similis *P. venustæ* sed colore nigro purpureo lavato, pileo, facie laterali et gutture nigris distinguendus: pectore summo nigro purpureo lavato: long. tot. 6·8, culm. 0·85, wing 3·54, tail 1·3, tarsus 1·6.

Hab. Lawas river, N.W. Borneo.

The differences between *P. ussheri* and *P. venusta* consist in the much richer coloration of the former. Thus, where *P. venusta* is brown with a reddish gloss, *P. ussheri* is black with a purple lustre; the top of the head, sides of face, and throat are entirely black. In *P. venusta* the edges to the wing-coverts are cobalt, but are not very distinct, whereas in *P. ussheri* they are extremely broad and very brilliant, while the secondaries are also shaded with blue.