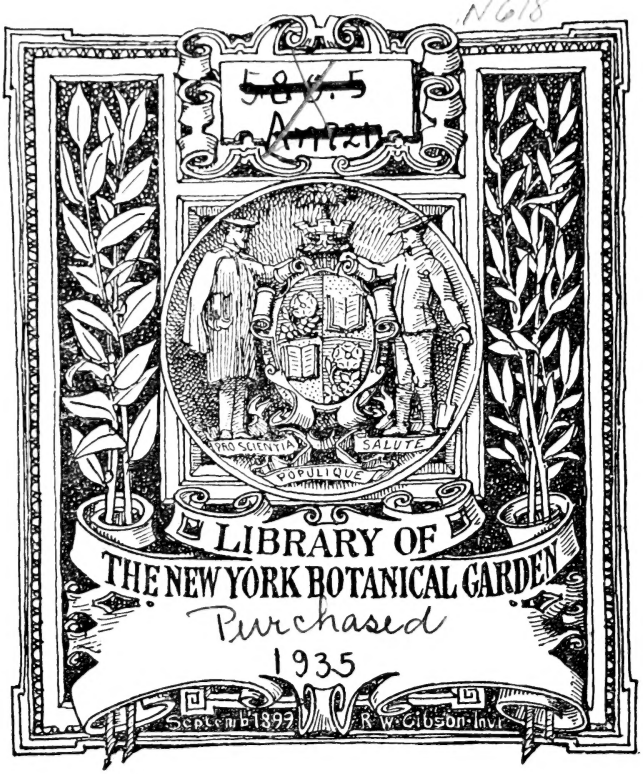
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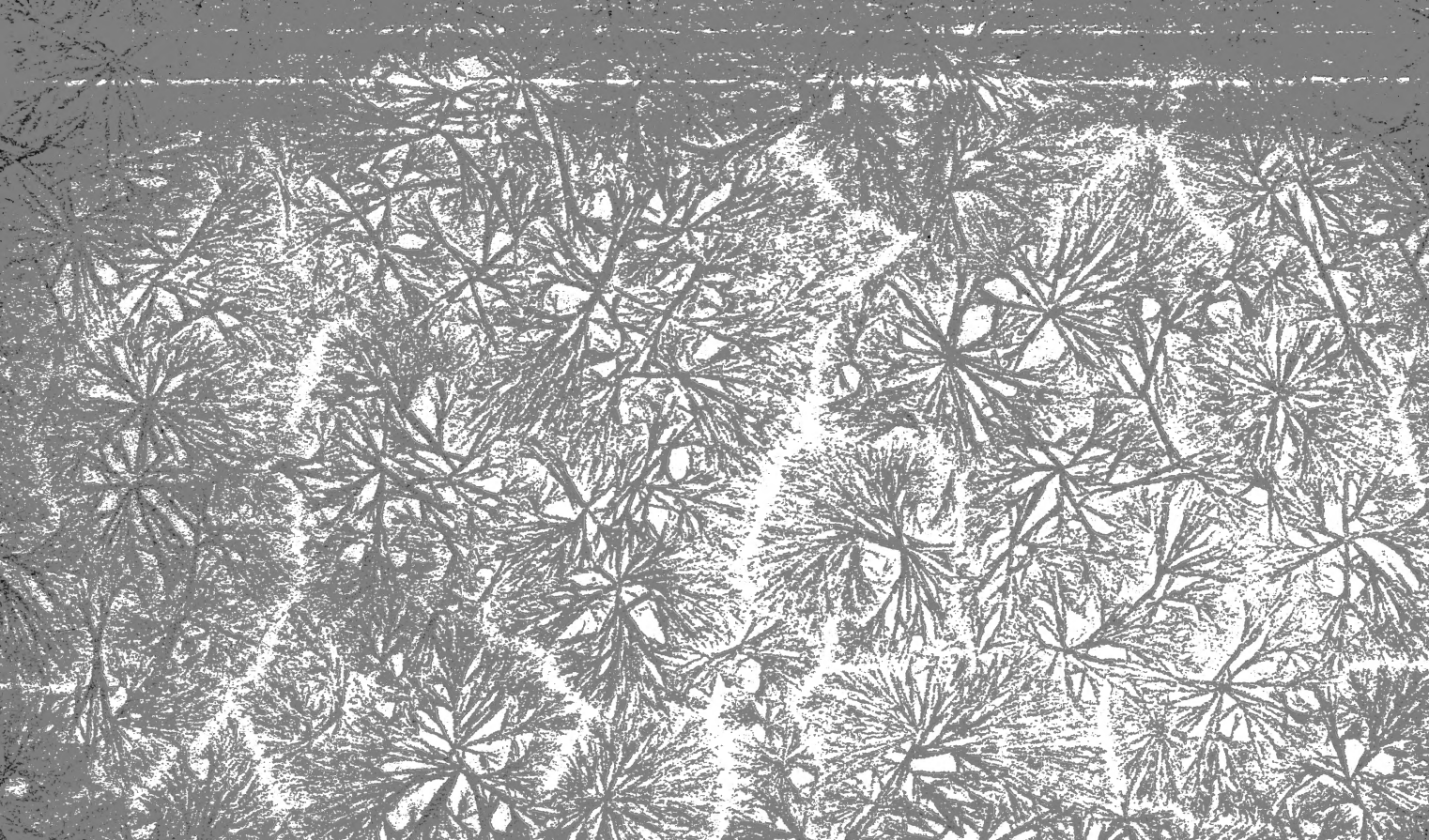

ANNALS OF NATURAL HISTORY;

OR,

MAGAZINE

OF

ZOOLOGY, BOTANY, AND GEOLOGY,

(BEING A CONTINUATION OF THE 'MAGAZINE OF ZOOLOGY AND BOTANY,' AND SIR W. J. HOOKER'S 'BOTANICAL COMPANION.')

CONDUCTED BY

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AND

RICHARD TAYLOR, F.L.S.

VOL. IV.

LONDON:

PRINTED AND PUBLISHED BY R. AND J. E. TAYLOR.

SOLD BY S. HIGHLEY; SIMPKIN AND MARSHALL; SHERWOOD AND CO.: W. WOOD, TAVISTOCK STREET; BAILLIERE, REGENT STREET, AND PARIS: LIZARS, AND MACLACHLAN AND STEWART, EDINBURGH: CURRY, DUBLIN: AND ASHER, BERLIN.

1840.

"Omnes res creatæ sunt divinæ sapientiæ et potentiæ testes, divitiæ felicitatis humanæ: ex harum usu *bonitas* Creatoris; ex pulchritudine *sapientia* Domini; ex œconomia in conservatione, proportione, renovatione, *potentia* majestatis elucet. Earum itaque indagatio ab hominibus sibi relictis semper æstimata; a vere eruditis et sapientibus semper exculta; male doctis et barbaris semper inimica fuit."—LINN.

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ANNALS OF NATURAL HISTORY.

I.—*Descriptions of some Mammalia discovered in Cuba by* W. S. MacLeay, Esq. By JOHN EDWARD GRAY, F.R.S., &c. *With some account of their Habits, extracted from* Mr. MacLeay's *Notes.*

THE small collection of Mammalia made by Mr. MacLeay during his stay in Cuba consisted of the following species of *Cheiroptera,* and a fœtal specimen of a Dolphin (*Delphinus*), which I have not been able to determine on account of its youth.

The bats, besides adding to our knowledge, are very interesting forms, and several hitherto unrecorded species are particularly interesting, as enabling me to locate with certainty, according to my present views, the genus *Mormoops* of Dr. Leach, of which only a single dried specimen was before known, and which had always been placed among the anomalous genera of this interesting family. It is curious, as regards the geographical distribution of these animals, which have usually been considered very local, that out of this small collection of eight species five should prove to be new to science and one of them an entirely new form, and that the other three should be common to Cuba and Jamaica.

VESPERTILIONIDÆ, *Gray.*

Tribe *Phyllostomina,* Gray.

Arctibeus falcatus, Gray. Edge of the lips crenulated, inner part of the sides near the angle ciliated, front of the lower lip with a small central tubercle surrounded by a lunate series of six distant small warts. Nose-leaf broad ovate lanceolate, expanded, with a very large elevated laminar crumpled projected edge on the sides. Tragus thick and convex internally at the end, with three or four distinct notches on the outer side of the ears. Fur (in spirits) grey-brown, with dark

tips to the hairs, paler beneath. The wings large, blackish; the index-finger falcately curved, with the membrane between it and the middle finger smooth, nearly transparent. Gland of the penis granular.

The form of the index-finger at once distinguishes this species from all the others of the genus.

Hab. Cuba, "Killed in my bed-room."—*MacLeay.*

Arctibeus Jamaicensis, Leach, Linn. Trans. xiii. Phyllostoma jamaicense, *Horsfield, Zool. Journ.* vii. 238. Edge of the lips crenulated, the inner edge with a series of brown membranaceous processes. Nose-leaf ovate lanceolate, acuminated, with a broad convex central midrib, edge folded back, and rather compressed at the tip; cheek at the sides of the nose-leaf large, convex, swollen, subtubercular; front of the lower lip triangular, with a central rather large, and two smaller lateral tubercles, surrounded with a series of close oblong warts. Tragus thickened at the top, crenulated externally, with three or four distinct notches at the outer side of the base. The index-finger straight.

Hab. Cuba. "Devours oranges on the trees and leaves the skins almost empty; it also comes into bed-rooms at night in search of mosquitoes."—*MacLeay.*

Brachyphylla cavernarum, Gray. Vespertilio cavernarum. *Guilding, MS.* Plate I. fig. 1.

Hab. West Indies. St. Vincents, Cuba.

I cannot observe the slightest difference between the Cuban specimen and that which I described from St. Vincents (1837), from the collection of Mr. Guilding, except that the Cuban one is smaller, and probably not an adult specimen, which view is somewhat favoured by the finger-bones being rather shorter comparatively with the armbone. In the Cuban specimen there are several round glands on the chin, and a very distinct convex isolated gland on the side of the face a little behind the angle of the mouth.

	St. Vincents.	Cuban.
Length of body and head	3	$2\frac{1}{4}$
——— of arm bone.....	$2\frac{7}{12}$	$2\frac{1}{4}$
——— of shin bone.....	$1\frac{3}{12}$	$1\frac{1}{12}$

Tribe *Noctilionina*.

* *Tail short, tip free on the upper side of the truncated interfemoral membrane.*

Mormoops, *Leach*, not *F. Cuvier*. Nose obliquely truncated, warty; lower lip expanded, membranaceous, sinuous, with a square warty plate in front; ears large, united over the forehead, with the lower edge produced and united to the membranes on the lower lip. Tragus distinct.

Dr. Leach, who first described this genus, characterizes it as having "a single nose-leaf confluent with the ears," and all subsequent writers, misled by his description, have placed it with the *leaf*-nosed bats. In my new arrangement I placed it at the end of the *Phyllostomina*, with a mark of doubt before it. The specimen under examination shows that it has no true nose-leaf, but that it is much more closely allied to the *Taphozoi* among the *Noctilionina*. This and the new Cuban genus *Chilonycteris*, which agrees with it in many particulars, will together form a new section in that group, characterized by the expansion of the lower lip and the convex and rounded form of the skull.

Mormoops Blainvillii, Leach, Linn. Trans., xiii. p. 77. t. 7.

The Cuban specimen agrees well with Dr. Leach's short description and the detailed figure of the head of the specimen which was formerly in Mr. Brookes's museum, and which he received from (Mr. Lewis) Jamaica: the only difference that I can see between them is that the two appendages in front of the disk in the centre of the chin are rather larger in the figure than in our specimen, and the hinder fold of the hinder membranes in front of the chin is represented as entire instead of being divided; but these I am inclined to regard as most probably errors of the artist, arising from Dr. Leach's specimen being dry, while ours is preserved in spirits.

As Dr. Leach's description was very short I shall now proceed to give a more detailed account of this curious and very interesting animal. The head is nearly globular, with a rather produced muzzle. The nose is rounded above, with three warts on each side, and obliquely truncated below, with a longitudinal central rib and a dentated transverse rib between the margin and nostrils. The upper lip is flat, expanded, with

some acute prominences on its inner, and a series of rounded tubercles on its outer edge; the hinder tubercles are much the largest. The lower lip is expanded, rather membranaceous, variously folded and twisted, forming a complicated appearance on the sides of the chin. There is a small smooth triangular disk above, immediately in front of the lower cutting teeth; and directly in front of this is placed a rather large four-sided expanded plate or disk, which has a quantity of small close warts on its upper face, and two small diverging appendages in the middle of its front edge. The front and hinder edges of this plate are scalloped out.

The ears are membranaceous, very large, broad, united over the upper part of the nose, and dependent over the face, with a slight notch on the upper part of the front edge; the lower side is expanded, with a rounded lobe in front, and is continued into the folded lower lip. The tragus is lunate, with a slight notch on the thickened front edge, and has a large appendage on the outer side of its upper part. The anti-tragus is large and tubercular. The eyes are small, far back, near the conchæ of the ears, and have a large wart before and behind them.

The wings are long, rather wide, hairy beneath near the sides, with rather wide marginal membranes inclosing the first joint of the thumb. The interfemoral membrane is very large, truncate at the tip, and furnished with many transverse and five diverging lines from the tail. The tail is elongate, and the last joint is elongated, tapering, and free in the upper side of the interfemoral membrane. The legs are elongate, slender; the ankle short, tapering; toes nearly equal, compressed, and the heel bone very long and marginal.

Hab. Cuba. "Killed in my bed-room." *MacLeay.*

Chilonycteris, *Gray.* Lipped Bat. Head conical, forehead high, convex; nose obliquely truncated, smooth, with a keeled toothed upper edge; nostrils anterior, inferior; lower lip large, dilated, hairy, with a broad reflexed membranaceous edge, furnished with a group of regular granular warts on the middle of its upper surface, and with a similar smooth membranaceous ridge behind it on the chin; ears large, separate, lateral, elongate, acute, with two folds on the front edge, and

a large notch on the centre of the outer edge, expanded, membranaceous, and produced to the hinder part of the crest on the edge of the lower lip. Tragus distinct, large, with an appendage on the outer side of its tip; eyes small, far back. Wings elongate, narrow, their index-finger of one bony joint; interfemoral membrane very large, elongate, slightly truncated. Heel bones very large, thumb compressed; tail elongate, superior, half as long as the interfemoral membrane, with the last joint free on its upper edge. Hind feet rather small; ankle elongate, subcylindrical; toes nearly equal, compressed.

Essential Characters. Nose obliquely truncated, appendaged; lower lip rounded, with two transverse reflexed membranaceous ridges; ears lateral, separate, with the lower outer edge expanded and continued to the hinder edge of the expansions on the lower lip. Tragus distinct.

This genus is highly interesting from its being intermediate between the *Saccopteri* and the genus *Mormoops* of Dr. Leach.

Chilonycteris MacLeayii, Gray. Fur mouse-colour, (in spirits) with greenish tips to the hairs, rather paler beneath; lower lip, with a triangular central wart and a group of small close warts on the centre of the lower lip plate; edge of the nose with two tooth-like expansions on each side, one over each nostril, and the other, which is rather larger, on the outer side of the first; chin with three longitudinal ridges and a conical wart on each side extending to the hinder edge of the lower chin membrane; wings chestnut-brown, nearly bald, the under sides of the interfemoral membrane with a few scattered hairs. Length $1\frac{3}{4}$, expanse 9″. Fore arm $1\frac{1}{2}$; tail $\frac{3}{4}$. Plate I. fig. 2.

Hab. Cuba. "Found in my bed-room; congregates in immense numbers in the eaves of houses and in holes in walls." *MacLeay.*

Nyctinomus macrotis, Gray. Ears very large, united in a common tubercle on the forehead, rather hairy in front; lips very large, pendulous; muzzle bald, with a central longitudinal and a transverse marginal ridge of close-set short rigid hairs; upper lip with an oblong tuft of black hairs under the nose;

tail cylindrical, elongate, rather more than half free; feet with a small round hinder pad. The pads of the great and little toes rather large, covered with white hairs, which are curved and rather dilated at the tip. Tragus rather large, truncated, with two or three small lobes on the edge; lobule large, rather obliquely truncated at the tip, and with a slight notch in front of the lower edge. Plate I. fig. 3.

Hab. Cuba. "Sent up from the interior of the island, where it was found in the hollow of a tree." *MacLeay.*

The head and nose of this species are very like the *N. plicatus* of India, but the lips and ears are much larger in proportion, and the lobule of that species is higher, rounded above, and without any notch at the base of the front edge. Like that species, the thumb has a large circular callous pad at its base, which agrees with Spix's character of his genus *Thyroptera*, and induces me to believe that his genus will only prove to be a synonym of *Nyctinomus*.

The species of *Nyctinomus* at present known may be thus divided:—

A. *Ears united at the base in front on a common tubercle. Lobule high, rounded, without any notch at the front of the base; ears large; tragus distinct.* N. plicatus.
Lobule elongate, truncate above, with a notch at the front of the base; ears very large; tragus very small. N. macrotis.

B. *Ears close but separate at the front of the base. Lobule semi-ovate, not notched in front; tragus subquadrate, rather large.* N. nasutus.

Molossus tropidorhynchus, Gray, *Mol. velox*, Horsf. Zool. Journ. vii. 237. Upper lip with a roundish tuft of close slender hooked hairs under the nostrils; muzzle angular with a central longitudinal and a transverse slightly crenated keel; throat pouch large; tail rather slender, tapering, more than half inclosed in the membrane.

Hab. Cuba. "Very common in the city of Havana." *Mac Leay.*

This species is very like *Dysopes velox*, but is smaller, and differs in having only a single central ridge between the nostrils, which is forked and sends a transverse ridge over each,

while in that species two oblique ridges continue separate nearly to the base.

It is not easy to distinguish the species as described by M. Temminck, for his figures and descriptions appear to have been mostly taken from stuffed and dried specimens, in which state the peculiarities of the face and ears, which are often the most characteristic parts of the species, are frequently destroyed. The species of this genus that are in the British Museum may be thus divided.

* Gland on the throat very large and distinct.

a. *The lobule of the ear semi-ovate with a large base; ears large, forehead rounded.*

Mol. rufus. Chestnut with whitish tips to the hairs; nose with a crenulated ridge over, and a broad flat bristly space between, the nostrils; tail thick, half free.

b. *The lobule of the ears round, compressed, with a contracted base; forehead keeled.*

Mol. velox. Chestnut, nose with a diverging ridge from the centre of the space between the nostrils; tail thick.

Mol. tropidorhynchus. Chestnut, nose with a longitudinal central ridge, and then a nearly straight crenulated cross ridge over the nostrils; tail tapering, thin.

** Gland on the throat very small, rudimentary.

Mol. fuliginosus. Black, tail elongate, slender, tapering; nose with a diverging ridge from the centre of the space between the nostrils; lobule round, compressed, contracted at the base; forehead keeled.

Mol. Norfolkensis. Grey-black, beneath grey; tail elongate, tapering; nose without any ridge; lobule small, round, not contracted at the base, ears acute; forehead not keeled?

Tribe *Vespertilionina.*

Scotophilus Cubensis. Fur blackish-brown (in spirits); wings dark, blackish; underside of the interfemoral membrane whitish, with scattered hairs; feet large; heel bone short, tapering; ears moderate, entire; tragus ovate-lanceolate. Body and head $2\frac{3}{4}$; tail $1\frac{3}{4}$; fore arm $1\frac{3}{4}$.

Hab. Cuba.

II.—*Extracts from a few rough Notes of a Journey across the Pampas of Buenos Ayres to Tucuman, in* 1835. By Mr. James Tweedie, addressed to Sir W. J. Hooker.

In reply to the inquiry contained in your last letter, as to whether I kept a journal of my late excursion to the interior, of which, if such be the case, you desire a copy, I beg to state that it is certainly my custom to take a few notes of whatever may particularly strike me as singular and worthy of remark, but that I am far from pretending to describe in a minute or scientific manner; although

> In wilds unknown I love to stroll,
> Where virgin plants their flowers unfold,
> Where unknown warblers tune their song,
> And unnamed rivers glide along.

Of my journey to the Andes of Tucuman, I now therefore send you a few notes, which had been hastily written while crossing the Pampas. My object in troubling you with them is merely to show the causes of that poverty in my botanical collections of which you complain.

On the 2nd of March our Tropa left Buenos Ayres: it consisted of seventeen waggons, each of which, together with its cargo, was computed to weigh about three tons, and was drawn by six bullocks. The body of the waggon is built of sticks and straw, and is arched over the top where it is covered with raw hides: the length is about 15 feet, the breadth 5, and the height $6\frac{1}{2}$ feet inside. Each wheel has a diameter of 8 feet. Thus when these unwieldy, uncouth-looking vehicles are set in motion, you might imagine that a village of Indian huts or toldas had suddenly taken a mind to walk, and the whole appearance is as curious as can well be imagined.

The tropa, on this occasion, consisted, besides the waggons, of 240 cattle, 44 horses, 35 mules, and 32 persons, including passengers. Well knowing by experience the lagging mode of travelling that prevails in this country, I allowed the party to have four days' start of me, and came up with them at the village of Morros, about five leagues distant from Buenos Ayres. Thus my future companions had performed rather more than a league per day. At the moment when I arrived

the tropa was preparing to cross an Arroy, where meeting two other tropas on their way to Buenos Ayres, we made a very grand appearance from the union of such a large number of cattle, &c., and six hours of time were lost before we again resumed our road. Morros is a small straggling village with a population of from 400 to 500 persons, and a respectable looking little church: excellent wheat, maize, and pumpions are raised in this neighbourhood, these being the chief articles of produce to which the farmer directs his attention.

While passing the Arroy I spent some of the leisure time which was thus afforded me in examining its marshy sides, in search of any new or rare plants, and my disappointment in this first attempt proved but too true an omen of the slender share of success which attended my journey. The tropa had hardly resumed its march on a good road, when they proceeded at the rate of about two miles an hour, than the approach of sunset warned them to halt for the night, and then the whole party dispersed to gather dry thistles, withered straw and herbage, or any material with which a fire can be lighted to cook their victuals. This process is very quickly and summarily performed; often have I seen the animal on foot helping to draw the waggon, and killed, flayed, roasted and swallowed in less than two hours! Dry grass is often the only fuel that can be procured: the men divide into parties, four to each mess; the portion of beef is handed to them; and they generally cook it by sticking it on an iron rod which they fix in the ground and lean over the smoky fire. Then each individual pulls off his singed and bloody portion, severing it partly with his knife and partly with his greased and gory fingers; and with unwashed hands and filthy beard, enjoys his half-raw meal, devoured without bread, vegetables or salt, in as much comfort and with greater health than does the London epicure his highly seasoned and varied feast.

Many of the people who accompany these tropas have been born in them and know no other home than a cart or waggon, nor can do anything save driving and tormenting the poor animals committed to their charge; he being esteemed the cleverest fellow who can make his bullocks cry loudest with the tortures he inflicts. It cannot be wondered at that they

are a very ignorant, thievish and deceitful set of savages. The traveller requires to be constantly on the look-out or his property will be stolen: if he has carried anything to eat or drink and does not share it with these ruffians, they abuse him, call him a bad Christian, and take it away; nay, murders are frequently committed and gloried in under these circumstances: and such were the people with whom I was once for seven months, the only stranger save one Frenchman!

Early on the 6th of March we crossed the river *de las Conchas*, twenty-one miles from Buenos Ayres, on an old, rickety, dangerous wooden bridge, the only bridge of any description that we met with in a journey of nearly 1200 miles. The care that was taken to prevent accidents consumed three hours in passing it, immediately after which we entered a grassy plain, diversified by no change of scenery, except a forest of tall thistles (*Carduus marianus*) six to ten feet high, mingled with a coarse species of *Erigeron*. At mid-day we halted and were here joined by a large carriage conveying the family of the owner of the waggons and his servants.

While stopping here I strolled a little way and found the first specimen worth gathering, it was an *Eupatorium*, with broad cordate leaves and tricoloured flowers, which I had however seen before at the Rio Negro, Banda Oriental.

7th. This day we performed the extraordinary distance of five leagues, all the way being over a grassy plain, where no water could be had, except at one solitary Rancho, where they gave us some excellent water, drawn from a depth of only 11 feet below the surface. I took the opportunity of ascertaining the depth of all the wells (which are however few in number) that we saw, and found that by digging about 20 feet at most, an abundance of fine water can always be procured. So lazy are the people, however, that they generally prefer using what they can obtain from some filthy stagnant pool, to taking the trouble of sinking a well; one hindrance, however exists in the want of materials for cradling such pits, as they have nothing for the purpose but bones. At night we were deprived of sleep by the clouds of mosquitoes which issued from a stinking marsh close to which we had encamped.

8th. Four hours were occupied this morning in crossing

the marsh, though but half a mile wide. Each waggon had to be dragged over by eight pair of oxen, so that after one had passed, the cattle had to be sent back to assist the next. I saw several vehicles, besides our own, thus engaged; for as there is no general road, each takes his own way as seems best. One unfortunate fellow had overset his cart loaded with wheat in this grassy marsh; he was going with it to Buenos Ayres, and the grain being in bulk and not in bags, must have been almost entirely lost under the water and among the aquatic herbage. Two others were helping him to recover it, standing nearly up to the middle in water.

Corn is not carried to market here in sacks, but four hides are loosely attached by their corners to the inside of the huge hurdle-cart already described, thus forming a kind of open box, into which the grain or any other cargo is flung.

At sunset, having been travelling over a grassy and somewhat undulating country, we arrived at the village of Lujuan (pronounced Leuchan) lying in a sort of flat valley. Our first view of it from an elevated ridge was very prepossessing: its straggling roofs and whitened church, mingled with fig trees, and lighted by the setting sun, gave me the idea of a neat English village; but a nearer approach dispelled this favourable appearance. We found it a poor miserable place, chiefly consisting of mud-built, straw-covered Ranchos; a few tolerable brick dwellings formed a kind of square in the centre and outside them were ranged several wretched huts, without gardens or any appearance of cultivated ground, except some small peach clumps, which are kept to be cut every two or three years for fuel. The peach trees here are as plentiful as osiers in England, and may generally be seen growing along with the *Agave Americana* and the seven-angled Cactus. A considerable quantity of good wheat and maize is raised in this district for the Buenos Ayres market: the pieces of ground thus occupied being unfenced are preserved from the intrusions of cattle by having a lion or tiger tethered in the centre, the smell of which deters any cattle from approaching. (What is here called a lion, is probably the American lion or puma.)

9th. Leaving Lujuan at midnight, we passed the Guardia de Lujuan, three miles on our left, where are the head quarters

of the Argentine cavalry: here the country is chiefly occupied in keeping and breeding horses for the army, being clothed with rich grass and abounding in good water.

10th. Having travelled most of the night, and up to eleven o'clock in the forenoon, except resting two hours at sun-rise, we halted about noon when the sun was very warm, and turned out the cattle to feed in a fine and rich, though rather coarse, grassy meadow. Except two species of grass I added nothing to my specimen-book, the vegetation being similar to that of Buenos Ayres. Water was scarce and bad; near one Rancho we unexpectedly found a sunken well, but nothing to draw withal, except a large horn which had many ups and downs before our thirst was satisfied; there was only eight feet of depth before we came to the water, but the well being lined with shank-bones gives the water a very bad taste.

11th. This day's travelling was slow and fatiguing, owing to the scorching unclouded sun; but we made up the difference by pushing onwards during the night, when we came to good roads, for the most of the daylight had been consumed in passing a bog of soft mud. To each cart the united force of nine or ten pairs of bullocks had to be applied to pull it through this bog which is only three-fourths of a mile wide. The whole day being thus spent, I took the opportunity of examining the vegetation of this neighbourhood, but only found two Syngenesious species that were new to me.

12th. Early this morning we came to another soft marsh with a slow river winding through it: the current did not flow faster than half a mile an hour. This river is called the *Arroya del Pez*, or Fish River, a name generally applied to distinguish such streams as do not dry up in summer from those which disappear at that period, although there may be no fish in either. Great caution was necessary in crossing this place, as the heads of the shaft bullocks were often drawn under water by the weight of the waggon. So long was the line of cattle, that often the foremost animals were already across before the cart had entered the water. When the traces break, as not unfrequently happens, the poor beasts are drowned.

13th. We rested during most of the hot afternoon of yesterday, and travelled all night through a rough trackless plain,

and stopped in sight of the small village of Salto Chico, which we reached in the afternoon. This was another straggling assemblage of Ronchos, their walls of unburnt bricks, but the church with its whitewashed spire looked rather respectable; for here, as in all countries where the Romish pontiff holds sway, be the morals of the people as depraved as they may, the outward appearance of the church is the first consideration. For instance, at San Lorenzo on the Poran, a village of but five miserable huts, the church is one of the most splendid buildings in the whole Argentine Republic. The population of Salto Chico is about 1500: the place is noted for sending a great number of cheeses to Buenos Ayres, which are however but very poor eating, and fetch a current dollar, fivepence each, weighing about 2 lbs. A small river passes the village: the water is very brackish and bad, but we obtained a supply of what was good from wells, about fifteen feet deep to the bottom.

14th. Having again travelled most of the night, we found ourselves in the morning traversing a dreary houseless plain country, covered however with cattle and sheep. Rain came on in the evening, accompanied with thunder and vivid continued flashes of lightning; these, however, caused no alarm to the inhabitants as they would have done in a metallic country: for though storms of lightning are much more frequent and violent here than in England, they are never known to do any injury.

15th. We entered another poor village, called Pergamena, with a population of about 2000. Here we quitted the province of Buenos Ayres and therefore found it needful to lay in a stock of pumpions and some bread; the latter was with difficulty procured, being considered a luxury in this neighbourhood. We are now 120 miles from Buenos Ayres, and I have found but seven specimens of plants.

16th. At the Arroya del Medio, which divides the province of Buenos Ayres from that of Santa Fè, we were joined by 100 fresh draught bullocks, as we now enter uninhabited Pampas, occupied only by wandering Indians, and it is most desirable to pass through this country as quickly as possible lest the Indians should have time to collect and attack us for

the sake of plunder. We therefore travelled night and day, making only very short stoppages to change the cattle and singe our beef, cooking being out of the question, where no fuel could be procured except dry grass, and when it was unadvisable to make any delay. We however saw nothing in these vast plains but three Tropas on their way to Buenos Ayres, at considerable distances from us. On these wide and open tracts an assemblage of fifty waggons only looks like a few ships scattered on the vast ocean, steering their way, as by compass, through the trackless wastes. Even the wild animals, as Foxes, Polecats, and Becatchos, abundant in more inhabited districts, are not to be seen in this desert: some grey and black vultures only attended our Tropa, which picked up any offal that came in their way. Here while stopping, during the passage of the Arroya called Del Indiomuerto, I saw great quantities of a large species of quail, generally called the pheasant of the country, probably attracted to this spot by the fine and large species of grass, with eatable seeds, which grow in the Arroya. On the 22nd of March, which was a clear calm sunny day, we noticed vast flocks of swallows, flying in a direction contrary to our course, which was north-west, at a great height from the ground; probably on their way to the warm islands of the Pacific Oceans. These birds generally quit Buenos Ayres in the beginning of April and return thither late in September. Only one kind of swallow is found in this country: it is large, and with more grey on the back than the house swallow of Britain, builds its nest under tiles and in holes of walls, and has a strong melodious note much resembling that of a rising lark.

24th. Having travelled for the last seven days and nights through a continued flat grassy plain, where nothing but bitter and brackish water could be had, we stopped at sunrise to let the poor exhausted cattle eat the damp though withered grass, and at nine in the morning reached Guardia del Equina, a poor village of thirty-two Ranchos. Here are some old mud forts, whence the cannon have however been removed; this military establishment, which was built by the old Spaniards to awe the Indians, is now given up. We rested all night at this place to repair our carts, and sent back about 100 of the

most worn-out bullocks. While these affairs were proceeding I examined the vegetation, but as the ground is dry and saline I only found a paniculated Syngenesious shrub, and a species of *Hordeum*. Round the old forts, where the ground has been broken up, the land is covered with the common Horehound and Fennel: these plants, which are inseparable companions, always occur in great abundance in similar spots, springing up wherever the original soil has been disturbed.

25th. Having now passed that part of the road which is considered the most dangerous from the attacks of Indians, we halted for six hours, but as it was by the side of a horribly stinking marsh, the clouds of mosquitoes prevented our getting any sleep. Most of the day was spent in crossing the bog, during which time I had the gratification of gathering a very beautiful kind of *Digitalis*, with crisped linear leaves. We then changed the draught beasts and resumed our journey on a fine dry ground, which, gradually rising, brought us to the summit of the highest ridge we had yet passed. From the summit we had before us one of the finest and most welcome views that could be imagined. Hitherto we had been travelling over a lonely desert, bare of everything but grass of a foxy-brown colour; but now our eyes were suddenly gladdened with a delightfully fresh verdure; a beautiful serpentine river, the Corcouñeon, slowly winding its course through richly wooded land, adorned with lakes of clear looking water. Several of the fields have the appearance of being cultivated with wheat and maize; this is owing to the fresh grass springing up after the process of burning the ground. A little before sunset we came to a beautiful piece of water where I had the comfort of getting myself thoroughly washed;—no small refreshment, after travelling for three weeks through clouds of dust. Here I found a curious *Eryngium*, smelling strongly like *Angelica*, and a species of *Eupatorium* with fine tufts of peach-coloured flowers.

[To be continued.]

III.—*Observations on* Trilobites, *founded on a comparison of their structure with that of living* Crustacea. By W. S. MacLeay, M.A., F.L.S., &c.*

Trilobites were originally considered by Klein and others to be a particular kind of molluscous shell with three lobes. This supposition, however, was afterwards abandoned as untenable, and remained so until Latreille, in the 7th volume of the 'Annales du Muséum,' revived it and referred the trilobitic fossils to the genus *Chiton* among the *Mollusca*. Latreille founded his argument on the presumed absence of feet, and on the lateral edges of the body in several species having been sub-coriaceous. It is evident, nevertheless, that these early inhabitants of the sea could not have belonged to the sub-kingdom *Mollusca*, since they possessed compound sessile eyes and a distinct labrum. They must, therefore, be assigned to the sub-kingdom *Annulosa*, in which we may find many articulated animals which have compound eyes and a labrum very similar in structure to those of Trilobites. Having a hard, shelly, apterous tergum and inconspicuous feet, the Trilobites must have either belonged to the order *Chilognatha* among the *Ametabola*, or to the class of *Crustacea*. But all the *Chilognatha* are terrestrial animals, and the obvious geological fact is, that Trilobites resided in the sea. We must clearly therefore exclude them from the *Chilognatha* and place them among the *Crustacea*, in which class it becomes now necessary to determine their exact place.

The class of *Crustacea*, so remarkable above all other animals for the great variation of their feet, both in number and form, is divisible into two groups; those which have the eyes sessile or the *Edriophthalma* of Leach, and those which have their eyes supported on moveable peduncles or the *Podophthalma* of Leach. To the *Edriophthalma* the Trilobites clearly belong, and the question is now reduced to determine merely whether they belong to the *Amphipoda* or those existing *Crustacea* which do not undergo metamorphosis in their larva state, (among which I include not only the *Amphipoda* of La-

* Reprinted with permission from R. I. Murchison's valuable work on the 'Silurian System.'

treille, but also his *Lœmodipoda* and *Isopoda*,) or whether they belong to the *Entomostraca* or those existing *Edriophthalma* which do undergo a change of form in their larva state. I conceive that the Trilobites will be found to differ in so many respects from both the *Amphipoda* and *Entomostraca*, that according to the present state of our knowledge, we must allow them to form a distinct order, intermediate between the tribe *Isopoda* on the one side, and the tribe *Aspidophora* on the other.

Those circumstances which generally are reckoned most anomalous in the Trilobites are not in reality so very extraordinary, since they may be detected in many *Crustacea* now existing. Thus the trilobed form of the body occurs in *Serolis* and *Bopyrus*. The membranaceous or rather coriaceous margin of the body, assumed by Latreille and others to exist in Trilobites, is to be found in the female *Cymothoæ*. In these last animals also, as well as in the female *Bopyrus*, we observe the eyes to disappear as in many Trilobites. The compound eyes of *Calymene* are situated on the back of the head, but wide apart, and are composed of large facets. The same structure may be seen in the male of *Cymothoa trigonocephala*, and many other *Cymothoadæ*. The absence of antennæ and the rudimentary state of the feet, both occur in *Bopyrus*, the well-known parasite of prawns. In *Spheroma* we have not only the onisciform body of *Calymene*, but also its property of rolling itself up into a ball. In *Spheroma* also we find the large convex semicircular anal segment of *Bumastus*. I think, therefore, that we can have no hesitation now in allowing the immediate affinity of the Trilobites to Isopod *Amphipoda*, and more particularly to the *Cymothoadæ* and that parasitical group which is called *Epicarides* by Latreille. Indeed, if the Trilobites are once demonstrated to have possessed articulated feet, it will be difficult to remove a male *Bopyrus* from the group. Here the two eyes are placed on the back of the head wide apart. Here also there are no antennæ, no posterior lateral abdominal appendages, and besides no very distinct articulation to the sternum. If the *Bumastus* of Murchison had a body of thirteen equal segments with short crustaceous feet it would be a male *Bopyrus*, so close is the affinity! The differences between a male and female *Bopyrus*, such for in-

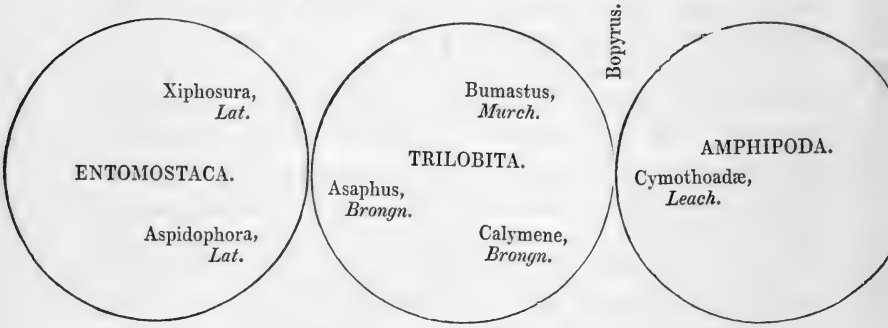
stance as the presence of eyes in the former and the want of them in the latter, may also induce us to fancy that similar differences may have possibly occurred between certain male and female *Trilobita*, which from their *prima facie* difference of form are now placed in distinct genera, although they may have truly belonged to one and the same species. *Serolis* has been generally considered to come near to *Paradoxides*; but as the former has got four well-developed antennæ with crustaceous feet, and the latter none, I am inclined to believe the relation between them to be one of analogy rather than of immediate affinity.—Let us now turn to the *Entomostraca*.

Dr. Buckland, following other authors, has compared the Trilobites with the genera *Limulus* and *Branchipus*. With the latter genus, however, they obviously have no immediate affinity; although it may be well, by reference to *Branchipus*, to show that *Crustacea* can and actually do exist, with soft membranaceous feet, such as Audouin and Brongniart suspected, and Goldfuss has more lately asserted, to have been the feet of Trilobites. When, nevertheless, I take into consideration the perfect manner in which the soft body of an animal referred to me by Mr. Murchison, and by that gentleman called *Nereites Cambrensis*, has left its impression in a slaty rock, I confess I find it difficult to understand how the vestiges of legs in a Trilobite (if such legs ever really existed) should not be more evident than Goldfuss has represented them in his plates. In short, I consider the question of feet to remain still unsettled. At the same time I ought to remark, that if the Trilobites were *Crustacea*, between *Apus* and *Bopyrus*, a fact I conceive capable of demonstration, they must have been in possession of subabdominal, laminar, oviferous, appendages. Now, no traces of such appendages remain, consequently we can easily understand how feet of a similar membranaceous consistency may have disappeared in like manner. I may here observe, that Brongniart is certainly wrong in imagining that the *Ogygia Guettardi* had oval oviferous bags appendent to the abdomen like *Cyclops*, for what he considers to be such organs are more probably the membranaceous margin of the abdomen, and, besides, *Ogygia* has no immediate affinity to *Cyclops*. With reference to *Limulus*,

its crustaceous, semilunar cephalothorax bears considerable resemblance to that of certain Trilobites, such as the genera *Ogygia, Asaphus, Paradoxides,* &c. In *Limulus,* we find reniform, compound eyes placed widely apart on the back of the head, and consisting of peculiar facets. We find, also, an indistinct trilobed structure of the superior abdominal shield. But then this is composed of a number of confluent segments, so as to appear of one piece; and, besides the two ocelli, the large crustaceous feet and cheliform antennæ throw *Limulus* far away from the Trilobites. We must, therefore, compare them with *Apus* and other *Aspidophora*; animals which, in my opinion, of all the Entomostraca, appear to come nearest to the *Trilobita.* Here we have a large clypeiform shell, rounded in front, and posteriorly emarginate, which forms a cephalothorax, on the back of which are situated three eyes. Of these the two largest are lunated, and obviously correspond to the eyes of *Trilobita,* although they are placed proportionally much nearer to each other. It is true they are simple, but so appear to have been the eyes of *Bumastus**. The abdomen, divided into many distinct segments, the foliaceous feet, the structure of the front of the cephalothorax, the two rudimentary antennæ, the large labrum and projecting mandibles, all show the affinity of *Apus* to the Trilobites, more particularly to *Asaphus platycephalus,* in a specimen of which from Lake Huron, Mr. C. Stokes has discovered a subquadrate labrum, which only differs from that of *Apus,* in being anteriorly deeply emarginate, while the latter is truncated. Dr. Buckland has compared this organ to that of crabs, but decapod *Crustacea* possess a very different structure, and the thing most like this labrum is to be found among the *Xiphosura,* or still better, among the *Aspidophora* of Latreille, of which group this naturalist's genus *Prosopistoma* ought more particularly to be compared with Trilobites. I am not aware, however, that any trilobite has yet occurred with vestiges of ocelli.

* The distinction between smooth eyes and granulose eyes does not seem to be of much importance in these animals; for among the existing family of *Cymothoidæ* we not only see the males of some species with eyes and the females without them, but we observe neighbouring genera, such as *Eurydice* and *Nelocira,* the one with granulose eyes like a *Calymene,* and the other with smooth eyes like a *Bumastus.*

Still there are characters which, in my opinion, distinguish Trilobites from almost all other *Crustacea*; and among these characters I would particularly mention the absence of all lateral, posterior, abdominal appendages. Excepting *Bopyrus** and certain *Læmodipoda*, all the *Amphipoda* possess these anal appendages, which are generally styliform, articulated and in number two. The *Læmodipoda*, however, want these appendages, because the whole abdomen in them has become evanescent, a case totally different from that of Trilobites, which, like *Bopyrus*, have a well-developed abdomen consisting of many segments. I therefore consider this deficiency of anal appendages to a well-developed abdomen, when joined with the evanescent feet and the total absence of antennæ, to be characters separating the *Trilobita* from all *Crustacea* except *Bopyrus*. The affinities of the group may be roughly expressed by the following diagram.



If we allow any accuracy to belong to the foregoing remarks on the affinities of Trilobites, it will follow that the class of *Crustacea* may for the present be distributed into orders, thus; viz.

Normal Group.	*Orders.*	
Podophthalma, Leach. Animals having their eyes supported on moveable peduncles.	Decapoda, Lat.	Antenniferous region of head confluent with the thorax.
	Stomatopoda, Lat.	Antenniferous region of head distinct from the thorax.

* *Bopyrus* may possibly belong to the *Trilobita*, but I confess I do not see how *Agnostus* can. Nor do I believe that the latter fossil has any connexion with the *Annulosa* at all.

Aberrant Group.	*Orders.*	
Edriophthalma, Leach. Animals having their eyes sessile.	Amphipoda, Lat.	Head distinct with four antennæ. Feet thick and crustaceous. Animals not undergoing metamorphosis.
	Trilobita, Brongn.	Head distinct without antennæ. Feet rudimentary, soft, and membranaceous.
	Entomostraca, Lat.	Head rarely, if ever, distinct from thorax, but provided with antennæ. Feet always distinct. Animals undergoing metamorphosis.

With regard to the habits of true Trilobites, these animals have been supposed by some naturalists to be parasitical; but I conceive this hypothesis not to be very tenable, since almost all existing articulated parasites that adhere externally to other animals have strong feet, hooked at the end for that purpose. Now the Trilobites certainly had no such strong crustaceous hooks to their feet, or these hooks would have long since been detected. The close affinity of Trilobites to *Bopyrus* does not prove a parasitical mode of life, for *Sphæroma* and other *Cymothoadæ* which, like Trilobites, have the power of coiling themselves up into a ball, are not parasitical, although so close in affinity to the parasitical genus *Cymothoa.* Nay, it has been said that the *Cymothoadæ* and *Epicarides* do not draw their nourishment directly from the animals to which they adhere; but, on the contrary, live entirely on the animalculæ brought to them in the water by the play of the branchiæ, near which they always take their post. Still the close connexion of Trilobites with *Bopyrus,* and their feet almost null, if not entirely so, induce me to think that these animals must have been to a certain degree sedentary. The flat under surface of their bodies, and the lateral coriaceous margin of several species, which is so analogous to that of *Chiton,* make it probable that they adhered with a soft articulated underside either to rocks or fuci. They appear to have been among *Crustacea* what the *Vermes* or white-blooded worms are among *Ametabola,*—often without eyes, and always without antennæ or distinct feet. If they had feet, as Audouin and Goldfuss imagine, and, as indeed is

most probable, they must have been so small, so membranaceous, so soft, and so rudimentary, as almost to be useless to the animals for locomotion. The mouth, so analogous to that of *Apus*, makes us imagine that the Trilobites were carnivorous; and they may possibly have fed on *Acrita*, *Annelida*, or naked *Mollusca*. That they had to search for their food, and that they possessed some small power of locomotion, is to be inferred from their highly organized eyes; for no truly sessile animal is provided with sight. The *Balanus*, when it becomes sedentary, loses its eyes, as does also, in like case, the female *Coccus*. I imagine, therefore, that although the Trilobites were to a certain degree sedentary, more particularly the blind ones, they must have had some power of crawling over a flat surface; but whether they moved by rudimentary, soft, membranaceous feet, or whether it was by means of the undulation of setigerous segments, like the earth-worm, or by wrinkling the under surface of the abdomen like a *Chiton*, are questions yet to be determined. One thing, moreover, is in my opinion clear, from their longitudinally trilobed form and lateral coriaceous margin; namely, that they had the power of adhering to a flat surface, like a *Chiton*, *Bopyrus*, or *Coccus*. While thus sedentary, the hard, although thin dorsal shell, probably saved them in some degree from the attacks of fishes, just as that of *Chiton* protects such *Mollusca* from all fishes except the *Scaridæ*. The Trilobites probably, like *Ostreæ*, *Chitones*, *Cocci*, and other sedentary animals, adhered in masses one upon the other, and thus formed those conglomerations of individuals which are so remarkable in certain rocks.

IV.—*Floræ Insularum Novæ Zelandiæ Precursor; or a Specimen of the Botany of the Islands of New Zealand.* By Allan Cunningham, Esq.

[Continued from vol. iii. p. 319.]

TILIACEÆ, *Juss.*

Entelea, *R. Br., Juss.*

Calyx 4—5 phyllus. *Petala* 4. *Stamina* indefinita uniformia, *Antheris* subrotundis incumbentibus. *Stigma* denticulatum. *Capsula* sphæroidea, echinata, 6-locularis, semi 6-valvis, polysperma.

601. *E. arborescens. R. Br. Mss. Bot. Mag.* 2480.—Apeiba australis. *A. Rich. Fl. Nov. Zel. p.* 301. *t.* 34.—Corchorus Sloanoides. *Sol. Ms. in Bibl. Banks.*

Whau or *Iwau*, indig. *R. C.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Shores of the Bay of Islands.—1826, *A. Cunningham.*

Arbuscula 12—15 pedalis, ramis teretibus pubescentibus. *Folia* alterna, longe petiolata, palmaria, subcordata, palmato 3—5 loba, inæqualiter erosodentata, præsertim subtus pubescentia, pilis densis stellatis. *Stipulæ* binæ, lanceolatæ deciduæ. *Flores* in racemum brevem, pauciflorum, pedunculatum dispositi.

ELÆOCARPEÆ, *Juss.*

1. Elæocarpus, *L.* (*Dicera, Forst.*)

602. *E. Hinau*; foliis petiolatis alternis oblongis subacuminatis obtusis basi sensim attenuatis dentato-serratis subter pube adpressa sericeis venosis, in venarum axillis sæpe saccato-foveolatis, racemis simplicibus axillaribus folio brevioribus, petiolis trilobatis, drupis ovatis, nucleo sulcato.—E. dentatus. *Vahl. Symb.* iii. *p.* 67.—Dicera dentata. *Forst. Prodr. n.* 226. *DC. Prodr.* i. *p.* 520. *A. Rich. Fl. Nov. Zel. p.* 303.

Hinau ab incolis vulgo nominatur.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Frequent in the forests of Wangaroa, Hokianga, &c.—1826, *A. Cunningham.* (Middle Island.) Shores of Queen Charlotte's Sound.—1773, *G. Forster.*

Arbor procera, 50—60 pedalis; *rami* teretes, patentes; *cortice* brunneo-griseo. *Folia* alterna, oblonga, vel ovato-lanceolata, dentato-serrata, coriacea glabra, patentia, petiolata, subtus tenuissime sericea, pulchre reticulato-venosa, et in axillis venorum sæpe profunde foveolata. *Racemi* axillares simplicissimi, palmares, laxiflores, folio breviores. *Calyx* 5-sepalus, sepalis lineari-lanceolatis acutis villosis æqualibus patentibus. *Petala* alba, oblongo-dilatata, 3-lobata, 3-nervia, unguiculata, lobis oblongis obtusis undulatis intermedio longiore. *Stamina* circiter 15—20. *Antheræ* lineares, teretiusculo-tetragonæ, villoso-scabræ, 2-loculares, filamentis longiores, apice 2-valves dehiscentes, valva unica aristata, altera breviore reflexa. *Discus* hypogynus 5-glandulosus, glandulis basi bifidis extus sericeis. *Ovarium* superum conicum sericeum 5-loculare. *Stylus* subulatus. *Stigma* simplex. *Drupa* nucleo sulcato 5-loculare? loculis 4 plerumque abortivis.

The wood of the *Hinau* is remarkable for its whiteness, but it is almost useless on account of the way in which it splits, when exposed either to wet or warmth. Its chief use is that it makes an excellent dye, either a light brown, puce or dark black, not removeable by washing. The natives employ it (that is the outer skin of the bark) for the purpose of dyeing the black threads of their garments.—*Yates's New Zealand*, p. 49.

2. Friesia, *DC.*

Calyx profunde 4-partitus, foliolis æqualibus ovatis. *Petala* 4, cuneata,

subunguiculata, apice triloba. *Discus* glandulosus. *Stamina* circiter 12. *Antheræ* cordato-oblongæ, muticæ, 2-loculares, poris sub apice dehiscentes. *Stylus* leviter sulcatus, apice 2-vel 4-fidus. *Bacca* sicca, fragilis, 4-locularis, loculis dispermis. *Semina* angulata subtriquetra, testa atra nitida, rugosa, crustacea.

603. *F. racemosa*, foliis (oppositis) cordato-ovatis acuminatis petiolatis inæqualiter serratis flaccidis venosis, racemis compositis subpaniculatis patentibus axillaribus ramulisque villosis.—Dicera? serrata. *Forst. Prodr. n.* 227. *DC. Prodr.* i. *p.* 520. *A. Rich. Fl. Nov. Zel. p.* 304.—Elæocarpus Dicera. *Vahl. Symb.* iii. *p.* 67.

Mako-Mako of the natives. *R. C.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Shady forests and margins of running streams, shores of the Bay of Islands, and elsewhere on the east coast where it usually flowers in Oct. and Nov.—1826, *A. Cunningham.* (Middle Island.)—1773, *G. Forster.*

Arbuscula erecta pulcherrima, 12—15 pedalis: *rami* patentes, teretes, suboppositi. *Folia* membranacea, minute reticulato-venosa, juniora varie violacea purpurascentique picta. *Flores* in racemos patentes dispositi. *Calyx* villosus ciliatus. *Petala* albido-rosea vel purpurascentia, sepalis alterna. *Filamenta* staminum cinereo-villosa. *Stylus* deciduus.

STERCULIACEÆ, *Kunth. Endl.* (*Bombaceæ, D.C?*)

Plagianthus, *Forst.*

Flores hermaphroditi. *Calyx* subhæmisphæricus 5-fidus aut dentatus, persistens. *Petala* 5, cum tubo staminum unita. *Stamina* 10—12, filamenta in tubum cylindraceum unitum. *Pistillum* solitarium. *Ovarium* ovatum, 1—2 ovulatum, ovulis suspensis. *Stylus* crassiusculus. *Stigma* magnum bilobum, hinc decurrens, papillosum. *Capsula* subdrupacea 1—2 cocca, apiculata indehiscens. *Cocculi* 1-spermi. *Semen* pendens. *Albumen* carnosum. *Embryo* immersus, curvatus. *Radicula* cylindracea, ad hilum seminis versa: Cotyledones majusculæ planæ subfoliaceæ longitudinaliter undulatæ.—Arbores *vel* Frutices. Folia *stipulata, alterna, linearia aut ovata.* Flores *subsolitarii paniculatique.*

604. *P. divaricatus,* glaber, foliis fasciculatis lineari-spathulatis obtusis integerrimis patentibus trinerviis floribus solitariis binisve axillaribus, petalis obovatis ad basin tubi staminum unitis, lobis stigmatis tubo inclusis, caule fruticoso. *Forst. Prodr. n.* 254. *DC. Prodr.* i. *p.* 477. *A. Rich. Fl. Nov. Zel. p.* 299. *Bot. Mag.* 3271.

Runa, indigenis. *R. Cunn.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Frequent in salt marshes on low sides of rivers, where it forms dense bushes.—1826, *A. Cunningham.* (Middle Island).—1773, *G. Forster.*

Frutex gracilis, diffusus, 3—4 pedalis, ramis virgatis divaricatis alternis teretibus prorsus glabris, cortice atro-brunneo, stipulis procumbentibus. *Flores* solitarii interdum bini; pedicellis brevibus. *Calyx* cyathiformis, 5-dentatus, dentibus acutis parvis brevibus divaricatis. *Petala* ovata, conca-

viuscula, patentia, flavescentia. *Stigma* bilobum, longitudine tubi staminum. *Ovarium* parce tomentosum, mono-dicoccum, ovulis pendulis.

605. *P. betulinus*; ramulis foliisque villosis, foliis sparsis petiolatis ovato-lanceolatis acuminatis grosse inæqualiterque serrato-trinerviis, floribus terminalibus lateralibusve ramoso-paniculatis decompositis, pilis cinereis conspersis, petalis lineari-spathulatis subciliatis ad medium tubi staminum cohærentibus, lobis stigmatis patentibus tubum superantibus recurvis, caule arborescenti.

New Zealand (Northern Island). A lofty tree on the banks of the Kana-Kana river, near its head, Bay of Islands.—1833, *R. Cunningham.*

Arbor procera, 70 pedalis. *Rami* stricti, teretes; juniores tomentosi, pilis stellatis, cortice fibroso tenaci brunneo. *Stipulæ* deciduæ. *Flores* paniculati, ramis patentibus villosis. *Calyx* 5-fidus; laciniæ ovatæ acuminatæ, nervosæ, coriaceæ, rigidæ, patentes. *Petala* alba, spathulata. *Stigma* bilobum, tubo staminum longius. *Ovarium* villosum, 1-loculare, uniovulatum. *Ovulum* pendulum.

606. *P. urticinus*; ramulis foliisque canescentibus, foliis sparsis petiolatis ovato-lanceolatis attenuatis grosse inæqualiterque serratis venosis, paniculis ramosis terminalibus, petalis lineari-spathulatis elongatis acutis, juxta basin tubi staminum concretis, stylo omnino incluso, caule fruticoso.

New Zealand (Northern Island). Among underwood on the banks of the Kana-Kana river, Bay of Islands.—1826, *A. Cunningham.*

Frutex 6—8 pedalis. *Rami* virgati, teretes laxiusculi, ramulis alternis brevibus, foliatis. *Stipulæ* caducæ. *Flores* paniculati, ramis strictis dense stellato-pilosis. *Calyx* 5-fidus, laciniis ovatis acutis, minus rigidioribus sed villosioribus quam in præcedenti. *Petala* attenuato-spathulata. *Stylus* in tubo staminum penitus inclusus.

This species differs from the preceding in its leaves being smaller and more attenuated, in having its branchlets more hoary, and its petals, which are united almost at the base of the tube of stamens, more attenuated and somewhat exceeding the tube in length, within which the style is, moreover, wholly inclosed.

MALVACEÆ, *R. Br. Kunth.*

Hibiscus, *L.*

607. *H. vesicarius. L. Willd. Sp. Pl.* iii. *p.* 832. *DC. Prodr.* i. *p.* 453. *Cav. Diss.* iii. *p.* 171. *t.* 64. *f.* 2.

New Zealand (Northern Island). On hills near the village of Mangamaka on the Hokianga river, and at Ngaire opposite the Cavallos Isles, off the East Coast.—1833, *R. Cunningham.*

An planta vere indigena? Forsan ex Anglia introducta.

LINEÆ, *DC.*

Linum, *L.*

608. *L. monogynum*, caule basi suffruticoso, foliis sparsis lanceolatis 3-nerviis integris glabris, stylo simplici. *Forst. Prodr. n.* 145. *DC. Prodr.* i. *p.* 428. *A. Rich. Fl. Nov. Zel. p.* 317. *Don. in Sweet Fl. Gard. t.*

Kaho, incolis. *R. Cunn.*—*Nao* vulgo ab incolis dicitur. *D'Urville.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* On bare rocks on the islets of the Bay of Islands, &c.—1826, *A. Cunningham.* (Middle Island.)—1773, *G. Forster.* Astrolabe Harbour.—1827, *D'Urville.*

CARYOPHYLLEÆ.

1. Arenaria, *L.*

609. *A. media, L. DC. Prodr.* i. *p.* 401. *A. Rich. Fl. Nov. Zel. p.* 315. —A. marina. *Engl. Bot. t.* 958.

Note-noho ab incolis vulgo sub nomine cognoscitur. *D'Urville.*

New Zealand (Middle Island). Frequent on rocks near the sea-coast, Astrolabe Harbour.—1827, *D'Urville.*

2. Stellaria, *L.*

S. media, Sm. Fl. Brit. p. 473. *DC. Prodr.* i. *p.* 396. *Engl. Bot. t.* 537. —Alsine media, *L. A. Rich. Fl. Nov. Zel. p.* 316.

Kaikaka, indigenis. *D'Urville.*

New Zealand (Northern Island). Frequent in open grounds, distant from any European settlement, apparently indigenous, in the country between Waimaté and Hokianga.—1833, *R. Cunningham.*

ELATINEÆ, *Cambess. in Mem. du Mus.* (1829.)

Elatine, *L.*

Calyx 3—4 partitus persistens inferus. *Petala* 3—4. *Stamina* 3—6—8. *Styli* 3—4, breves. *Capsula* 3—4 valvis, 1—4 locularis, polysperma. *Semina* cylindrica, longitudinaliter sulcata, transversimque striata placentis centralibus affixa.

610. *E.? gratioloides*, glabra, foliis oppositis subsessilibus obovatis obtusis venosis, floribus alternis axillaribus sessilibus.

New Zealand (Northern Island). In a bog at Tauraki, Hokianga river. —1833, *R. Cunningham.*

Herba glabra, *caules* repentes radicantes. *Folia* opposita, lato-obovata, obtusa, prope modum sessilia, decurrentia integerrima vel subrepanda, minutissime asperata. *Stipulæ* nullæ. *Flores* nondum vidi, sed expositione fructus judicans sessiles, axillares, alterni. *Calyx* 3-partitus, persistens, laciniis subrotundis, obtusis, concavis. *Capsula* depressa, umbilicata, 1-locularis, polysperma. *Semina* oblonga, cylindracea, longitudinaliter tenuiter striata, transversim sulcata.

[To be continued.]

V.—*Note on* Macroscelides Rozeti*. By Dr. Moritz Wagner.†

This curious small insect-eater inhabits the western portion of the province of Algiers. It has hitherto been discovered

* Established by Duvernoy in the 'Mém. de la Soc. d'Hist. Nat. de Strasbourg,' i. p. 2.

† Translated from Wiegmann's Archiv. First part, 1839.

only in the neighbourhood of the towns of Oran, Tlemsan and Arzew. It does not appear to go further eastward than Arzew. It is moreover very rare and difficult to obtain even near these towns. Capt. Rozet who first sent this animal to France procured it through the industrious soldiers of the bataillon d'Afrique, who with their meagre pay have an insatiable thirst, and grasp after all possible means of gratifying it. Two soldiers of this famous corps, who were in great renown in Oran as rat and serpent catchers, conducted me to a rocky mountain to the west of Oran, whose summit is crowned by a Marabut temple and the Spanish fort Santa Cruz. The *Macroscelides* lives there among the cavities formed by large fragments of rock. It seeks out natural places of concealment, and does not excavate any holes; the female, however, forms a nest for the young among the most dense thickets of the dwarf palm (*Chamærops humilis*), which grows in great plenty on this rock. In the early hours of the day the animal quits its hiding-place and seeks out some sunny spot, but during mid-day hies to the shade of the *Chamærops*, and there lurks for its prey, the insects which settle on the lower plants. The *Macroscelides* prefers insect larvæ, grasshoppers without elytra, and especially snails, in fact all small soft animals. Incapable of breaking the hard house of *Helix lactea*, it thrusts its remarkably prolonged narrow mouth into the aperture, and generally tears away a portion of the snail before it has time to draw itself completely into the interior of its shell. I kept my twelve animals for some weeks alive at home, and fed them on small Orthoptera. They would not touch bread, maize, or sugar, although Rozet states that he kept his on bread.

They are exceedingly gentle animals, which never bite, not even when they are tormented. They do not go on the hinder feet like the species of *Dipus*, but always on all fours, and when running the prolongation of their posterior feet is not at all perceptible. On the other hand I frequently observed them sitting on the rock raised like a rabbit on their hind feet, either watching their pursuers or spying about for prey. When catching flying or hopping insects they hide themselves, lurking among the dwarf palm, and then generally en-

deavour to reach their prey with the first long spring, for which the length of the hinder feet is of great service. The taking of this insect-eater is very difficult. Should the pursuer not succeed in discovering their hiding-place and cutting off their retreat under the mass of rock, it is then necessary to turn over the heavy blocks of stone with iron crow-bars. In the hot months, as also during rainy days, the *Macroscelides* disappears. The best time to obtain it is in spring and autumn. My soldiers had found the very small young of this snouted mouse *in the month of February* near Tlemsan, consequently the time of pairing appears to be during the winter months. When imprisoned, I noticed in these small animals a very peculiar, powerful exhalation. A single *Macroscelides* which had been confined for some days in a large case left behind it an odour which the box retained for several weeks. Among themselves these animals appear to be very mild and not quarrelsome, at least I never observed them to fight, even about their food.

VI.—*Amaryllidearum Species novæ*. By the Hon. and Rev. Wm. Herbert.

Pancratium tortuosum.

Bulbus subrotundus. Collo producto; folia angusta linearia $\frac{3}{16}$ unciæ lata, tortilia (humifusa?); scapus brevis (subterraneus?); spatha $2\frac{1}{4}$ unciali, 3—4-flora, germine sessili, tubo gracili 5 unciali. Corona $2\frac{1}{4}$ unc., limbi laciniis linearibus ultra 3 uncialibus, stylo filamentis coronam $\frac{5}{16}$ superantibus longiore.—W. H.

"Habitat in planitie arenosa Djeddæ in Arabia; floret Febr." S. Fischer, MS. in Herb. Hooker. Planta viva est in hort. Spofforthiano.

Pancratium trianthum.

Scapus 4—9 unc., spatha $1\frac{1}{4}$ unc., germen sessile; tubus 4—5 unc., limbus $2\frac{1}{2}$—3 unc., coronam circ. unciam stylum $\frac{3}{8}$ unc., superans, filamenta stylo breviora coronam circ. $\frac{5}{8}$ unc. superantia.

Ex Senegambia, 1839. Specimina omnia triflora ex herb. Hooker. Absque foliis.—W. H.

VII.—*Descriptions of British* Chalcidites. By Francis Walker, F.L.S.

[Continued from vol. iii. p. 419.]

Sp. 70. Cirrospilus Zopyrus, Mas. *Viridi-æneus, abdomen cupreum, antennæ fuscæ: pedes flavi fusco- et fulvo-varii, alæ sublimpidæ.*

Viridi-æneus: oculi et ocelli rufi: antennæ fuscæ; articulus 1us viridis; 2us piceus, apice fuscus: abdomen cupreum: pedes flavi; coxæ virides; femora fusco late cincta: tibiæ fulvæ apice et basi flavæ; tarsi apice fusci; propedes tibiis et tarsis pallide fulvis: alæ sublimpidæ; squamulæ piceæ; nervi fusci, basi fulvi. (Corp. long. lin. $\frac{2}{3}$; alar. lin. $\frac{3}{4}$.)

Found near London.

Mas. Corpus sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve convexum, juxta thoraci latum: antennæ filiformes, corporis longitudine, pilis longis vestitæ; articulus 1us gracilis, sublinearis; 2us longicyathiformis; 3us brevis; 4us, 5us et 6us longi, lineares; clava longifusiformis, acuminata, articulo 6° duplo longior: thorax longiovatus, convexus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsidum suturæ bene determinatæ; scutellum breviconicum: metathorax mediocris, transversus: petiolus brevissimus: abdomen sublineare, planum, thorace brevius fere angustius: pedes graciles: proalæ angustæ; nervus ulnaris humerali longior, radialis vix ullus, cubitalis sat longus.

Sp. 71. Cirr. Arathis, Mas. *Viridis, abdomen cupreum, antennæ piceæ, pedes picei, tarsi fulvi, alæ limpidæ.*

Obscure viridis: oculi et ocelli rufi: antennæ nigro-piceæ; articuli 1us et 2us virides: abdomen nigro-cupreum: pedes picei; coxæ virides; genua fulva; tibiæ apice fulvæ; tarsi fulvi, apice fusci; propedes tibiis et tarsis fulvis: alæ limpidæ; squamulæ piceæ; nervi fusci. (Corp. long. lin. $\frac{3}{4}$; alar. lin. $1\frac{1}{4}$.)

Found near London.

Mas. Corpus sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve convexum, juxta thoraci latum: antennæ filiformes, latæ, pilis longis vestitæ, corpore paullo breviores; articulus 1us longiovatus, latus; 2us longicyathiformis; 3us brevis; 4us et sequentes fusiformes, usque ad 6um curtantes; clava longifusiformis, acuminata, articulo 6° duplo longior: thorax ovatus, convexus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsidum suturæ bene determinatæ; scutellum breviconicum: metathorax mediocris, transversus: petiolus brevissimus: abdomen sublineare, planum, thorace angustius non brevius: pedes graciles: proalæ latæ; nervus ulnaris humerali longior, radialis vix ullus, cubitalis sat longus.

Sp. 72. Cirr. Rhode, Mas. *Viridis, abdomen cupreum, antennæ nigræ; pedes piceo-fulvi, femora viridia, tarsi flavi, alæ limpidæ.*

Viridis: oculi et ocelli rufi: antennæ nigræ, articuli 1us et 2us nigro-vi-

rides: abdomen nigro-cupreum: coxæ virides; trochanteres picei; femora viridia, apice flava; genua fulva; tibiæ fulvæ; tarsi flavi, apice fusci; mesotibiæ apice piceæ; metatibiæ piceæ, basi fulvæ; protarsi fulvi: alæ limpidæ; squamulæ piceæ; nervi fusci. (Corp. long. lin. $\frac{3}{4}$—$\frac{3}{4}$; alar. lin. $1\frac{1}{6}$—$1\frac{1}{4}$.)

Var. β.—Obscure æneo-viridis: pedes flavi; coxæ nigro-virides; femora nigro-picea; tibiæ fuscæ, apice et basi flavæ; tarsi apice fusci; propedes tibiis et tarsis fulvis.

Found near London.

Mas. Corpus breve, latum, sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve convexum, juxta thoraci latum: antennæ filiformes, latæ, pilis longis vestitæ, corpore non breviores; articulus 1^{us} longiovatus latus; 2^{us} longicyathiformis; 3^{us} brevis; 4^{us} et sequentes fusiformes, usque ad 6^{um} curtantes; clava longifusiformis, acuminata, articulo 6° duplo longior: thorax ovatus, convexus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum latitudine longius; parapsidum suturæ bene determinatæ; scutellum breviconicum: metathorax mediocris, transversus: petiolus brevissimus: abdomen sublineare, planum, thorace brevius vix angustius: pedes graciles; proalæ latæ; nervus ulnaris humerali longior, radialis vix ullus, cubitalis sat longus.

Sp. 73. Cirr. Clito, Mas. *Nigro-viridis, abdomen cupreum, antennæ piceæ, pedes nigri, tarsi flavi, alæ limpidæ.*

Nigro-viridis: oculi et ocelli rufi: antennæ piceæ; articuli 1^{us} et 2^{us} nigro-virides: abdomen nigro-cupreum: pedes nigri; trochanteres flavi; genua flava; tarsi flavi, apice fulvi; propedes tibiis tarsisque fulvis: alæ limpidæ; squamulæ fuscæ; proalis nervi fulvi, metalis flavi. (Corp. long. lin. $\frac{1}{2}$; alar. lin. 1.)

July; near London.

Fem. Corpus sublineare, nitens, scitissime squameum, parce hirtum: caput transversum, breve, convexum, juxta thoraci latum; vertex sat latus; frons abrupte declivis: oculi mediocres: antennæ graciles, extrorsum crassiores, corporis dimidio paullo longiores; articulus 1^{us} sublinearis, gracilis; 2^{us} longicyathiformis; 3^{us} et sequentes ad 5^{um} curtantes; clava longiovata, acuminata, articulo 5° multo longior: thorax ovatus, convexus: prothorax transversus, brevis: mesothoracis scutum latitudine longius, linea per medium; parapsidum suturæ remotæ, bene determinatæ; scutellum obconicum: metathorax mediocris: petiolus brevissimus: abdomen longiovatum, depressum, acuminatum, thorace paullo longius vix latius; segmenta transversa, subæqualia: pedes graciles, simplices; tarsis articuli 1° ad 3^{um} curtantes, 4^{us} paullo longior; ungues et pulvilli parvi: alæ vix ciliatæ; nervus ulnaris humerali longior, radialis brevissimus, cubitalis sat longus apice stigma minutum fere bimucronatum fingens.

Sp. 74. Cirr. charoba, Fem. *Cyaneo-viridis, abdomen cupreum, antennæ fulvæ, pedes flavi, alæ subflavæ.*

Cyaneo-viridis, æneo-varius: oculi et ocelli rufi: antennæ fulvæ; articuli 1^{us} et 2^{us} virides, hic apice fulvus: abdomen viridi-cupreum: pedes

læte flavi; coxæ virides; tarsi apice fusci; protarsi fulvi: alæ flavescentes; squamulæ flavæ; nervi flavi.

July; near London.

Genus Miscogaster, *Walker*.

Mas. Corpus sublineare, convexum, nitens, scitissime squameum, parce hirtum, caput transversum, breve convexum, thorace paullo latius; vertex latus; frons abrupte declivis: oculi mediocres, non extantes: antennæ filiformes, corpore breviores; articulus 1^{us} gracilis, sublinearis; 2^{us} brevis; 3^{us} et 4^{us} minimi; 5^{us} et sequentes lineares, usque ad 10^{um} curtantes; clava linearis, apice acuminata, articulo 10^{o} duplo longior: thorax longiovatus: prothorax transversus, brevissimus: mesothoracis scutum longitudine latius; parapsidum suturæ bene determinatæ; scutellum obconicum: metathorax sat magnus, declivis, postice angustior: petiolus brevissimus: abdomen sublineare, breve planum, thorace paullo brevius et angustius; segmentum 1^{um} magnum; 2^{um} et sequentia brevia: pedes simplices, subæquales; alæ mediocres; nervus humeralis ulnari fere duplo longior, radialis ulnari longior, cubitalis ulnari multo brevior; stigma minutum.

Sp. 1. Misc. Dryops, Mas. *Cyanea cupreo et viridi varia, antennæ nigræ, pedes luteo-fulvi, femora fusca, alæ limpidæ.*

Cyanea, viridi-varia: oculi et ocelli rufi: antennæ nigræ; articuli 1^{us} et 2^{us} virides: abdominis discus cupreus: pedes lutei; coxæ virides; trochanteres fusco maculati; femora fusca, apice subtus lutea; tibiæ fulvæ; tarsi apice fusci; propedum tibiæ luteæ, tarsi fulvi: alæ limpidæ; squamulæ piceæ; nervi proalis fusci, metalis flavi. (Corp. long. lin. 1$\frac{2}{3}$; alar. lin. 2$\frac{1}{2}$.)

Found near Edinburgh, by Dr. Greville.

Mas. M. æneæ proxima: corpus sublineare, convexum, nitens, scitissime squameum, parce hirtum: caput transversum, breve, thoraci latius; vertex latus; frons impressa, abrupte declivis: oculi mediocres, non extantes: antennæ filiformes, corpore breviores; articulus 1^{us} gracilis, sublinearis; 2^{us} breviovatus; 3^{us} et 4^{us} minimi; 5^{us} et sequentes lineares, usque ad 10^{um} curtantes; clava sublinearis, apice acuminata, articulo 10^{o} fere duplo longior; thorax longiovatus: prothorax transversus, brevis antice angustior: mesothoracis scutum longitudine paullo latius; parapsidum suturæ bene determinatæ; scutellum fere conicum: metathorax sat magnus, declivis postice angustior: petiolus brevis: abdomen sublineare, breve, planum, thorace brevius et angustius; segmentum 1^{um} magnum; 2^{um} et sequentia breviora; sexualia exerta: pedes simplices, subæquales: alæ sat magnæ; nervus humeralis ulnari duplo longior, ulnaris radiali brevior, cubitali paullo longior; stigma parvum.

Sp. 2. Misc. Gelanor, Mas. *Cyaneo-viridis, abdomen cupreo-varium, antennæ nigræ, pedes luteo-fulvi, femora fusca, alæ limpidæ.*

Cyaneo-viridis: oculi et ocelli rufi: antennæ nigræ, articuli 1^{us} et 2^{us} virides: abdominis discus cupreo-varius: pedes fulvi; coxæ virides; trochanteres fusci; femora supra fusca; genua lutea; protibiæ luteæ; meso- et metatarsi apice fusci: alæ limpidæ: squamulæ piceæ; nervi proalis picei, metalis fulvi. (Corp. long. lin. 1$\frac{1}{4}$; alar. lin. 2$\frac{1}{4}$)

Found near Edinburgh, by Dr. Greville.

Mas. M. Dirci proxima: corpus crassum, breve, convexum, nitens, scitissime squameum, parce hirtum: caput transversum, breve, thorace latius; vertex latus; frons abrupte declivis, vix impressa: oculi mediocres, non extantes: ocelli approximati: antennæ validæ, extrorsum crassiores, thorace paullo breviores; articulus 1us gracilis, subarcuatus, fere linearis; 2us longicyathiformis; 3us et 4u minimi; 5us et sequentes approximati, usque ad 10um curtantes; clava fusiformis, articulo 10° plus duplo longior: thorax breviovatus, altus: prothorax brevissimus: mesothoracis scutum longitudine multo latius; parapsidum suturæ non bene determinatæ; paraptera et epimera magna; scutellum breviovatum, prominens: metathorax obconicus, declivis: petiolus brevis: abdomen longiovatum, convexum, breve, thorace brevius et angustius; segmentum 1um magnum; 2um breve; 3um longius; 4um adhuc longius; 5um et 6um minima: pedes graciles, simplices, subæquales; mesofemora subtus unisetigera: alæ mediocres; nervus humeralis ulnari plus duplo longior, cubitalis ulnari vix longior radiali multo brevior: stigma parvum, ramulum emittens perbrevem.

Sp. 3. Misc. Sopolis, Mas. *Æneo-viridis, caput cyaneo-viride, antennæ nigræ, pedes picei, femora viridia, tarsi flavi, alæ limpidæ.*

Æneo-viridis: caput cyaneo-viride: oculi et ocelli rufi: antennæ nigræ; articuli 1us et 2us virides, ille basi fulvus: abdomen viride, æneo-varium: pedes virides; trochanteres picei; genua fulva; tibiæ piceæ; protarsi picei; meso- et metatarsi flavi, apice fusci: alæ limpidæ; squamulæ piceæ; nervi proalis picei, metalis fulvi. (Corp. long. lin. $1\frac{1}{3}$; alar. lin. $2\frac{1}{4}$.)

Found near Edinburgh, by Dr. Greville.

Genus Gastrancistrus, *Westwood.*

Mas. G. compresso proxima: corpus breve, convexum, nitens, scitissime squameum, parce hirtum: caput transversum, breve, thorace latius; vertex latus; frons abrupte declivis: oculi mediocres, non extantes: antennæ graciles, submoniliformes, corporis dimidio multo longiores; articulus 1us gracilis, sublinearis; 2us brevis; 3us et 4us minimi; 5us et sequentes discreti, usque ad 10um curtantes; clava fusiformis, acuminata, articulo 10° plus duplo longior: thorax ovatus, crassus: prothorax brevissimus, supra vix conspicuus: mesothoracis scutum longitudine latius; parapsidum suturæ bene determinatæ: scutellum magnum, subovatum: metathorax transversus, brevis: petiolus brevissimus: abdomen lineare, depressum, subcompressum, læve, thorace brevius et multo angustius: pedes simplices, subæquales: alæ mediocres; nervus humeralis ulnari fere duplo longior, radialis ulnari paullo brevior, cubitali longior; stigma minutum.

Sp. 1. Gast. Acontes, Mas. *Æneo-viridis, abdomen cupreo-purpureum, antennæ fulvæ, pedes flavi, alæ limpidæ.*

Viridis, æneo-varius: oculi et ocelli rufi: antennæ fulvæ; articuli 1us apice 2usque basi obscuriores: abdomen cupreo-purpureum, basi viride: pedes flavi; coxæ virides; tarsi apice fusci: alæ limpidæ; squamulæ fulvæ; nervi proalis fulvi, metalis flavi. (Corp. long. lin. $\frac{3}{4}$; alar. lin. $\frac{1}{2}$.)

Found by Dr. Greville near Edinburgh.

[To be continued.]

VIII.—*Instructions relative to Botany and Vegetable Physiology, for the Scientific Expedition to the Antarctic Regions, prepared by the President and Council of the Royal Society*.*

The duty of the Botanist should be, to collect specimens and preserve evidence concerning every department of Botany and Vegetable Physiology, not merely in illustration of these subjects as branches of science, but with reference to purposes of general utility.

The vegetation of the Antarctic regions and of the most southern countries which the expedition may visit, should be an object of especial attention, for however sterile and uninviting a place may appear to be, it is most desirable to know exactly what plants those regions produce. Here, therefore, and at all other places, as complete an herbarium as possible should be formed. At Kerguelen's land, of which the Flora is so little known, this is especially necessary: even at St. Helena, the Cape of Good Hope, and Hobart Town, carefully as the botany of these places has been examined, a dried collection of plants should be made, especially of the lower orders of phænogamous vegetation and of aquatic and submersed plants, whether of fresh or salt water. Fungi also, and Rhizanths, should be diligently sought for, and all those minute species of cryptogamic plants which are parasites.

Though but little accession to our knowledge of Systematic Botany can be anticipated at any of the principal stations of the expedition, many new and interesting facts may be collected in Physiological Botany, if anomalous forms of vegetation be examined, as concerning these so little that is positive has as yet been ascertained in foreign countries. Collections should be made of the stems of Casuarinas, Urticaceous trees, and of twining woody plants, the internal structure of which is frequently at variance with the ordinary plan of vegetable formation. Diligent search should also be made for cases of the occurrence of the embryo buds of Dutrochet. It is probable that attention skilfully directed to these last productions will throw light upon some of the most obscure points of Vegetable Physiology. Most of the specimens of this kind may be preserved in a dry state; but as some will require to be kept moist, it is re-

* The President and Council having been informed by the Lords Commissioners of the Admiralty that it had been determined, in conformity with their recommendation, to send out Captain James C. Ross on an Antarctic Expedition for scientific objects, and having been requested to communicate any suggestions upon subjects to which they might wish his attention to be called, referred the consideration of each to distinct Committees. We have selected those reports which are connected with the subject of our Journal.—Ed.

quisite, for this purpose, that the Botanist should be supplied with bottles, jars, acetic acid and spirit.

Attention should be especially directed to the distribution of remarkable species in each country, regard being paid, in particular, to the elevations at which they are found, and the soils which they seem to prefer, where preference is observable. Connected with this topic are the limits to which cultivated plants extend, and the circumstances under which they succeed or fail. In noting points of this nature, facts concerning the commoner species will be interesting, because they are so frequently neglected, and because of the evidence as to climate which they may be expected to afford. In the absence of this kind of knowledge, it is difficult for persons here to judge correctly respecting the kind of plants it may be desirable to introduce into another country. Should the causes of failure or of success in the cultivation of particular plants be apparent, they ought to be noted down. As an instance of the importance of this branch of inquiry, the Vine at the Cape of Good Hope may be mentioned: the bad quality of Cape wine, with the exception of that produced at the farm of Constantia, is well known: can any physical cause be assigned for this circumstance? If exotic plants are commonly cultivated with apparent success, they should receive particular notice; European Oaks, for example, are common about Cape Town, where they are planted for their shade; the species to which they belong, and the effect of that climate upon their growth, and the quality of their timber, are points deserving of attention.

The original Flora of St. Helena should be fully investigated and carefully distinguished from that which has been gradually formed there by the introduction of numerous plants from various countries. The association of plants in this island will be found extremely curious, and the circumstances which enable species of very different habits to flourish equally well in the same place, notwithstanding their constitutional diversity, are deserving of particular attention. A very detailed catalogue should be formed of these exotics, the degree in which they are affected by their new country should be observed, and an attempt be made to discover the causes which are favourable to the maintenance of so singularly mixed a vegetation in so small an island. Such a catalogue, if well prepared, may be expected to illustrate many difficult and important questions which are connected with the relation borne by vegetation to climate.

Both at St. Helena and Hobart Town, Tree Ferns will be found: those in the former place have the stems destitute of external fibres

except near the ground, while the Tree Ferns of Hobart Town are thickly covered with similar fibres from the very summit. The origin of these fibres and the circumstances under which they are produced, are unknown, and should, if possible, be determined; indeed, the manner of growth of these plants in all other particulars is an interesting subject for careful investigation, as are also the circumstances under which this tropical form of vegetation is produced upon Mount Wellington. In the event of the expedition visiting the southern part of New Zealand, it should also be ascertained under what conditions the Tree Ferns that exist there extend so far beyond the usual geographical limits of such trees, and also whether they are not accompanied by other forms of an equally tropical character.

The northern coast of Van Diemen's Land being in many respects clothed with a different vegetation from the south side, it is desirable to notice the peculiarities of each. At Emu Bay, there exists the *Gunnia australis*, an orchidaceous epiphyte, which is far to the southward of the general range of plants of that kind. It will probably be found that this apparent exception to general rules is dependent upon some local peculiarity of climate. Possibly other species with similar habits occur on the same line of coast; they should be sought for, and particular attention should be paid to the plants with which the orchidaceous epiphytes are associated.

A principal object of inquiry should be, plants yielding useful products of all kinds. It is in this way only that the resources of foreign countries can be ascertained, and it is presumed that in an expedition which will be stationary for considerable periods of time, such inquiries can be easily made. Under the head of useful products the following may be particularly mentioned:

1. *Dietetical, medicinal,* and *poisonous agents* of all kinds. The nature and action of the poisons employed by the natives of many countries are but slightly known.

2. *Dye stuffs.* Attention should be paid, especially to obtain Lichens, as substitutes for the *Roccella tinctoria,* now becoming scarce, and consequently very valuable in European commerce. The fitness of these plants for this purpose may be approximately ascertained by Hellot's lichen test, which is as follows: digest the lichen at a temperature of 130° F. for a few hours, in a weak solution of ammonia, but sufficiently strong to be tolerably pungent. One that is fit for the dyer will yield a rich violet red liquid.

3. *Astringent substances adapted for tanning.* It is desirable to ascertain with accuracy the source of the various astringent extracts

imported from New Holland and the neighbouring parts, and which are employed by the tanners of this country.

4. *Fibres adapted for cordage and weaving.* Substitutes for Hemp are very desirable. Great strength, flexibility and freedom from injurious influence in working are three essential qualities of good hemp.

5. Information respecting the source of many of the *ornamental woods* imported from the southern hemisphere is very imperfect. It is desirable, therefore, that inquiries be made on this subject as well as for new kinds of wood.

6. *Gums, resins, volatile oils, fecula.* Especially the source of some resins brought to this country from New Holland, and which are analogous in some properties to the *yellow resin* of that country.

In forming collections of such objects, especial care must be taken when collected to number alike both the products and the plants by which they are furnished, and to note whatever can be learned concerning them, more particularly with regard to their abundance and the facility with which they can be procured. It is also necessary that the observations made by the Botanist himself should be carefully distinguished from such information as he may receive from other persons.

No opportunity is to be lost of collecting information respecting the source and mode of preparation of any vegetable substances known in commerce; for many exotic products, even those with which we are most familiar, have many points connected with their natural history deserving attention.

The vegetation of South Shetland cannot be expected to furnish much that can be made available for purposes of commerce, except Lichens. With respect to these plants, however, it is possible that species fit for the purposes of the dyer may be found in those southern latitudes; and if such should prove to be the case, an additional source of profit may become available for the South-sea traders.

Where the native names of useful plants can be correctly ascertained, they should be preserved; but care must be taken to avoid error in this respect. Implicit credit must not be given to the statements of individual natives; it is only by comparing the separate evidence of different persons, that correctness can be expected.

Collections should be formed of the seeds and bulbs of useful and ornamental plants wherever opportunities occur, and they should be forwarded to Europe from time to time. It is also recommended that duplicate collections be transmitted to the Supreme Govern-

ment at Calcutta for distribution among the botanical gardens of India. In packing these collections, the best method is to enclose each kind of seed in separate packets of brown paper, which should be placed loosely in canvas bags, or in boxes with holes in their sides, and arrangements should be made for their being transmitted in a cabin, or some well-ventilated part of the ship. Among those seeds which it is more particularly desirable to procure, may be mentioned the arborescent Compositæ of St. Helena, and the native Coniferous plants of all countries, particularly the Phyllocladus or Celery-leaved Pine, and the various species of Athrotaxis inhabiting the mountains of Van Diemen's Land. As the seeds of such plants are apt to suffer from long keeping, and as other instances may occur when it would be desirable to send home young plants instead of seeds, it would be advisable that the expedition should be supplied with one of Mr. Ward's glazed cases, to be used if occasion should arise.

Light is an agent which operates so powerfully upon plants, determining the amount and even nature of their secretions, and influencing in the most essential manner their vital actions, that it would be most interesting to obtain, if possible, some good photometrical observations. The extreme and mean temperatures of the atmosphere, its humidity, the quantity of rain, and the temperature of the earth immediately below and within a few feet of the surface, have also a direct and important bearing upon Vegetable Physiology, especially when considered with respect to the distribution of plants, and the arts of cultivation. Observations upon all such points tend to explain the connexion which exists between vegetation and climate, and should be introduced by the Botanist into his report, notwithstanding that they also occur in the Meteorological Journal.

If the observations here recommended be briefly noted in a tabular form, and at the time that they are made, the registration of much useful matter which might otherwise escape recollection, will be secured, and a valuable document formed for future reference.

In conclusion, the Council most particularly recommend that the Botanist to the expedition be directed to number all the objects collected by him in one consecutive series; that the dried specimens, seeds, woods, and productions of all kinds, shall correspond in number with the plants producing them; and that two complete collections be prepared for Government, of which one shall be for incorporation with the general collections belonging to the public, and the other be preserved separately, to illustrate the botany, &c.,

of the expedition. The Council also recommend that both these collections be delivered up within six months after the return of the expedition; and, finally, that a report upon the botanical results of the expedition be furnished to Government within six months after its return, every plant or object mentioned in the report bearing the number of the specimens in the collections to be delivered up as above recommended.

Zoology and Animal Physiology.

1. Marine Invertebrata.

The animals which it is desirable to preserve, and which may first present themselves to the notice of the naturalist in the present expedition, are the floating marine *Mollusca* and *Crustacea*, and those which inhabit the Sargazzo or Gulph-weed.

With respect to the *Mollusca*, all the species of the *Cephalopoda* or Cuttle-fish tribe, and all the *Pteropoda* or lower organized floating Mollusca, should be preserved. If taken alive they should be allowed to die gradually in sea water, by which means they commonly remain in a relaxed state, and display more of their natural outward form. When dead they should be soaked for a short time in fresh water, and then put into spirit; or if transparent, in the saline solution*, to prevent decomposition, which otherwise rapidly takes place.

To each specimen should be attached a number, stamped on sheet tin, corresponding to the entry-number in the Catalogue, in which should be noticed the kind of locomotion, or other vital phenomena, and the colour of the living animal, the latter being speedily altered or lost in the preserving liquor. The larger Crustacea will be liable to become putrid in spirit, unless the soft mass, which fills a large portion of the body, consisting of the liver, &c. be removed. Each specimen of this class, excepting the very minute ones, which will be best preserved in small phials or glass tubes, should be wrapt in a piece of very soft, thin linen or cotton cloth, to prevent the legs from being intermixed or lost, as they are very likely to fall off after having been a short time in spirit.

A very important object of investigation is the development of the Crustacea, from the earliest period at which they can be observed to the perfect state. They may be readily examined even before they leave the egg, by opening the egg under a single microscope.

* Common salt..... 1 part.
Alum..... 2 parts.
Boiling water .....10 parts.
Filter the solution when cold.

Drawings of these changes are very desirable, and when practicable the eggs and young ones in different stages should be preserved in spirit in short glass tubes. The smaller oceanic Crustacea offer a prolific and hitherto unexplored field of investigation.

Among the floating Mollusca likely to be met with in the tropical latitudes is the *Spirula*, a small Cephalopod with a chambered shell. An entire specimen of this rare Mollusk is a great desideratum; and if it should be captured alive, its movements should be watched in a vessel of sea water, with reference more especially to the power of rising and sinking at will, and the position of the shell during those actions.

The chambered part of the shell should be opened under water, in order to determine if it contain a gas; the nature of this gas should likewise, if possible, be ascertained. As a part of the shell of the *Spirula* projects externally at the posterior part of the animal, this part should be laid open in the living *Spirula*, in order to ascertain how far such mutilation would affect its power of rising or sinking in the water. In the event of a living Pearly Nautilus (*Nautilus Pompilius*) being captured, the same observations and experiments should be made on that species, in which they would be attended with more precision and facility, as the species is much larger than the *Spirula*, and its shell external. The towing-net should be kept overboard at all practicable periods, and drawn up and examined at stated intervals, as some of the rarest marine animals have been taken by thus sweeping the surface of the sea.

A sketch or drawing of Molluscous and Radiate animals, of which the form and colour are liable to be materially altered by death, or when put in spirit, will aid materially in rendering the description of the species useful and intelligible. The *Echinodermata* and *Asterias echinus*, and similar forms, should be soaked in fresh water previously to their being put into spirit.

Care must be taken not to crowd too many soft-bodied Invertebrata in the same bottle, and to change the spirit or preserving liquor at least once, if not oftener.

2. Fishes.

The mode and speed of swimming, living colour, temperature, and any other peculiarity, should be noticed before placing the specimen in spirit.

In very large specimens of the Shark or Ray kind, a section of the jaws, with a part of the vertebral column, should always be preserved as wet preparations, and the remainder of the jaws and ver-

tebral column in a dry state. The eyes, eyelids, and part of the surrounding skin should be preserved in the saline solution. In less bulky specimens the entire head should be taken off by dividing the fish below the heart across the upper part of the liver, by which means the mouths of the oviducts, if it be a female, the heart, gills, and head are all preserved together.

The tail of a Shark may be taken off a little below the anus, and the trunk alone preserved for examination. If the trunk be too large, it should be cut through above the pelvis, and the parts contained in the hinder portion, as the claspers of the male, should be preserved in spirit. If the specimen be a female, separate the two oviducts through their whole length, where they run along the abdomen, on each side of the spine, but keep them attached to the cloaca and its surrounding parts.

If with young, or eggs, take the whole out in the same way without opening the oviducts.

The heads of all fishes should be preserved, when the specimens are too large to be preserved entire.

All external parasites, and those which infest the gills of fishes, should be preserved. The alimentary canal should, in all cases, be examined for the presence of the entozoa, which, if adherent to the coats of the intestine, should be preserved with the part to which they are attached. One of the most interesting fishes of the Southern Seas is the Port Jackson Shark (*Cestracion Philippi*). Moderate sized specimens of this species should be preserved entire: and the head, vertebræ, with the dorsal spines, viscera, and especially the impregnated oviduct, should be preserved. The Southern Chimæra (*Callorhynchus antarcticus*) merits also the especial attention of the Naturalist, and the same specimens of this species should be preserved as of the Cestracion.

3. Reptiles.

Specimens of Turtle should be carefully examined for parasitic animals; a curious Barnacle (*Chelonobia*) and a Leech (*Hirudo branchiata*) are occasionally found adhering to these marine Reptilia.

In the event of the expedition touching at the Galapagos Islands, specimens of *Amblyrhynchus*, a lizard of marine habits, should be secured, and the particular locality of the capture noted.

4. Birds.

The *Chionis* or Sheath-bill of the Falkland Islands and Cape Horn.

The Great Penguin (*Aptenodytes*).

The Penguin of the Isle San Lorenzo.

Of these rare and desirable birds, besides the prepared skins, the entire body should be preserved in spirits for anatomical purposes. The young of the Great Penguin, and the eggs at different stages of incubation, should likewise be similarly preserved.

5. Mammalia.

The skulls, skeletons, and viscera of a specimen of each species of the *Cetacea* of the Southern Ocean are worthy of being preserved. With respect to the Sperm Whale, an entire fœtus, or, if of large size, the brain, eyes, pharynx, larynx, and blow-holes, and the viscera; a part of the impregnated uterus; the ovaria, and a portion of the membrane of the fœtus; are all parts worthy of preservation.

The same observations apply to the great Elephant-Seals (*Phoca* (*Cystophora*) *proboscidea*); of which the skull and skeleton of both male and female are very desirable.

The skulls or skeletons of all the species of the Southern Seals should be preserved, the sex being noted.

6. In Particular Regions.

In Australia or Van Diemen's Land the following species are more especially worthy of attention.

Thylacinus Harrisii, Hyæna of the Colonists.

Of this species, the skeletons of male and female, detached skulls, an entire specimen in the saline solution for dissection, the viscera, and more especially the impregnated uterus, and a young specimen for the changes in dentition are particularly desirable; such specimens not having been as yet transmitted to the museums of this country or on the continent.

The skeletons, skulls, and female organs of every marsupial quadruped, and of the *Ornithorhynchus* and *Echidna* (or Porcupine of the Colonists) should be preserved.

The smaller Mammalia of Australia, whether Marsupial or Rodent, should be preserved in spirit, and particular notice taken of their locality and habits.

Among the birds of Australia the Lyre-Pheasant (*Menura*) would be an interesting subject for anatomical investigation. Of this species are wanting the skeletons of a male and female, and of the young bird; and the entire body of both sexes in spirit, or the saline solution.

The same with respect to the large-billed Cuckoo (*Scythrops*), and Sea-Partridge (*Glareola*).

In New Zealand similar preparations should be obtained of the *Megapodius*, and of the *Apteryx australis*.

With regard to birds it may be observed, that if spirit be injected down the windpipe, it will pass through almost the whole body by means of the air-cells. In the case of a quadruped preserved in spirit, or in the saline solution, it is proper to inject the preserving liquor into the abdominal cavity and intestinal canal.

BIBLIOGRAPHICAL NOTICES.

Supplement to the History of British Fishes. By William Yarrell, F.L.S., V.P.Z.S., Illustrated by Wood-cuts. London, Van Voorst, 8vo. 1839.

In an early number of the 'Magazine of Zoology and Botany,' we noticed the work to which that bearing the title above is a Supplement, considering it as one well executed in all its departments, and of much importance in bringing together our knowledge of a branch of the British Fauna which had not been investigated so minutely as either the zoology or ornithology; and moreover we looked upon it as a work which was sure to cause the production of much additional information. In the latter prophecy the Supplement before us bears ample testimony that we have not been deceived, while it also exhibits the zeal of the author in his interesting department, and the assiduity with which he is assisted, which is mainly to be attributed to the excitement given to our ichthyologists by the interest of his previous volumes.

The execution of the Supplement more than equals that of the former volumes. Thirty-one figures of fishes are given, besides vignettes illustrating structure or characters. Among the species the greater number are new to our Fauna, the others being improved representations of fishes previously illustrated, or taken from specimens where the former wood-cuts were, for want of better materials, copied from drawings or other engravings. In the letter-press several mistakes and inadvertencies have been corrected. We trust that Mr. Yarrell will continue to collect materials as he has already done, and we will venture to predict that it will not be long before they will again swell to an extent even beyond that which he has already presented to the public.

The following may be noticed as occurring among the more important corrections and additions to this Supplement:—Couch's *Serranus* Mr. Yarrell has found to be identical with the *Polyprion cernuum* of Cuv. and Val. An improved figure of the baagmaer or Deal fish is given from the representation of Professor Reinhart of

Copenhagen, together with extracts from that naturalist's not easily accessible memoir. There is a beautifully cut figure of *Crenilabrus rupestris*, which formed the subject of an interesting paper by Mr. Selby in an early number of this periodical, and which (since attention has been directed to the species) has been met with on several parts of the English and Irish shores. In the paper alluded to 'Mag. of Zool. and Bot.' i. p. 137, the third specimen is said to have been found on the shore near "*Barncleugh*:" there is no such place, the name is a misprint for *Bamborough*, which we regret to see copied by Mr. Yarrell, as well as by foreign writers without blame on their parts, and we trust that this notice will tend to correction. The *Pomeranian* Bream, *C. Buggenhaggii*, is a fine addition to our *Cyprinidæ*, and has been taken in Dagenhambreach, Essex, and by Mr. Thompson in the river Logan near Belfast. Of the very singular genus *Hemiramphus*, a fish is represented under the title of *H. Europæus*, detected several years since by Mr. Couch of Polpero. In the description Mr. Yarrell remarks, "one question may be hazarded:—Is this fish, with its unequally developed jaws, the very young state of our common Garfish, *Belone vulgaris*?" and we would request our ichthyologists to attend to this query, very interesting and important, whether it proves us to have a British member of the genus *Hemiramphus*, or that the lengthened jaw is only a peculiar structure in another division; and perhaps touching upon another question immediately suggested by Mr. Yarrell's surmise,—whether or not the *Hemiramphi* may not be all a young or immature form of this fish, and if so what is the use of the elongation of the under jaw at this early period? Among the *Salmonidæ* we have a second figure of *S. ferox* from an Irish specimen, authenticating its Irish range. Mr. Yarrell also mentions having received specimens of trout weighing 32 and 34 lbs. from Lake Wenern, and which are considered identical with the British fish. A species of smelt, *Osmerus Hebridicus*, taken near the Isle of Bute, is given as new to Britain and to ichthyology. The *powan* of Loch Lomond, and *pollan* of Loch Neagh, are also now figured. *Platessa elongata*, taken at Stoford, in Bridgewater Bay, is described as new to ichthyology. Among the British Sturgeons ichthyologists will find interesting employment, and we refer to Mr. Yarrell's finely cut figures of the heads of two, and to his short observations for excitement. *Echinorhinus spinosus* is a very interesting addition, but surely there is much difference between Mr. Yarrell's figure and Dr. Smith's in the proportion and relative positions of the members, and also in the form of the teeth. We judge now only from the figures before us.

Epicrisis Systematis Mycologici seu Synopsis Hymenomycetum. Elias Fries. Upsaliæ, 1836—1838. Vol. I. 8vo.

Twenty years have elapsed since the preparation of the first volume of the 'Systema Mycologicum,' which appeared in 1821. Numerous species have since been published by the learned author himself in his 'Elenchus,' and in the 'Linnæa,' and various new labourers have arisen in the mycological field. The author's intention in the present work, of which we have here only the commencement, is to give short characters of all the fungi hitherto published or known in Herbaria under manuscript names. At the same time he takes the opportunity of completely revising the species, correcting errors, improving the synonyms where needful, and making such alterations in the arrangements and such new genera as the very enlarged number of species may demand. The difficulty and labour of the task can scarcely be fully estimated, except by persons versed in the intricacies of the subjects, though some notion perhaps may be formed from the fact that the volume, which comprises only the Hymenomycetes, contains specific characters of nearly 2560 species. The number of genera amounts to 65; of these about 28 are either new or sectional divisions of different value raised to the rank of genera. As it is, the genus *Agaricus*, after nine dismemberments, some of which are very extensive, still comprises 980 species. Of the value of the new genera it would be very rash to speak without careful investigation. The whole group is so natural that it is exceedingly difficult to define genera very nicely, though the species associated are evidently allied in a more peculiar degree amongst each other; and the characters assigned will be judged sufficient or insufficient according to the notions which individuals attach to the term genera, which are confessedly artificial assemblages; for genera do not exist in nature. It is at present uncertain whether the other orders of Fungi will be reviewed, as the encouragement to mycological works is so small, that even in the case of an author of such superior qualifications no publisher could be found to undertake the risk. The work is therefore published "sumtibus auctoris,"—a circumstance which we hope will be an inducement, not only to mycologists, to whom it is indispensable, but to botanists not so immediately interested in the subject, to become purchasers. As it was imperative upon the author to bring the book out at as little cost as possible, he has been obliged to curtail the descriptions as far as is consistent with clearness, to give only the most important synonyms, and to forgo a general index. It is painful to find the author after so

many years of labour expressing himself in such terms as the following: "Mycologia enim referatur ad vilia illa et a plerisque neglecta studia quæ nec pecuniam nec honores suis parant cultoribus; sed eo ipso fidos tantum semper habebit, licet paucos, quibus satis erit in naturæ gremio acquiescendo infinitam rerum creatarum varietatem et artificium admirari." Sweden however is not singular in this respect. Little encouragement is given at home to works on Cryptogamic botany, especially on Mycology; and in France, we know from the highest authority, that it is regarded as a very inferior branch of botany. Germany alone appears duly to appreciate its value.

Linnæa, ein Journal für die Botanik, &c. Vol. XII. Part 6. Vol. XIII. Parts 1, 2, 1839.

[Continued from vol. ii. p. 465.]

Contributions to the genus *Mentha*; by A. Rochel.—Supplementary observations on *Papaveraceæ* and *Fumariaceæ*; by Prof. Bernhardi.—On the structure of the Flowers of *Balsamineæ*; by Prof. Bernhardi.—Observations on the Hairs in the Air-tubes of *Limnanthemum* and *Villarsia*; by Drs. Grisebach and Hoffmann.—Monstrosities of Plants; by Schlechtendal.

Vol. XIII. No. I.

Anatomical investigation of the reproductive organs of *Riccia glauca*; by Prof. Unger.—On Brasilian Vetches; by Dr. Vogel.—On the Liverworts, collected by Beyrich in North America; by E. Hampe.—Description of Mount Slavnik and its botanical rarities, particularly *Pedicularis Friederici Augusti*; by M. Tommasini.— A very interesting account of a Botanical Excursion to the mountainous regions between Trieste and Fiume; by the Botanists who accompanied Mr. Forbes in his botanical excursion to the mountains of Ternova, of which an account is given in this work, vol. iii. p. 236.—Description of a new *Pancratium* and *Gilia*; by C. Bouchè.—Remarks on American *Laurocerasi*; by the Editor.—To the memory of Chamisso; by Schlechtendal.

Vol. XIII. No. 2.

On *Jungermannia Porella*, Dick; by Prof. Schwägrichen.—On the origin and development of *Botrytis Bassiana* and another parasitic mould; by Prof. Crivelli.—On a curious monstrosity of *Hordeum Himalayense trifurcatum*; by T. Irmisch.—Supplement to the enumeration of Mexican Ferns, collected by Schiede, Ehrenberg, and

others; by Kunze.—On *Conyza chilensis*, Spreng, and *C. diversifolia*, Weinw.; by Weinmann.—Review of a century of Brazilian *Malpighiaceæ*; by Dr. Grisebach.—On Mexican Plants collected by Schiede, &c.; by Schlechtendal.

Plantes Cryptogames de France. Par J. B. H. Q. Desmazières.

Of this valuable work three Numbers, 18—20, have appeared since our last notice. It would take up too much room to give a list of the species, which amount to 150, contained in them; but it may truly be said that with every number the interest increases.

Deutschlands Kryptogamische Giftgewächse, &c. Von Dr. P. Phœbus. Berlin, 1838. 4to.

This is a continuation of Brandt and Ratzeburg's account of the poisonous plants of Germany. With the exception of the Fungi, the cryptogamic plants noticed as possessing deleterious qualities are confined to one or two species of *Equisetum* and *Lycopodium*. The poisonous fungi are admirably described, with remarkably full synonyms, and of many of the more common ones there are excellent figures, with a very correct analysis. There is a very complete account of Ergot beautifully illustrated. We recommend the work very highly to the notice of such as wish to become acquainted with dangerous Fungi, and to the general cryptogamic student. The price is very reasonable.

Fauna Coleopterorum Helvetica, auctore Oswaldo Heer. Pars I. Fasc. I. Turici.—The present first fasciculus contains the *Carabidæ* and the commencement of the *Dytiscidæ*.

We are glad to learn that the Rev. Dr. Pye Smith's Congregational Lecture on the Relation between the Holy Scriptures and some parts of Geological Science is in the press.

PROCEEDINGS OF LEARNED SOCIETIES.

BRITISH ASSOCIATION.

August 26.—J. E. Gray, Esq., V.P., in the Chair.

Secretaries:—Mr. E. Forbes and Mr. Patterson.

The first paper read was by Mr. Lankester, on the Formation of Woody Tissue, the conclusions in which were opposed to the views, supported in this country by Dr. Lindley, of the formation of fibrous tissue by descent from the buds and leaves, and contained some in-

teresting observations on what have been termed by Dutrochet 'Embryo Buds.'

A notice, by Mr. Forbes and Mr. Goodsir, of Zoological Researches in Orkney and Shetland, the result of a journey made in June last, in which twenty-three new species were described, chiefly Mollusca, Radiata and Zoophytes, and many new facts stated in regard to some of the rarer British marine animals.

A notice, by Dr. Wilde, on Peruvian Mummies;—and on the preservation of Fish.

A paper on the same subject, by Mr. Lankester, who exhibited specimens, well preserved by a very ready and expeditious method.

ZOOLOGICAL SOCIETY.

November 13, 1838.—Professor Owen, in the Chair.

A letter from Alexander Gordon, Esq. was read, begging the Society's acceptance of the animal described by Mr. Waterhouse under the name of *Myrmecobius fasciatus*, and also the *Perameles lagotis*. Both of these animals, Mr. Gordon stated, were from Swan River and not from Van Diemen's Land as had been supposed.

A paper entitled "Observations on certain modifications observed in the dentition of the Flying Opossums (the genus *Petaurus* of authors)," was communicated by Mr. G. R. Waterhouse.

"In the '*Dents des Mammifères*' of M. F. Cuvier, the dentition of the Flying Opossums and that of the Phalangers is described under the two heads '*Petaurus*' and '*Phalangers proprement dits*.' Both the groups termed *Petaurus* and *Phalangers* by M. F. Cuvier contain certain species of Flying Opossums, and likewise species of Phalangers. Those species, however, which have the flank-membrane extended from limb to limb, enabling them to sail in the air like a parachute, are now with universal consent separated from the Phalangers (*Phalangista*), and arranged under the generic title Petaurus or Petaurista.

"In grouping the Phalangers and Petaurists as above mentioned, M. F. Cuvier was guided only by the characters offered by the dentition; that of *Petaurus Taguanoides* certainly bearing a very close resemblance to that of *Phalangista Cookii*. The teeth of *Petaurus sciureus*, however, do not bear so close a resemblance to those of *Phalangista vulpina* and *P. maculata*, although the three animals mentioned are placed in the same division by the author alluded to. Regarding the Petauri as a distinct genus from the Phalangers, I will proceed to describe their dentition as I find it in the skulls before me, which I may observe consist of two specimens of each of the

following species:—*P. taguanoides*, *P. flaviventer*, *P. sciureus*, and *P. pygmæus*, and one skull of a new species hereafter described.

"In these *crania* three distinct modifications in the dentition are observable; and as they are combined with certain differences in the skulls and in the external characters of the animals to which they belong, they may be regarded as forming three subordinate sections, to which for convenience I shall apply the names, *Petaurus*, *Belideus*, and *Acrobata*. Two of these names will be found in the 'Mammologie,' by M. Desmarest. The dentition observable in the species of the first of these sections (*Petaurus*) is as follows:—Incisors $\frac{6}{2}$; canines $\frac{1-1}{0-0}$; false molars $\frac{3-3}{1-1}$; true molars $\frac{4-4}{4-4}$. I am induced to call the two first teeth following the incisors canines, since they represent those which are *evidently* canines in the two next sections. The incisors of the upper jaw are arranged laterally, the three on either side being placed close together; the two foremost are separated from one another by a space about equal to their diameter; they are narrow at the base, and expanded and somewhat compressed above the base. The next incisor on each side is larger than the last or posterior one, and about half the height of the first, narrow at the base, and wide and truncated at the apex. The third incisor is small and but slightly wider at the tip than at the base. The canine is very small, being in size about equal to the posterior incisor; its tip is rounded, and it springs from the maxilla a little behind the intermaxillary suture; the space between it and the canine being about equal to twice its diameter or more; for there is a difference in this respect in the specimens before me. The first false molar is minute and conical, separated by a considerable space from the canine and also from the following molars. The next two molars on each side I have called false molars, because they do not possess the inner tubercles which are observed in those behind; they are broad at the base and compressed at the tip; the foremost presents an anterior larger, and a posterior small compressed tubercle; the third is divided at the tip into three compressed points. The true molars are nearly square, but rather longer than broad; the crown of each, with the exception of the last, presents four tubercles, with sharp cutting edges, and very much resemble those of a Ruminant animal. In the last molar there are but three of these tubercles, two in front and one behind. The incisors of the lower jaw are large, nearly cylindrical at the base; beyond this they are somewhat dilated, flattened, pointed, and have two sharp edges. There are no minute detached false molars in the lower jaw. The single false molar on each side is placed close to the true molars, compressed in front and expanded

behind; a small anterior tubercle is separated from the body of the tooth by a sli ht transverse incision. The true molars resemble those of the upper jaw, excepting that they are narrower, and the last molar has four tubercles instead of three.

"The above description is taken from *P. Taguanoides*. The *cranium* differs from that of the species of the second section (*Belideus*), in being proportionately smaller, more contracted, and deeply concave between the orbits; the cranial cavity is smaller, the zygomatic arches deeper, and the bony palate is deeply emarginated posteriorly; in fact, the palatine portion of the palatine bone is wanting. The dense woolly fur on the outer side of the ears will serve to distinguish the animal externally from either of the species of the next subgenus. *P. macrourus* I suspect belongs also to this section. In M. F. Cuvier's 'Dents des Mammifères,' it is stated, that besides the false molars described by me there are two others on each side, which are small;—these I have not seen, nor are they shown in the plate of the work quoted. Perhaps they are shed at an early period, or perhaps M. Cuvier may have described the dentition of *Phalangista Cookii* and figured that of *Petaurus Taguanoides*.

"Section 2. *Belideus*.—Dentition: Incisors, $\frac{6}{2}$; canines, $\frac{1-1}{0-0}$; false molars, $\frac{3-3}{4-4}$; true molars, $\frac{4-4}{4-4}=40$. The anterior incisors of the upper jaw are large, somewhat suddenly dilated immediately above their insertion in the intermaxillaries, and assuming a triangular form. In *P. flaviventer* they are broader than in either *P. sciureus* or the new species here described under the specific name of *breviceps*, where these incisors are proportionately shorter, and perhaps a little broader than in *P. sciureus*. The next incisor on each side is smaller than the posterior one, narrow at the base, and broad at the apex. The third incisor is broad, and has a sharp incurved cutting edge. The canine is tolerably large, and has its origin close behind the intermaxillary suture; in fact, is in the usual situation of the canine. It is separated by a small space on either side from the false molars and the incisors, compressed and pointed, and its anterior and posterior edges are sharp. The apex projects beyond the level of either of the molars. The first false molar on each side is rather large, broad, compressed and pointed, has a very faint indication of an anterior and posterior lobe, and two distinct fangs (which is not the case in the small and cylindrical corresponding tooth in *Petaurus Taguanoides*). The second false molar is small, short, and compressed, and has a minute anterior lobe. This tooth is separated by a considerable space from the first false molar, and by a narrow space from the third. The latter touches the first true molar, is narrow in

front, and consists chiefly of one triangular and pointed tubercle. The first true molar on each side is considerably larger than the following molars, each of which is smaller than the preceding, so that the last is not equal in bulk to one half of the first. With the exception of the last, all the true molars possess four somewhat blunt and rounded tubercles, and in general appearance very much resemble the corresponding teeth of a Squirrel. The last molar has but three tubercles, two in front and one behind.

"The incisors of the lower jaw are long, compressed, and pointed, and have the upper and lower edges sharp; they are almost horizontal in their direction, being but slightly curved upwards. Next follows a series of four small teeth on each side, which I have called false molars, though possibly the last only is properly so called, that having two fangs, whereas the others appear to have but one. The true molars nearly resemble those of the upper jaw, though they are narrower and longer. The first has a large irregular anterior lobe, which is higher than the posterior portion of the tooth, which is divided into two tubercles. The three posterior molars have each four tubercles.

"Besides the points of distinction already alluded to between the species of the present section and the preceding, there are other characters which cannot be considered unimportant. The space occupied by the grinding teeth of the upper jaw, compared with the space between the last incisor and the first true molar in the species of Belideus, is much less than in Petaurus. In Belideus the molars occupy a space equal to rather more than two-thirds of that between the incisors and first true molar; whereas in Petaurus, the four last molars occupy more space than that which extends from them to the incisors. There is a corresponding difference in the lower jaw. In Petaurus the molars are very nearly equal in size, whereas in Belideus they decrease considerably from the first molar to the last. In Petaurus, again, there are five molars on each side of the lower jaw opposed to six in the upper jaw, all of which are fitted for the mastication of the food; whilst in Belideus the molar corresponding to the first on either side of each jaw in Petaurus is so small, and its crown is so low, that it cannot be used in mastication. The comparatively large size of the canines, and the series of small teeth in front of the molars, will also serve to distinguish the species of the present section from the preceding, where the upper margin of the *ramus* of the lower jaw somewhat suddenly descends in front of the molars, and the coronoid process is comparatively broad.

"*Petaurus sciureus* may be regarded as the type of the section *Belideus*, which will also contain *P. flaviventer* and *P. breviceps*.

"In the third section, which is the subgenus *Acrobata* of Desmarest, the incisors are $\frac{6}{2}$; canines, $\frac{1-1}{0-0}$; false molars, $\frac{3-3}{4-4}$; true molars, $\frac{3-3}{3-3}=36$. The incisors resemble those of Belideus; the canines are well-developed, long, pointed, and recurved, placed close to the intermaxillary suture, and even encroaching slightly on the intermaxillary bone. The three false molars of the upper jaw have each two fangs, they are compressed, sharply pointed, and viewed laterally, of a triangular form. The first and second are about equal in size, and larger than the third, the apex of which projects beyond the level of the crowns of the true molars. Between the first and second false molars on each side there is a narrow space; the third is placed close to the true molars; these as well as those of the under jaw resemble the true molars of Belideus; there is however one less on each side of both jaws. The incisors of the lower jaw also resemble those in Belideus. Behind these incisors there are two minute teeth on each side, which are followed by two sharply pointed false molars, the foremost of which is the larger, and the apex of the second is raised above the plane of the true molars.

"The difference in the form of the false molar teeth pointed out, together with the reduced number of true molars, the slenderness the zygomatic arch, and the incurved angle of the lower jaw, combined with the imperfect state of the palate, will serve to distinguish the species of the present section from the preceding. Externally, the *P. pygmæus* (which is the type of M. Desmarest's subgenus) may be distinguished by its distichous tail.

PETAURUS BREVICEPS. *P. cinerea, lineâ dorsali longitudinali membranâque laterali suprà nigrescentibus, hac ad latera albâ; corpore subtùs sordidè et pallidè cinereo: caudâ gracili, ad apicem fuliginosâ; auribus mediocribus.*

	unc.	lin.
Longitudo ab apice rostri ad caudæ basin	6	6
——— *caudæ*	7	0
——— *tarsi digitorumque*	1	1
——— *auris*	0	9

Habitat New South Wales.

"This species very much resembles the *P. sciureus* in colouring; the under parts, however, have a distinct grayish tint: the dark mark which extends from the tip of the nose along the back is indistinct. It is of a much smaller size than *P. sciureus*, the tail is much more slender, and occasionally has a white tip. The skull is proportionately broader and shorter than that of *P. sciureus*, as will be seen in the following dimensions."

	P. breviceps.			*P. sciureus.*	
	in.	lin.		in.	lin.
Total length of skull	1	$3\frac{1}{2}$	.....	1	10
Length of nasal bones.....	0	$5\frac{1}{3}$	.....	0	$7\frac{1}{2}$
Length of frontal.....	0	$6\frac{1}{4}$	.....	0	$8\frac{1}{2}$
Length of palate	0	8	.....	0	$11\frac{1}{3}$
Width of skull.....	1	0	.....	1	$2\frac{1}{4}$

Mr. Waterhouse then proceeded to point out some peculiarities in the skull and dentition of the American Badger (*Meles Labradoria*). Three skulls of this species, belonging to individuals of different ages, were exhibited to the Meeting. "The most striking peculiarity in the skull of the American Badger," observes Mr. Waterhouse, "consists in the great expanse of the occipital region; the width of the occiput being equal to that of the skull measured from the outer surface of the zygomatic arches. The general form of the skull is almost conical; viewed laterally, the outline of the upper surface is most elevated at, or very near the occiput; thence it runs downwards with a slightly convex curve to the nasal bones. The interorbital portion is considerably contracted, and is narrowest posteriorly. The occipital crest is well-developed, but the sagittal crest is very slightly elevated; in this respect differing from the corresponding ridge in the *Meles vulgaris*.

"The auditory *bullæ* are very large and convex. The articulating surface of the temporal bone, or glenoid cavity, like that of the Common Badger, has its anterior and posterior process; these processes, however, merely serve to prevent the protrusion or retraction of the lower jaw, and not to enclose and lock the condyle as in that animal. Comparing the lower jaw with that of the Common Badger, the most striking difference consists in the form of the coronoid process. The anterior margin of this process is less oblique than in the last-mentioned animal; its apex is somewhat pointed, whereas in the Common Badger it is rounded: the posterior margin is formed of two lines, an upper one, running backwards and downwards from the apex of the coronoid process, and a lower one, which is perpendicular, and forms an obtuse angle with the first. In this form of the coronoid process we perceive a similarity between the American Badger and the Otter."

Dentition.—"In the number of the teeth the present animal agrees with the Common Badger, excepting that in the skulls now before me, and which belong to animals of different ages, I do not find the molar corresponding to the small first false molar of the lower jaw of that animal. In the relative size and form of the teeth there is much difference. The incisors of the upper jaw are arranged in an

arch, but form together a segment of a larger circle than those of *Meles vulgaris*; they are proportionately smaller and shorter. In the canines there is but little difference; the posterior cutting edge observed in the Badger is here almost obliterated. The false molars likewise scarcely differ. In the '*carnassière*' and true molar, however, there is much difference, the former being of great size and equal to the last molar. It is nearly in the form of a right-angled triangle, the cutting edge is much raised, and there is a large tubercle on the inner lobe of this tooth, which has no analogue in the Badger. The true molar is also nearly triangular; the tubercles with which it is furnished are but slightly raised, and are much less developed than in the corresponding grinding molar of the Badger. The principal differences observable in the teeth of the lower jaw, consist in the smaller size of the incisors, the larger size of the last false molar, and its being furnished with two distinct tubercles at its apex; that of the Common Badger being simply pointed: the smaller size of the '*carnassière*,' which is not distinctly dilated posteriorly, as in the Badger, and the cutting edge being higher; the true molar is smaller.

"The '*carnassière*' of the lower jaw may be divided into two portions, that which is opposed to the '*carnassière*' of the upper jaw, and which is the cutting portion, having high sharp cusps; and that which is opposed to the true molar, which is the grinding portion. Now in the Common Badger (*Meles vulgaris*) the latter portion decidedly exceeds the former in bulk, whereas in the American Badger the reverse is the case, arising from the comparatively large size of the '*carnassière*' of the upper jaw, and smaller size of the true molar."

Mr. Waterhouse also pointed out other distinctions between the American Badger and the European species. Independent of the differences observable in the colouring and markings, the former may be distinguished by its muzzle being hairy at the tip, the fore limbs stouter, and the claws larger and stronger.

The peculiar form of the skull in the present animal, and the modifications in the dentition are such, as, in Mr. Waterhouse's opinion, would indicate a subgeneric rather than a specific distinction; and should his views be borne out by the discovery of other species agreeing essentially with the above animal, he suggested that the name *Taxidea* might be an appropriate title for the group.

November 27, 1838.—Lieut.-Colonel W. H. Sykes in the Chair.

Dr. Horsfield laid before the Meeting a series of Mammalia and Birds collected in India by John M^c^Clelland, Esq., Assistant Sur-

geon E.I.C.S., and proceeded to point out the characters of some which were undescribed.

A paper on the Fishes of the Deccan, illustrated with numerous coloured drawings, was read by Colonel Sykes.

"In submitting to the Society an account of the fishes of Dukhun," observes Colonel Sykes, "it will scarcely excite surprise, that out of 46 species described no less than 42 are new to science, since they are from a hitherto untrodden field, and from peculiar localities, on the great plateau of the Dukhun (Deccan), none of them coming from a less elevation than 1500 feet above the sea; many from near 2000 feet, and others from yet higher situations. The chief features in the collection are the paucity of orders to which the collection belongs, and the remarkable prevalence of the members of the families of *Siluridæ* and *Cyprinidæ*. There is but one apodal *Malacopterygian*, but 4 *Acanthopterygii*, and the whole of the rest of the fish belong to the order Abdominal Malacopterygians. Of the families there are only eight: *Percidæ*, *Scombridæ*, '*Pharyngiens Labyrinthiformes*,' *Gobiadæ*, *Siluridæ*, *Cyprinidæ*, *Esocidæ*, and *Murænidæ*, comprising 15 genera and 9 subgenera, including one subgenus, which I have been compelled to add to the *Cyprinidæ*. An attempt has been made to methodize and distinguish the multitudinous members of the families of *Siluridæ* and *Cyprinidæ*. The fact is, the continued inosculation in the character of the teeth, of the *cirri*, of the spines (serrated or not) of the fins, the armature of the head, and the position of the fins in the *Siluridæ*; and the number of *cirri*, and form and position of the fins in the *Cyprinidæ*, together with the character of the mouth, produce such approximations in species to each other, and in individuals of one genus to another, that not only is there infinite difficulty in determining the genera of the fishes of these families, but their identity as species is occasionally not less difficult. Some of my *Siluridæ* do not exactly correspond with the generic characters of the genera of this family as now constituted, and I might have added to the number of genera; but to this I have an objection, unless as an evidently necessary measure. In the *Cyprinidæ*, however, I was obliged to set aside my repugnance, for three species were not referrible to any one even of the numerous subgenera which Buchanan Hamilton wished to establish. It only remains to state that the whole of my fishes were drawn from absolute measurement, and have a scale of size attached to each figure; they were caught in the various rivers on whose banks I encamped, as individuals were required; so that my draftsman, who worked constantly under my own eye, never had to finish his drawings from shriveled and

discoloured specimens. I have to a great extent adopted the names by which the fishes are called by the Mahrattas as specific names, so that naturalists who travel the country can always obtain them.

Ord. Acanthopterygii.

Fam. Percidæ.

Ambassis, Agass.

Amb. Barlovi, Sykes. An *Ambassis* with the two back fins united, with the first ray indented on the edge, and containing 7 spines, and the second 14 spines; all the spines longer than the membrane, with 18 rays longer than the membrane in the anal fin, and with a short vertically compressed diaphanous body.

Closely allied to *Changa Ranga* of Hamilton. 'Fishes of the Ganges.' This fish is dedicated to our Secretary.

Fam. Scombridæ.

Mastacembelus, Gron.

Mast. armatus, Sykes. A *Mastacembelus* with the fins of the tail, back, and vent united, with thirty-nine to forty short sharp bony spines along the back, and two behind the vent.

This fish has not the exact generic characters of *Macrognathus*, *Mastacembelus*, or *Notacanthus*, and might probably constitute a genus between the two last.

Fam. 'Pharyngiens Labyrinthiformes,' Cuv.

Ophicephalus, Bloch.

Oph. leucopunctatus, Sykes. An *Ophicephalus* with from 51 to 53 rays in the dorsal, and 6 in each ventral fin, and with the rays of the dorsal and anal fins undivided; the pectoral fins ending in a central point, and the fish covered with white dots.

I have never known this remarkably fine fish crawl on shore or in the grass, as some species of the genus are said to do. It is excellent eating.

Fam. Gobiadæ.

Gobius, Linn.

Gob. Kurpah, Sykes. A *Gobius* with 7 rays in the first dorsal fin, 11 in the second, which is of similar size with the anal fin; 19 in the pectoral, and 10 in the anal fin.

In different individuals of this species I have found the number of rays in the fins slightly differ. Of a sweet flavour.

Ord. Malacopterygii Abdominales.

Fam. Cyprinidæ.

Cyprinus, Linn.

Cyp. Abramioides, Sykes. A *Cyprinus* with 20 rays in the dorsal, 8 in the anal, and 18 in the pectoral fins, without tendrils, with tuberculated nose, red edged fins, and with a red lunule on each scale.

This very fine fish is called Tambra by the natives, from the

general prevalence of a copper colour over it. Attains the length of 21 inches and more; height 7 inches. Is excellent eating.

Cyp. Potail, Sykes.

A *Cyprinus* proper, deep and fleshy, slightly compressed, without tendrils, with the dorsal fin of 13 rays, pectoral of 14, and anal of 9. Scales large and silvery; length 10 or more inches; height $3\frac{1}{4}$ inches.

Cyp. Nukta, Sykes.

A *Cyprinus* with two tendrils on the under jaw, and with two short horns or bosses on the space between the eyes, which together with the deflected upper lip are tuberculated; large scales.

In the judgement of my friend Mr. Yarrell, to which I subscribe, this very singular fish is considered a monstrosity of *Cyp. auratus*. Dr. Rüppell, who did me the favour to look over my drawings, expresses the same opinion. Found very abundantly in the Inderanee river 18 miles north of Poona. It is called Nukta (or nob) by the Mahratta fishermen.

Varicorhinus, Rüppell.

Var. Bobree, Sykes. A *Varicorhinus* with tuberculated nose, without tendrils; with 17 rays in the dorsal, and 8 in the anal fin; with the form of a tench.

It may be a question whether this is not a real Labeo of Cuvier, with long dorsal, no spines or cirri, and thick fleshy lips frequently crenated; size 6 inches by $1\frac{6}{10}$ high.

Barbus, Cuv.

Barb. Mussullah, Sykes. A *Barbus* with 12 rays in the dorsal, 8 in the anal, and 16 in the pectoral fins, with the mouth furnished with 4 very short *cirri*, and tuberculated nose; sometimes 3 feet and more long, and a foot high, and weighing 42 pounds.

Found in the Goreh river.

Barb. Khudree, Sykes. A *Barbus* with 4 *cirri*, blood-stained fins, large hexagonal scales, elongated body, and with 14 rays in the dorsal, 14 in the pectoral, and 7 in the anal fins.

Found in the Mota Mola river, 8 miles east of Poona.

Barb. Kolus, Sykes. A *Barbus* with 13 rays in the dorsal fin, 8 in the anal, and 10 in the ventral; with moderate-sized scales; with callous tubercles on the head, and a short *cirrus* at each corner of the mouth.

This fish shows the difficulty of drawing up generic characters to embrace all the species of a genus. Having only 2 *cirri*, it should not be a Barbel; but having *cirri* at all, it does not belong to the next genus *Gobio*;—moreover, it has a spine in the dorsal.

Chondrostoma, Agassiz, the first division of the genus *Leuciscus* of Klein. Dorsal fin in the centre of the back.

Chond. Kawrus, Sykes. A *Chondrostoma*, without lateral line, tubercles, or *cirri*, with 12 rays in the dorsal, 8 in the anal, and 16 in the pectoral fins.

A sub-cylindrical fish found in the Beema river; grows to a foot in length, but is usually smaller. Proportion of length to height in one specimen, 6 inches by $1\frac{4}{10}$ inch.

Chond. Fulungee, Sykes. A *Chondrostoma*, with dorsal fin of 10 rays, anal 6, and pectoral of 10; of an elongated, not much compressed shape. Length about a foot; height 4 inches.

Chond. Boggut, Sykes. A *Chondrostoma*, without tendrils or tubercles on the nose, with 12 rays in the dorsal, 15 in the pectoral, and 8 in the anal fin; body of an elongated form. Length from 7 to 11 inches; height $1\frac{1}{4}$ to 2 inches.

Chond. Mullya, Sykes. A *Chondrostoma*, with a short, obtuse head, without tubercles or tendrils; sub-cylindrical body, with 11 rays in the dorsal, 14 to 16 in the pectoral, and 8 in the anal fins; a red process or protuberance on the snout between the nostrils. Length 5 to 6 inches; $1\frac{1}{4}$ to 2 in diameter.

Chond. Wattanah, Sykes. A *Chondrostoma* of an elongated form, without tubercles or tendrils, with the dorsal fin high, and having 11 rays: and 9 or 10 in the ventral, and 8 in the anal fin; subcylindrical form. Length $4\frac{1}{4}$ inches, height $\frac{3}{4}$ of an inch.

Found in the Beema river.

Chela, Buchanan Hamilton. A sub-genus of *Leuciscus*, with the dorsal fin very far behind over the anal; straight back, and nose on the level of the line of the back.

Chel. Balookee, Sykes. A *Chela* of the size of a minnow; back straight; body elongated; dorsal fin situated far back, and having 8 rays, 14 rays in the anal, and 12 in the pectoral fins. Length 3 inches.

Very sweet eating, the bones as well as other parts. Common in all the rivers.

Chel. Oweni, Sykes. A *Chela*, with straight back, elongated and vertically compressed body; dorsal fin situated far back, with 11 rays, 12 in the pectoral, and 19 in the anal fins, with scales so minute as to be scarcely discoverable. Length 5 inches; greatest size 7 inches.

Found in most of the rivers. The *Cyprinus Cultratus* of Bloch would appear to be the type of the sub-genus.

I have dedicated this fish to my friend Mr. Owen, the distinguished naturalist.

Chel. Jorah, Sykes. A *Chela*, with straight back, convex belly, dorsal fin far behind; size of a large minnow; with 10 rays

in the dorsal, 12 in the pectoral, and 8 rays in the anal fin. Length about 4 inches, height $\frac{8}{10}$ths of an inch.

Excellent eating. Found abundantly in the Beema river near Pairgaon.

Chel. Teekanee, Sykes. A small *Chela*, with nearly straight back; snout on the continuation of the line of the back; belly arched; with 10 rays in the dorsal, 12 in the pectoral, and 14 in the anal fins. Length $2\frac{1}{4}$ inches, height $\frac{3}{4}$ inch.

Found in the Beema.

Chel. Alkootee, Sykes. An elongated, silver-white, slightly compressed, minute *Chela*, with the dorsal fin of about 8 rays, very far back; ventral of about 7, and anal of about 10 rays, with burnished silver gill covers and black orbits; rarely more than an inch long, and not much thicker than a good-sized crow quill.

This very beautiful fish has a sweet flavour.

Leuciscus, Klein. First division. The dorsal situated a little behind the centre of the back, above the space between the ventral and anal fins.

Leuc. Morar, Cyprinus Morar, Buchanan Hamilton. A *Leuciscus* allied to *Chela*, but with the dorsal fin a little behind the centre of the back, with 8 rays in each ventral fin, 12 in the anal, and 10 in the dorsal, and with the edge of the belly smooth. Length $4\frac{3}{4}$ inches; height $\frac{1}{10}$.

Differs slightly from Buchanan Hamilton's *L. Morar*.

Leuc. Sandkhol, Sykes. A *Leuciscus*, with nearly cylindrical body; dorsal fin of 12 rays, pectoral of 14, and ventral of 10 rays; gibbous head; 8 to 10 inches long by $1\frac{1}{2}$ to 2 inches high; eyes with whitish narrow irides. The dorsal in this fish is situated a little *before* the centre of the back.

Found in the Goreh river at Kullumb.

Leuc. Chitul, Sykes. A *Leuciscus*, with 14 rays in the dorsal, 14 in the pectoral, and 8 in the anal fins; of a reddish grey colour, and rounded head. Sub-cylindrical. Length about 5 inches, height $1\frac{1}{2}$ inch.

Found in the Inderanee river near Chakun.

It being found impracticable to arrange, in any of the sub-genera described, the following fishes of the Carp family, it is proposed to place them in a new sub-genus, which I will call by the native Mahratta name of Rohtee.

ROHTEE, nov. genus.

Carps with a lozenge-shaped body, rather long dorsal and anal fins, the former seated on the angle of the back, with the first complete ray serrated posteriorly; scales minute.

Rohtee Ogilbii, Sykes. A *Rohtee*, with 12 rays in the dorsal, 9 in the ventral, and 17 in the anal fins; the body very compressed, and very high, with the back sloping to each

end from the centre; head sharpish; pectoral fins, narrow acuminated. First complete dorsal ray, a strong bone, serrated behind. Length, 4½ inches, height 1½ inch. A bony fish.

Found in the Beema river near Pairgaon. This fish is dedicated to my friend Mr. Ogilby, a distinguished member of the Society.

Roht. Vigorsii, Sykes. A *Rohtee*, with armed dorsal fin of 11 rays, ventral of 10, and anal of 28 rays; compressed body; high in the middle, and sloping to each end; head slightly recurved; eyes very large. Length, 6 inches; height, $1\frac{9}{10}$ inches; greatest length, 8 inches.

Found abundantly in the Beema river at Pairgaon. I have dedicated this fish to my friend Mr. Vigors.

Roht. Pangut, Sykes. A *Rohtee*, compressed, deep, angular-backed, with 12 rays in the dorsal, 14 or 15 in the pectoral, and 8 in the anal fins, and with the first 3 or 4 rays of the dorsal fin black at their tips; scales larger than in the preceding species. Length, 5 inches; height, 1¼ inch.

Found in the Baum and Beema rivers.

Roht. Ticto; *Cyprinus Ticto* of Buchanan Hamilton. A *Rohtee*, 1½ inch long, with 4 to 6 black spots on the body; the 2nd ray of the dorsal toothed behind with sharp incurved teeth; with 10 rays in the dorsal, 8 in the anal, and 8 in the ventral fins; pectoral fins narrow, acuminate.

Found in the Mota Mola at Poona. This fish differs slightly from Dr. Buchanan Hamilton's *Cyprinus Ticto*.

Cobitis, Lin.

Cob. Rupelli, Sykes. A nearly cylindrical scaleless *Cobitis*, not much thicker than a large goose-quill; from 2 to 3 inches long, with 6 *cirri*; the lateral line marked with short brown bars, and the rays of the dorsal and anal fins similarly barred; dorsal fin of 13 rays, pectoral of 12, and ventral of 8 rays.

This fish is much esteemed for food. Found in the Beema river at Taimbournee and Mota Mola near Poona. I have dedicated this beautiful little fish to Rüppell, who did me the favour to look over my drawings, and at the same time gave me his opinion respecting the genera of the fishes.

Cob. Mooreh, Sykes. Differs from the preceding only in being of a smaller size, in having 12 rays in the dorsal, and 7 in the anal fin; the head is more obtusely pointed, and there are more dark blotches on it; the bars on the lateral line are differently arranged.

Cob. Maya, Sykes. Differs from the first species in having a spine under each eye, and in having a blunter head; 9 rays in the dorsal, 7 in the ventral fins.

Fam. *Esocidæ.*

Belone, Cuv.

Bel. Graii, Sykes. A *Belone* with the fin of the tail rounded and emarginate, with both jaws elongated into a quadrangular beak; with very minute scales; dorsal of 16 rays and anal of 16 rays: closely allied to the *Esox Cancila* of Buchanan Hamilton.

I have dedicated this fish to a gentleman well known for his contributions in natural history.

Fam. *Siluridæ.*

Schilbe, Cuv.

Sch. Pabo; *Silurus Pabo*, Buchanan Hamilton. A *Schilbe*, with the tail divided into 2 unequal lobes, both pointing downwards; with 4 *cirri*, 2 shorter than the head, and with from 68 to 70 rays in the anal fin. Length from 12 to 15 inches, height 2½ to 3 inches.

Found in most of the rivers. Differs slightly from Buchanan Hamilton's *Silurus Pabo*. No second dorsal.

Sch. Boalis, *Silurus Boalis*, Buchanan Hamilton. A *Schilbe*, with the fin of the tail divided into 2 unequal lobes; with 4 *cirri*, of which 2 extend to the middle of the fish; all the fins unarmed; dorsal of 5 rays, pectoral of 15; ventral fins very small, of 9 rays; anal fin of 84 rays. Attains the length of 3 feet, and the weight of 8 lbs.

Found in the Mota Mola at Poona. Differs slightly from the *Silurus Boalis* of Buchanan Hamilton. No second dorsal.

Hypophthalmus, Spix.

Hyp. Goongwaree, Sykes. An *Hypophthalmus*, with 8 *cirri*, all longer than the head, but not extending to the middle of the fish; with 7 rays in the dorsal, and 52 in the anal fin, with an extremely minute second dorsal; first ray in the pectoral, and first in the dorsal, spinose and serrated behind. Greatest length, 28 inches: body vertically compressed.

Found in the Mota Mola near Poona.

Hyp. Taakree, Sykes. An *Hypophthalmus*, with 8 *cirri*, 2 of which reach to the ventral fins, 2 very minute near the nostrils, and 4 on the chin, nearly as long as the head; with the first dorsal and pectoral rays serrated on the posterior edge, with 8 rays in the dorsal and 50 in the anal fin. Length, 9 inches; height, 2 inches.

Bagrus, Cuvier.

Bagr. Yarrelli, Sykes. A *Bagrus*, with the first rays of the pectoral and dorsal fins terminating in long fleshy tendrils and serrated behind; with 8 *cirri*, two of which are as long as the head, thick, fleshy, and being lateral elongations of the upper lip; other *cirri* very short; head broad, covered with a granulated bony plate; the fish olive brown, marked with black blotches like a Dalmatian dog; 2nd dorsal fleshy,

triangular. Length, 18 inches, but attains to a very great size; body not vertically compressed.
Found in the Mota Mola at Poona.

Bagr. Lonah, Sykes. A *Bagrus,* with 8 small *cirri*; flat, granulated head; first dorsal fin of 7 rays, and pectoral of 10 rays, the first ray of which is furnished on the posterior edge with long sharp teeth; anal fin of 10 rays; 2nd dorsal of a triangular form and fleshy: something resembling the preceding in colour.

Platystoma, Agassiz.

Plat. Seenghala, Sykes. A *Platystoma,* with the tail fin crescent-shaped, lobes unequal; with 8 *cirri,* two of which only are longer than the head, reaching to two-thirds of the length of the fish; the first ray of the pectoral and ventral fins serrated behind; head long, flat, spatulate, covered with a granulated bony plate. Dorsal fin of 8 rays; high, ventral fins, very far back, of 6 rays. Grows to a great size; flesh heating and soft.

Phractocephalus, Agassiz. *Pirarara* of Spix.

Phract. Kuturnee, Sykes. A *Phractocephalus,* with 6 *cirri,* 2 of which only are longer than the head; the first pectoral spine serrated on both edges; the 1st dorsal spine on the posterior edge only; these two spines terminating in a filament: the shoulder-bone elongated into a point behind. Greatest length, 6 inches; dorsal fin of 7 rays; pectoral of 9 rays; ventral fin small, of 7 rays; second dorsal replaced by a small adipose fin.

Phract. Itchkeea, Sykes. A *Phractocephalus,* with 8 *cirri,* 2 of which from the upper lip, extend to the end of the pectoral fins; the other 2 very minute, with the 4 on the chin nearly as long as the head; with the 1st ray in the pectoral fins only serrated; with 8 rays in the dorsal, and 12 in the anal fins; with a sharp prolongation of the scapula. Fish handsomely marked on the back with dark colours. Length, 2 inches.
This fish presents some slight deviations from the generic characters.

Phract. Gogra, Sykes. A *Phractocephalus,* with 4 shortish *cirri*; the plates of the shoulder elongated into acute, angular, broad spines, with a dorsal fin of 8 rays; first ray a bone serrated behind; pectoral fins of 10 rays, the first ray a broad compressed bone serrated on both edges; head flat and broad; second dorsal small, fleshy. Size 6 inches, but grows larger.

Pimelodus, Lacepède.

Pimelodus Seengtee, Sykes. A *Pimelodus,* with the caudal fin divided into 2 unequal sharpish lobes, and having 8 *cirri,* 2 of which reach to the tail fin, and 4 to the end of the head, and 2 are shorter than the head; the dorsal fin high and

without spine, of 9 rays; 12 rays in the anal fin; the second dorsal adipose, and extending from the termination of the first dorsal to near the tail. Length of fish, 6 inches.

Ageneiosus, Lacepède.

Ageneiosus Childreni, Sykes. An *Ageneiosus*, without *cirri*, with the first ray of the dorsal and pectoral fins serrated on the *anterior* edge only; with 8 rays in the dorsal, and 42 in the anal fin; with two sharp lobes to the tail, the upper being somewhat the smallest. Length of fish, 18 inches; height, 4½ inches, but grows to a larger size. Second dorsal adipose, minute.

Fam. *Clupeidæ*.

Mystus, Buchanan Hamilton; *Notopterus*, La Cepede.

Mystus Badgee, Sykes. A *Mystus*, with not less than 105 rays in the anal fin, 7 or 8 in the dorsal, and in the pectoral from 13 to 16, all unarmed; without apparent ventral fins, and with a single small dorsal; the anal and caudal fins uniting, and terminating in a point at the end of the body; posterior edge of the last gill plate crenated; scales minute. This remarkable fish belongs to the genus *Mystus* of Buchanan Hamilton, but not to the genus *Mystus* of Cuvier. Fish vertically compressed. Length, 11 inches; height, 3 inches.

Ord. Apodes.

Fam. *Murænidæ*.

Anguilla, Cuv.

Ang. Elphinstonei, Sykes. An *Anguilla*, with the lower jaw the longest; with the back, tail, and anal fins united, and with a broadish, flat head; body dark green, blotched with black; with 2 short tubular processes, one on each side of the upper jaw. Attains the length of 3 feet, and diameter of 3 inches.

I have dedicated this fine fish to the Honourable Mountstewart Elphinstone.

In concluding my characters of the fishes of Dukhun (Deccan), I may be allowed to state, that I have found the number of *cirri*, whether in the *Siluridæ* or *Cyprinidæ*, insufficient as a *generic* character; different species of the same genus varying in the number of their *cirri*."

December 11, 1838.—Dr. Bostock in the Chair.

A Wasp's Nest, of very large size, was also exhibited to the Members present. This nest was sent from Ceylon by the Governor of that island, and was accompanied by the following letter from Lieut. W. Williams, R.A.

Colombo, 27th May, 1838.

"The specimen of the Social Wasp's nest, now on board the barque 'Morning Star,' was found by me in a talipot tree near Colombo in Ceylon: its apex was secured at the junction of two of

the smallest leaves of this magnificent tree, and the bottom of the nest was about seventy feet from the ground, at which elevation the leaves began to shoot.

"It had been abandoned by the wasps, and its exterior walls were much injured by the monsoon rains and storms, which left the terraces unprotected and unsupported, except by their interior pillars: and the natives were in consequence unable to lower it from such a height without destroying some of the lower terraces.

"I shall not attempt to enter further on this subject, a structure so well known to naturalists. The appearance of the nest, as it hung upwards of seventy feet from the ground, the shaft to it perfectly bare; and the larger leaves (used by the natives as umbrellas and tents) waving over it, presented a very singular appearance: and I hope its remains may reach England in a state of preservation sufficient to satisfy the inspection of the curious.

"W. Williams, Lieut. R. Artillery."

January 8th, 1839.—Professor Owen in the Chair.

Dr. Harlan read a paper entitled, "Description of a new species of *Meriones* inhabiting the United States of North America."

"A male and female specimen of the species which it is now proposed to add to the Fauna of the United States, were taken some time during 1836, on the farm of Mr. Beck, in Philadelphia County, a few miles north-east of the city. The female at the moment of her capture carried several young, which adhered to the teats firmly, notwithstanding the violent efforts and leaps of the parent.

"In the descriptive details which follow, the usual allowance must be made when such are drawn from impaled skins."

Meriones microcephalus. *Mer. supernè nigro flavoque mixtis, flavo apud latera prævalente ornatus; corpore subtùs albescente, flavido lavato; auribus mediocribus, pilis flavis et nigris intermixtis, intùs atque extùs instructis.*

"Male. Length of the body, three inches; of the tail, four inches; total length of the hind leg, one inch four-eighths; of the thigh, three-eighths; of the leg, five eighths; of the foot, four-eighths. Five toes behind; four before; with a rudimentary nailed thumb; all the toes sparsely hairy, and terminating in strong, sharp claws.

"Colour above, plumbeous, interspersed with reddish fawn; below, white, similarly interspersed in a less degree, a lateral longitudinal band of reddish fawn colour separating the sides from the abdomen; tail, sparsely hairy, dark coloured above, white beneath,

with a pencil of hairs at the extremity; this member being proportionably longer, and the head much smaller and more elongated than in *G. Canadensis*. The last-named species has been figured by the late Professor B. T. Barton, in the Transactions of the American Philosophical Society, also in the Encyclopédie Méthodique, but was for the first time adequately described from living specimens in the 'Fauna Americana,' p. 156, when specimens were deposited in the cabinet of the Academy of Natural Science of Philadelphia.

"The subjects of the present memoir were placed in my hands for description by Mr. Chaloner, a Member of the Academy. The female is larger than the male, and of purer white beneath."

The specimens of *Gerbillus microcephalus* above referred to, were presented by Dr. Harlan to the Society; and also a species of *Spermophilus*, which Dr. Harlan exhibited to the Meeting. The last-mentioned animal very closely resembles the *S. Franklinii*; but being of a much smaller size, Dr. Harlan was anxious that it should be submitted to examination, and should be carefully compared with that animal upon some future occasion.

Several specimens of the Bean Goose (*Anser segetum*), the Gray-Lag Goose (*Anser cinereus*), the White-fronted Goose, (*Anser albifrons*), and of another species allied to these, were exhibited by Mr. A. D. Bartlett, in order to illustrate a paper which he communicated to the Meeting, "On a new British species of the genus *Anser*, with remarks on the nearly-allied species."

"It may be necessary, before describing the new species," says Mr. Bartlett, "to notice the three birds most nearly allied, in order more clearly to point out the distinctions existing between them; I do this in consequence of the imperfect descriptions given by authors, from which it is almost impossible to distinguish the species. I shall commence with that which is the most common.

"*Anser segetum*, Meyer. Bean Goose. Entire length, 33 inches; extent, 64; from the carpal joint to the end of wing, 19 inches. The head and neck are brown, tinged with grey: back and scapulars, darker brown, slightly tinged with grey, each feather being margined with greyish white; primaries, dark brown, tinged with grey; shoulders of wings and secondary quill-feathers, greyish brown; rump, blackish brown; upper tail-coverts, white; tail, dark brown, deeply edged with greyish white; breast and belly, dirty white; abdomen and under tail-coverts, pure white; bill, $2\frac{1}{4}$ inches long, rather slender, flattened and narrow towards the tip; the base, sides and nail, black; immediately above the nail commences a yellowish orange mark, extending a little beyond the anterior margin of the

nostrils in front, and passing under and beyond the termination of them at the sides, but seldom reaching the corner of the mouth, except in very old individuals, in which this mark extends under and behind the nostrils, crosses the base of the bill next the forehead, leaving only the central part of the bill (between the nostrils) and the nail black; which latter part is sometimes, though rarely, white; legs and feet, reddish orange; wings, when closed, reaching 2 inches beyond the tail. The young of this species are darker, and the markings less distinct; the bill is shorter, the mark upon it narrower, and of a deep red colour; the legs and feet, pale orange.

"*Anser cinereus*, Meyer. Grey Lag Goose. Entire length, 35 inches; extent, 64; from the carpal joint to end of wing, $17\frac{1}{2}$ inches. The plumage more cinereous than in the last-described species; the shoulders and rump, light grey; breast and belly, white, sometimes spotted with black; the bill, $2\frac{1}{2}$ inches long; more robust, deeper, broader, and the laminæ much more developed than in the Bean Goose, and of a dull yellow, inclining to flesh colour towards the nail, which is white; in summer the bill assumes a redder tint; legs and feet, pale flesh colour; wings, when closed, even with the end of the tail. The young of this species are darker than the adults, but the grey upon the shoulders and rump, the form of the bill, and colour of the legs and feet, will always distinguish them from the young of any of the other species.

"*Anser albifrons*, Bechstein. White-fronted Goose. Entire length, 26 inches; extent, 52; from the carpal joint to end of wing, $16\frac{1}{2}$ inches. The adult of this species may be distinguished from others of the genus by the conspicuous white mark upon the forehead and sides of the bill, and the irregular patches of black and white upon the breast and belly; the bill, $1\frac{3}{4}$ of an inch long, of a reddish flesh colour; the nail, white; legs and feet, bright orange; wings, when closed, reaching $1\frac{1}{2}$ inch beyond the tail. The young of this species are much darker than the adult; the forehead and sides of the bill, nearly black; the breast and belly, dirty white, spotted with brown; bill, brown, inclining to flesh colour; nail, dark brown; legs and feet, pale orange.

"*Anser phœnicopus*, Bartlett. Pink-footed Goose. Entire length, 28 inches; extent, 60; from carpal joint to end of wing, $17\frac{1}{2}$ inches. Top of the head and back of the neck, dark brown; sides of the face, forepart of the neck, and upper part of the breast, light brown; back and scapulars, dark brown, tinged with grey; each feather deeply margined with greyish white; shoulders of wings and rump, greyish ash; primaries, brown, tinged with grey; tail, brownish

ash, deeply edged with white; lower part of belly, upper and under tail-coverts, pure white; legs and feet, of a reddish flesh colour or pink; the hind toe closely united by the membrane that runs along the edge of the inner toe; the feet, remarkably thick and fleshy; bill, $1\frac{5}{8}$ of an inch, long, narrow, and much contracted towards the tip; the base, sides and nail, black; the space between the nail and the nostrils, reddish flesh colour or pink; wings, when closed, reaching $1\frac{1}{2}$ inch beyond the tail.

"Having thus noticed the three nearly-allied species, and described the new one, I will endeavour to point out more particularly the distinctions between this new species and the Bean Goose, to which it bears the nearest resemblance. First, the great difference in the size; the average size of the Bean Goose is 33 inches in length, and 64 inches in extent; while the average size of the new species is 28 inches in length, and 60 inches in extent. Secondly, the bill is much smaller, shorter, more contracted towards the tip, and of a different colour. Thirdly, the difference in colour and in form of the legs and feet, and in the fleshy character of the foot, and the hind toe being more closely united by its membrane, has consequently, less freedom of motion. Fourthly, the plumage on the rump and shoulders being more inclined to grey. And lastly, in the form of the sternum, which differs from that of the Bean Goose in shape and bears a more close resemblance to that of the White-fronted Goose. In conclusion, I may remark that I have examined, in all, twelve specimens of this new species, four of which were alive; one of them is now living in the garden of the Zoological Society, where it has been, I am told, eight years, without exhibiting any perceptible alteration in its plumage, or in the colour of its legs and feet.

"The Grey Lag Goose is by far the most rare of the four species here referred to."

Professor Owen commenced the reading of a paper, "On the Classification and Affinities of the Marsupial Animals."

LINNÆAN SOCIETY.

June 18, 1839.—Mr. Foster, V.P., in the Chair.

The Secretary read a letter addressed to him by the President nominating the four following Members of the Council to be Vice-Presidents for the year ensuing, commencing the 24th of last month, viz.

Robert Brown, Esq.; Edward Forster, Esq.; Thomas Horsfield, M.D.; Aylmer Bourke Lambert, Esq.

The V. P., in the chair, read a notice, addressed to the Society from Upsal, announcing the death of Louisa von Linné, the third and last surviving daughter of Linnæus, which took place at Upsal, on the 21st of March last, at the very advanced age of 90.

Read "A Biographical Sketch of Ferdinand Bauer, Natural History Painter to the Expedition under Capt. Flinders." By Dr. John Lhotsky. Communicated by the Secretary.

Ferdinand Bauer, the celebrated Natural History Painter and Traveller, was born in the year 1760, at Feldsberg in Austria, where his father held the appointment of Painter to Prince Lichtenstein.

In the year 1775 we find him employed by the Rev. Norbert Boccius, of the same place, to make miniature paintings of plants from nature.

In 1784, while still in the same employment, he was through the recommendation of the elder Jacquin engaged by Dr. Sibthorp to accompany him in his first Journey to Greece, and on his return he was for several years occupied in finishing the numerous drawings of plants made in that journey, and which prove him to have been, even at that period, a very accurate observer, as well as a highly accomplished artist.

In 1801 he was selected by Sir Joseph Banks as the Natural History Painter in the voyage of Capt. Flinders. From this expedition he returned to Europe in 1805, bringing with him no less than 1600 finished sketches of plants, besides numerous drawings of animals, of equal merit, and for several years was engaged in finishing a selection of his drawings of plants, which are deposited at the Admiralty, the board by which he was employed.

After the Investigator was condemned as unfit for the prosecution of the voyage, and Capt. Flinders had left New Holland to return to Europe, Mr. Bauer, along with Mr. Brown, remained in New South Wales, chiefly at Port Jackson; but he also visited and remained a considerable time in Norfolk Island, where he diligently collected and made drawings of all the plants of that remarkable island, and from his materials Dr. Endlicher has lately published his very interesting 'Flora Insulæ Norfolkiæ.'

In 1813 Mr. Bauer commenced the publication of a work entitled 'Illustrationes Floræ Novæ Hollandiæ,' which did not extend beyond three numbers, and of these the last was finished at Vienna, where he had returned in 1814. This work met with very little encouragement, either in this country or in his own.

In the vicinity of Vienna he continued to reside, employing himself in drawing the more remarkable plants that flowered in the im-

perial gardens of that capital, and even in making occasional botanical excursions into the Austrian and Styrian Alps. Besides the works already noticed, during his stay in England he prepared the greater part of the drawings of the first volume of Mr. Lambert's work on the genus *Pinus*, and the plates of that work were chiefly coloured by him. He also prepared a series of drawings of the species of *Digitalis*, which have since been published by Dr. Lindley, in his 'Digitalium Monographia.'

Mr. Bauer was seized with a severe illness in 1825, which terminated in his death on the 17th of March 1826, having attained the age of 66.

Read, "A Notice of a Plant which produces perfect Seeds without any apparent action of Pollen on the Stigma." By Mr. John Smith, A.L.S.

The subject of the present notice belongs to the natural family of *Euphorbiaceæ*, and has been cultivated for several years in the Royal Botanic Garden at Kew, under the name of *Sapium aquifolium*. It is a native of Moreton Bay, on the east coast of New Holland, where it was discovered by Mr. Allan Cunningham, who sent three plants of it to Kew in 1829. A short time after their introduction the plants flowered, and they proving to be all females, they were naturally passed over as belonging to a dicœcious plant, until Mr. Smith's attention was particularly drawn to them by the fact of their producing perfect seeds. They have annually flowered and matured their seeds since, and notwithstanding the most diligent search and constant attention no male flowers or any pollen-bearing organs have been detected. Young plants have been raised at different times from the seeds, and they bear so close a resemblance to their parents that it is scarcely possible even to suspect the access of pollen from any other plant.

Mr. Smith considers the plant as the type of a new genus, which he names *Cœlebogyne*. It forms an irregularly branched, rigid, evergreen shrub, of about three feet in height, with alternate, petiolate, elliptical, mucronate, coriaceous leaves, having three large spinous teeth on each side, and furnished with two small subulate persistent stipules. The paper was accompanied by a young plant raised from seed produced at Kew, and by a beautiful drawing of the parts of fructification from the pencil of Mr. Francis Bauer.

Read also, "Descriptions of newly discovered Spiders." By John Blackwall, Esq., F.L.S.

This paper comprises descriptions of new species of Spiders, recently discovered, and principally by the author himself, in the north

of England and Wales, and it must be confessed that the success which has attended his labours in this department is greater than could have been anticipated, no fewer than fifty-three species having been added by him to the catalogue. Much of this success is to be attributed to the fact of his attention having been chiefly directed to those species which, on account of their diminutive size, require the aid of optical instruments, of a high magnifying power, for their accurate examination.

The genera to which the species chiefly belong are *Drassus, Clubiona, Lycosa, Agelena, Theridium, Walckenaera, Neriene* and *Linyphia.*

MISCELLANEOUS.

ON THE PLACE OF *SCARABÆUS LONGIMANUS* IN THE SYSTEM.

M. Klug read before the Academy of Sciences of Berlin a paper upon the place of *Scarabæus longimanus* in the system. Its affinity to *Geotrupes,* Fabr. (*Scarabæus,* Latr.), among which it has been placed in modern systems, consists only in its considerable size. It is most decidedly removed from this genus by its very small and simply formed anterior half of the body, or head and prothorax, compared to the elytra or posterior portion, which, as is never the case in the *Scarabæi,* are completely defenceless; by the quadrate clypeus, which is deeper in the middle, but on the contrary is sharply edged anteriorly and at the sides; by the clearly visible, perpendicularly descending lip with a projecting tuft of hair, as in *Lucanus*; by the similar lancet-formed mandibles, which lie concealed as in *Ateuchus* and *Copris, Trichius* and *Cetonia*; by the triangular hinder part of the body which projects over the elytra, as in *Melolontha*; lastly, as in the latter, by the curved claws armed in the centre with a strong curved tooth. It appears possible from the last-mentioned character, as well as from the form of the clypeus and the exceedingly similar form of the body, to reckon the *Sc. longimanus* amongst the true *Melolonthidæ,* yet the formation of the mandibles does not allow this, and it rather requires to be placed at some distance from *Scarabæus* and even after *Cyclocephala,* yet before *Melolontha.* The genus has been determined, and is according to Hope *Eucheirus* of Kirby. The *Scarabæus mucronatus,* Pall. would form a second species, which, under the name of *Propomacrus Arbaces,* has been described over again and delineated as new by Newman in the fourth number of the Entomological Magazine for the year 1837. Thus

the *Scarabæus longimanus* forms a distinct genus in a separate small group: *Eucheirus*, Kirby, Hope; *Propomacrus*, Newman. The genus contains two species, *E. longimanus* (*Scarabæus longimanus*, L. Fabr.) and *E. bimucronatus* (*Scarabæus bimucronatus*, Pall., *Propomacrus Arbaces*, Newman).

IDENTITY OF THE SHANNON WITH THE LOUGH NEAGH *COREGONUS*.

The examination of more specimens of the fish described as *Coregonus clupeoides*, Nills.? in the 'Annals,' vol. ii. pp. 266 and 421, pl. 16, has proved its identity with the *Cor. Pollan*. Different as the figures and descriptions of these *Coregoni* may appear, I have now seen individuals (so liable are they to variation) exhibiting all the intermediate characters.—W. Thompson.

PREVENTIVE AGAINST MADNESS IN ELEPHANTS. BY CARL FREIHERR VON HUGEL.

The announcement in the Berlin papers of the tragical end of M. Tourniaire's Elephant*, certainly renders it desirable to know some means of preventing similar misfortunes, which have already occurred so frequently in Europe. The state of the Elephant which drives it to madness is termed by the Indians *Mosti*, literally, intoxicated by sexual stimulus or by spirituous liquors, and as soon as the keeper of the Elephants observes the symptoms of the mosti coming on, he has a never-failing means of restoring the animal confided to his care immediately to his senses. He places before it a vessel with three seers (a seer is somewhat more than a pound) of fluid butter, called *Ghie*, which the Elephant swallows and again becomes sober. When on great festivals Elephants are intoxicated with brandy for the purpose of fighting them, they are rendered sober as soon as desired by the same means. Ghie has moreover the same effect on Dromedaries and Camels when they are mosti. A portion of Ghie poured down their throats soon restores them to their usual state.—*Wiegmann's Archiv.*

ARE THE *CLOSTERIÆ* ANIMALS OR PLANTS?

Ehrenberg enumerates the following reasons for considering the *Closteriæ* as belonging to the Animal Kingdom. They enjoy voluntary motion, they have apertures at their extremities, they have

* Poisoned with hydrocyanic acid. Our readers will also remember the fate of Mr. Cross's Elephant, which it became necessary to shoot from the same cause.

projecting permanent organs near the apertures, which are constantly in motion, and they increase by horizontal spontaneous division. Dr. Meyen, who is of the opposite opinion, mentions as the most important observations in favour of their vegetable nature, that their structure is exactly similar to that of the *Confervæ*; their formation of seed and the development of this seed is like that of the *Confervæ*. The occurrence moreover of amylum in the interior of the *Closteriæ* with which they are frequently nearly filled, is a striking proof of their being plants; they have no feet,—what Ehrenberg regards as such are molecules having a spontaneous motion, which occur in great number in *Clos. Trabecula*, and quite fill a canal the whole length of the plant. Their function is difficult to determine, but they also occur in very many *Confervæ*, and may perhaps be compared with the Spermotazoa of plants.

METEOROLOGICAL OBSERVATIONS FOR JULY, 1839.

Chiswick.—July 1—3. Fine. 4, 5. Very fine. 6. Sultry. 7. Hot: thunder and much lightning at night, accompanied with unusually little rain. 8. Very fine. 9—11. Fine. 12. Cloudy: slight rain. 13. Very fine. 14. Very fine: rain. 15, 16. Fine. 17. Slightly overcast: thunder and heavy rain at night. 18. Showery: windy. 19, 20. Very boisterous. 21, 22. Fine. 23. Showery. 24. Rain: fine. 25. Overcast. 26. Very heavy rain. 27. Heavy thunder showers. 28. Cloudy. 29. Fine. 30, 31. Rain.

Boston.—July 1. Cloudy. 2. Cloudy: rain A.M. 3. Cloudy. 4. Fine. 5. Cloudy. 6. Fine. 7. Cloudy. 8. Fine: rain, with thunder and lightning A.M.: rain P.M. 9. Fine: rain, with thunder and lightning P.M. 10, 11. Fine. 12. Fine: rain P.M. 13. Fine. 14. Fine; rain P.M. 15—17. Fine. 18. Cloudy: stormy, with rain P.M. 19. Stormy. 20—23. Cloudy. 24. Cloudy: rain early A.M. 25. Cloudy. 26. Cloudy: rain P.M. 27. Rain: rain early A.M.: thunder and lightning P.M. 28. Fine: rain early A.M. 29. Fine: rain P.M. 30. Cloudy: rain early A.M.: rain P.M. 31. Cloudy: rain early A.M.

Applegarth Manse, Dumfries-shire.—July 1, 2. Very fine summer days: clear sky. 3. Very hot. 4. Warm, but with a pleasant breeze. 5. The same: getting cloudy P.M. 6. Slight showers all day. 7. Rain. 8. Slight showers A.M.: cleared and was fine. 9. Showery. 10. Wet and stormy nearly all day. 11. Warm but cloudy: very wet P.M. 12. Heavy rain during night: showery: flood. 13. Fine bracing air. 14. Showery A.M.: cleared up noon: cloudy P.M. 15. Showery A.M.: cleared, and was fine. 16. Remarkably fine day. 17. Cloudy and threatening, and electrical. 18. Frequent heavy showers and high wind. 19. Stormy day: rain nearly throughout. 20. Slight showers all day: flood. 21. Pleasant bracing air: getting cloudy P.M. 22. The same: a very slight shower. 23. Showery all day. 24. Showery A.M.: cleared up P.M. 25. Very fine day: air warm and genial. 26. The same: sultry P.M.: thunder. 27. Cooler: wind northerly: cloudy P.M. 28. Remarkably fine day. 29. Showery all day: distant thunder. 30. Fair and pleasant. 31. Slight shower A.M.

Sun 25 days. Rain 17 days. Thunder 2 days.

Wind southerly 23 days. Northerly 5 days. Westerly 1 day. Easterly 2 days.

Calm 14 days. Moderate 7 days. Brisk 4 days. Strong breeze 3 days. Boisterous 3 days.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. ROBERTON; *by* Mr. THOMPSON *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. VEALL *at Boston, and by* Mr. DUNBAR *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1839. July.	Barometer.						Thermometer.								Wind.				Rain.				Dew point.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc.			Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy.Soc. 9 a.m.	Chiswick 1 p.m.	Bost.	Dum-fries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	8½ p.m.	Fahr. 9 a.m.	Self-register. Max.	Min.	Max.	Min.		9 a.m.	9 p.m.									
1.	30·312	30·315	30·215	29·81	30·23	30·25	55·2	55·5	48·6	65	45	52	59	60	N.	NE.	calm	NW.	…	…	…	…	46
2.	30·308	30·307	30·220	29·76	30·27	30·28	56·9	63·3	51·8	70	51	59	65	59	W.	NE.	calm	NW.	…	…	…	…	50
3.	30·308	30·304	30·224	29·78	30·26	30·21	61·3	64·0	53·5	67	50	58	64½	53	N.	NE.	calm	W.	…	…	·05	…	53
☾ 4.	30·228	30·204	30·178	29·66	30·18	30·18	63·9	66·7	57·0	71	56	65	62	58	NE.	NE.	calm	SW.	…	…	…	…	55
5.	30·208	30·191	30·097	29·60	30·12	29·98	62·8	73·8	57·8	72	52	60	65	60½	E.	SW.	calm	SSE.	…	…	…	…	58
6.	30·040	29·925	29·901	29·39	29·80	29·63	66·8	80·3	56·5	76	53	67	58	57	SW.	SW.	calm	S.	…	…	…	0·80	62
7.	29·860	29·842	29·701	29·20	29·54	29·50	64·9	78·2	59·0	78	58	63·5	56	58	SE.	SW.	SW.	SSW.	…	·03	..	…	60
8.	29·664	30·082	29·628	29·00	29·40	29·43	66·2	74·4	61·0	74	50	65	61	58	SSE.	SW.	SW.	S.	·094	…		…	61
9.	29·738	29·728	29·713	29·12	29·47	29·52	62·8	73·2	56·2	70	49	63	53½	54½	S.	SW.	W.	S.	·044	…		…	60
● 10.	30·008	30·017	29·976	29·39	29·52	29·68	63·7	77·3	53·3	73	51	63	53	60	S.	SW.	SW.	S.	·022	…	·20	…	59
11.	30·016	29·991	29·887	29·35	29·63	29·60	65·4	78·3	58·6	77	59	66·5	59	58	S.	SW.	SW.	S.	…	…	…	…	61
12.	29·852	29·921	29·820	29·14	29·54	29·76	67·4	71·6	62·4	72	50	67	58	55½	S.	SW.	SW.	SW.	…	·08	…	…	61
13.	30·116	30·116	30·078	29·46	29·93	30·01	64·3	73·2	56·6	81	49	64·5	61	58	S.	NW.	calm	SW.	·033	…	·10	…	60
14.	30·026	30·006	29·880	29·38	29·88	29·80	67·7	73·6	58·2	71	54	65·5	62	56	E.	S.	calm	SW.	…	·07	…	3·26	54
15.	30·016	30·156	29·976	29·32	29·77	29·92	65·2	70·4	57·9	74	47	63	52	57	SW.var.	W.	calm	SW.	·069	·01	·04	…	61
16.	30·198	30·260	30·166	29·56	30·03	30·07	64·2	69·3	56·3	74	47	63	60	58	W.	SW.	calm	SSW.	…	…	…	…	56
17.	30·100	30·080	29·758	29·52	29·99	29·81	65·4	68·7	53·2	80	61	65	59½	59	E. var.	S.	SW.	SSE.	…	·34	…	…	58
☽ 18.	29·550	29·684	29·485	28·92	29·47	29·34	67·0	72·0	62·3	73	56	66	58	58½	SE.	S.	SE.	SE.	·222	·06	…	…	64
19.	29·636	29·695	29·616	29·02	29·20	29·23	63·4	68·3	58·2	69	59	62	55	57	SW.var.	S.	S.	SSE.	…	…	·15	…	59
20.	29·754	29·825	29·726	29·11	29·41	29·52	63·3	67·7	60·0	76	53	62·5	56½	55	S.	SW.	W.	S.	…	…	…	…	59
21.	29·912	30·006	29·889	29·28	29·50	29·70	63·5	72·0	56·6	70	54	60	63½	57	S.	SW.	SW.	S.	…	·01	…	2·00	58
22.	30·100	30·087	30·039	29·44	29·81	29·85	64·4	72·8	56·9	73	53	65	58	58	SSE.	SW.	W.	S.	…	·20	…	…	59
23.	30·076	30·062	29·926	29·43	29·86	29·72	63·3	69·8	58·0	72	59	63	58	58	S.	S.	calm	S.	·283	·23	…	…	60
24.	29·818	29·802	29·781	29·15	29·60	29·60	63·8	69·3	61·2	69	56	63	57	58	S.	S.	SW.	SSE.	·186	…	·13	…	60
25.	29·800	29·823	29·780	29·16	29·64	29·70	63·0	69·3	58·8	65	50	64	61	58	S.	SW.	calm	S.	…	…	…	…	60
○ 26.	29·794	29·782	29·551	29·21	29·68	29·57	62·3	70·3	55·6	66	52	64	62	58	S.	S.	calm	SW.	…	·70	…	…	58
27.	29·620	29·642	29·575	29·00	29·56	29·66	61·2	67·0	53·5	62	54	58	57	55½	S.	SW.	calm	NE.	·658	·31	·73	…	59
28.	29·854	29·969	29·833	29·27	29·74	29·85	57·7	66·3	55·0	66	51	61	61½	55½	WNW.	W.	calm	NW.	·383	·01	·19	…	57
29.	30·068	30·056	29·688	29·45	29·88	29·78	62·3	65·6	53·2	66	54	62	60	55½	S.	S.	calm	N by s.	…	·40	…	0·75	56
30.	29·804	29·781	29·750	29·22	29·77	29·67	57·7	65·8	54·9	62	55	60·5	60	54	NW.	E.	calm	E.	·322	·21	·86	…	56
31.	29·370	29·718	29·298	28·80	29·48	29·61	57·7	59·6	56·0	67	52	61·5	52	52	S.	SW.	SE.	E.	·261	·26	·96	…	58
Mean.	29·940	29·976	29·850	29·31	29·767	29·773	63·1	69·9	56·7	70·00	53·22	62·6	59·0	57·3					Sum. 2·577	2·92	4·36	6·81	Mean. 58·0

IX.—*On the Discoid Piths of Plants.* By Ch. Morren, Professor of Botany in the University of Liège, Member of the Royal Academy of Sciences of Brussels, &c.*

The immortal Grew could not dissect the wood of the walnut tree (*Juglans regia*, L.) without being struck with the very singular form of its pith, which is formed of lenticular empty discs and of transversal membranous septa †. Hill, in 1770, who also investigated the structure of woods, observed the same fact, and saw that this form originated exteriorly from a continuous ordinary pith ‡. Much later (in 1815) M. Mirbel made known a similar organization in the *Nyssa aquatica*, L. (*Nyssa biflora*, Mx.) and in *Phytolacca decandra* §. In 1827 M. DeCandolle the elder attempted to explain this fact by a rupture, asserting that the pith to assume this form must either have great cells or a tissue not susceptible of extension. The elongation of the young shoots then tore the pith across at the end of the first year, and thence arose both the discoidal cavities, and the transversal discs. This physiologist mentioned, in addition to the walnut tree, the *Jasminum officinale*, as presenting the same structure ||. In 1835 Treviranus appears to adopt the explication of Hill, that the cavities and the discs are derived from a compact pith, and in that Treviranus is perfectly right; he does not mention any other plant in which this structure might be found ¶. These remarkable organizations seem to have escaped the scrupulous attention of M. Meyen, who does not notice them in his 'Physiology **.'

* A translation of the MS. original communicated by the Author.

† Grew. Anat. Plantarum, 1682. Pl. 19. f. 4.

‡ Hill. The Construction of Timber from its early growth explained by the Microscope. London, 1770. Tab. X. fig. 1—4.

§ Mirbel. Elémens de Physiologie Végétale, 1815, vol. i. p. 112.

|| DeCandolle. Organographie, vol. i. p. 167.

¶ Treviranus. Physiologie der Gewächse, 1835, vol. i. p. 252.

** Meyen. Physiologie der Pflanzen, 1837, vol. i. p. 377.

It is highly probable that this structure is much more common than is generally supposed, since by counting the *Begoniæ* among those plants which present it to us, as we have observed, we find that the discoid piths exist in the families of the *Santalaceæ*, *Juglandeæ*, *Phytolacceæ*, *Jasmineæ*, and *Begoniaceæ*, which have no similarity with each other. This induces me to suppose that further inquiries will prove the existence of this form in many more plants. I should however remark that species of the same genus may in this respect completely differ. Thus *Begonia argyrostigma* presents a discoid pith, whilst *Begonia undulata*, *B. semperflorens*, *B. papillosa*, *B. dichotoma*, have a continuous pith*. Thus the *Phytolacca decandra* is furnished with a discoid pith, whilst that of the *Phytolacca dioica*, *Ph. stricta*, is continuous, &c. Some similar examples might also be taken from the genus *Jasminum*, the genus *Nyssa*, &c. This structure therefore depends upon some circumstance wholly specific, which neither extends to the genus nor to the family, and which consequently could never become of any importance in methodical distributions.

Observation however has taught us that the physiology of the pith of dicotyledons would receive useful and remarkable improvements from the careful study of the formation of these medullary discs, for it is known that to few parts have been assigned so many different uses as to the pith. It was considered by some as the nervous system of the plant, even as the brain of this system; by others, and that not long ago, as the apparatus of the ascension of the stem; for, said they, if *the brain* is placed in the head, the organ which is placed *in front* in the progression of animals, the *pith* is placed in the *stalk*, the organ which progresses upwardly in a plant. Then

* In vegetable physiology great attention has been paid to the secretions of the pith and consequently to its colour: it is correctly said to be *green* at its origin and *white* or *brown* at a later period and when it is dead. But the *Begonia papillosa* exhibits the phænomenon of a beautiful *red* pith when it arrives at maturity. The red is as bright as that of the beet-root, and this colour is caused by a red liquor without globules, which fills the prismenchymatous cells of this pith, so that there is no difference between the kind of coloration of this part, which occupies the interior axis of the plant, and that of the most peripherical organs, such for instance as the derm, the petals. This fact corroborates the opinion that in this phænomenon the work is all cellular, that is to say, it resides in the cell itself and proceeds from it.

the pith was said to be an organ which nourished the stem in its youth in order to aërate it subsequently (Hales); or it was that which formed the pistil, the supposed centre of the flower (Linnæus). Now it is taken for an apparatus which nourishes the fruit, as milk nourishes the young animal, the fruit of the mother (Magnol);—now the pith becomes an attracting pump, which draws water from the soil by the vacuum it causes in the branch (Borelli). With one (Malpighi) it is a conductor of the sap; with another (Plenck) it is a reservoir for the moisture which the young branch makes use of in dry weather. A celebrated physiologist (DeCandolle) sees in it a *cotyledon of the bud*, that is to say an organ which nourishes the bud, as the cotyledon nourishes the plumula which germinates. Another philosopher, whose views we must confess are very ingenious (Du Petit Thouars), supposes it to be the substitute for the cotyledons; for where these do not exist (*Lecythis*) the pith is in excess.

Now in the midst of these differences of opinion one fact remains certain, which is that the bud has need of pith to be developed, it is its necessary *sustentaculum*. Raspail knew very well that the evolution of the bud is in reality a germination under other forms. But, if this is become a settled truth, it must be acknowledged that a number of circumstances have remained unknown, and it is precisely the study of discoid piths which will reveal to us some of the most curious. This has induced me to publish at present the results of my observations on these piths, the more so as these remarks have convinced me that if the explanation given by M. DeCandolle of their formation is correct, it must be understood in a certain manner, and a restricted sense must be given to the word rupture; for were we to suppose that a *rupture* was a *rent*, a dissolution of continuity effected with violence and with *laceration* of cells or of vessels, we should be quite wrong. In the same manner that a fruit *opens* by a *predisposition* of the tissues *destined to break*, that is to say *to divide*, so a pith perforated with transversal cavities is also thus *pierced* by a *predisposition* in the organic elements which lose their continuity by means of a structure appropriated to this purpose. If the text of adopted physiologies were taken literally, we should say that

it is the mode in which the elongation of the branch takes place which *tears* the pith *regularly* into discs, whilst observation and the anatomy of the organs prove that these discs are the result of a condition of existence of the pith itself and not of the ligneous apparatus surrounding it. Such is the first conclusion I have come to in this investigation. It will subsequently serve to prove that this phænomenon of the separation of the pith into discoid plates is attended with several remarkable changes in the cells of this apparatus, and these changes are in fact the strongest proofs that can be brought to show effectually that the pith is a species of *mamilla for the bud*; that the modifications which take place in the alimentary cells are the same as those which take place in a cotyledon during germination, but still with conditions often quite different and even inverse. The modifying operation takes place in fact altogether in the cell, to the detriment, in the first place, of its contents, and afterwards of its envelope also.

These results, and others in addition, which had not been thought of till now, will come out clearly from this investigation; and the better to convince the reader, I will go into the details themselves,—the analysis of the facts.

I will first keep to the investigation of *Begonia argyrostigma*, which suits this kind of inquiry extremely well.

If we take a young stem of this plant, fresh and quite healthy, the diameter of which at the bottom would be a centimetre and more, and diminishing by degrees from the bottom to the top by internodes of 8, 7, 3, 1, $\frac{1}{2}$ centimetres in length, and we examine its pith, it is found to be of such a size that it occupies $\frac{7}{10}$ths of the stalk. Moreover this pith (Pl. II. fig. 1.) forms a column channeled by three deep grooves (A, B, C, fig. 1.), and by three slighter grooves alternating with the first (*a*, *b*, *c*, fig. 1.). When the internode is 10 or 9 millimetres in diameter we observe that the pith begins to be perforated with discoid cavities tolerably equidistant, but separated by rather large masses of compact pith (*e*, *f*, fig. 2.). But if an internode of 6 or 7 millimetres in diameter is taken, we find a pith *quite continuous*, compact, similar to that of a great number of plants. This change takes place suddenly; for two successive internodes, the one of 7 millimetres in diameter, the other of 9,

exhibited a *continuous* pith in the first and an *interrupted* pith in the second.

On the section of an internode where the lenticular cavities are formed we see first the derm (*a*, fig. 2.), then the cellular envelope (*b*, fig. 2.), after which comes the ligneous sheath (*c*, fig. 2.), which at the nodes abuts on diaphragms that are also ligneous but not formed of fibres (*d*, fig. 2.). In the centre appears the pith (*e*, fig. 2.) and its cavities (*f*, fig. 2.). These cavities do not in their first state extend to the exterior limits of the pith, and their first appearance is that of a simple transversal *slit*. These slits are separated by portions of compact pith, which are of six, eight, or ten times the extent of the slits.

These slits, are they *lacerations* of tissue? So we should believe, according to the assertion of M. DeCandolle. But seeing their evenness, the outline of their separation broken off all at once, and the smooth and polished surface of their sides, this became very improbable. Where there are *rents* of tissue there is raggedness, irregular indentations, and jagged fragments; here there are none of these. I presumed therefore that this was rather a *separation* of tissue, and a separation brought about by a particular disposition of the elementary parts. Examination with a microscope proves to me in fact that nature had so contrived it.

Figure 4. explains this structure. The pith is formed by cells of 8-sided prisms, the sections of which are hexagons, but these hexagons are elongated and *all* laid transversely, so that the pith is definitely formed by *layers* of horizontally elongated cells.

Now the slits are simple *separations* of these *layers*, without the cells themselves being in any way affected (*l*, *m*, fig. 4.). I am well aware, that on examination of piths cut longitudinally for the purpose of seeing these slits, open cells will be found, but these arise from the dissection; the others are all perfectly closed, but simply separated one from another.

Here then is a first fact established, that if the pith is broken or slit, this interruption of continuity arises from a dislocation of the layers of cells, and that these cells are, in order

to be thus separated, laid flat one upon another in horizontal planes.

We have seen that the slits do not extend to the circumference of the pith. There in fact the prismatic cells are no longer elongated, but as broad as they are high (*d*, fig. 4.). Nearer the exterior also the cells are again elongated, but in an inverse direction; there they are perpendicular, that is to say parallel to the ligneous vessels on one side and to the axis of the stem on the other (*b*, *c*, fig. 4.). At the same time they become narrower, and it is these which represent the pith itself in very old branches; they are never divided by horizontal slits; their longitudinal elongation is opposed to this.

But what is most curious is the change which takes place in the contents of these cells, whether they be taken in the slit parts or in the circumference of the pith. In the cells longitudinally elongated and in those which are of equal diameter in every direction there is a great agglomeration of *grains of fecule* (*c'*, *d*, fig. 4.). These granules are spheroidal, white, and vary greatly in diameter. More towards the centre some cells show these feculaceous grains, smaller and less frequent, and here and there octohedral crystals (*f*, fig. 4.); in the slit pith we see, though but seldom, cells with a *nucleus en couronne* (*g*, fig. 4.), but most frequently the cell is destitute of any internal body with the exception of its *water of vegetation*, which is transparent, without globules, and fills all its cavities, rendering them true aquiferous vessels. Such is the composition of this pith in its early stage.

Now let us take an *old* stalk of *Begonia argyrostigma*. Here things have taken quite a different aspect. A derm which has become brown (*a*, fig. 3), a cellular envelope solidified by a ligneous deposition (*b*, fig. 3.), a system of white wood (*c*, fig. 3.) clearly distinct from the nodal, ligneous and very hard diaphragms (*d*, fig. 3.), and a pith singularly formed of exceedingly numerous, transverse, very thin discs, leaving between them lenticular cavities (*f*, fig. 3.), but generally formed by two discs with separate roots, discs which join at their centre, so that their double roots leave a fresh space empty between them (*g*, fig. 3.). It is just as if the pith had slit or

rather separated into as many discs as possible, in order that each one might touch its neighbour, and that there might be the greater number of lenticular cavities between them. What is most astonishing is the regularity of this arrangement, as may be seen in figure 3.

It now became a subject of interest to examine the intimate structure of these discs. And at first, upon taking them off the stalk, in the form of membranes of a shining reddish-brown and very dry, I was struck with the great number of brilliant points which were detached from their surface and powdered the stage of the microscope. These brilliant points were in fact a vast quantity of *octohedral crystals* (*f*, fig. 5.) similar to those I had so clearly seen scattered in the young pith, but much more voluminous; and others were *dodecahedral crystals*, some of which having their tops truncated, thus presented fourteen facets (*e*, fig. 5.). These crystals lined, principally the surfaces of the pith, all along the stem, rather than the transverse discs.

The latter were formed of cells two or three times *larger* than those of the young pith, and nevertheless the stalk upon which my observations were made, only measured twelve millemetres in diameter, that is to say, two millemetres more than the stem where the pith, still young, was not yet formed of discs;—a proof that it is not the augmentation of the stem which by pulling the cells had caused their increase in diameter; a proof, moreover, that this development of the cells has its origin in the cells themselves, and in the changes which they undergo.

What characterized these cells was the numerous folds of their membrane (figs. 5. and 6.); which generally proceeded from central points whence they radiated (fig. 6.). The water of vegetation had disappeared, some few globules (fig. 5 *c*, fig. 6 *b*) still remained here and there, but in general the organic utricular element was dry and empty; it was *dead* and *withered.*

In resuming these observations on the discoid pith of the *Begonia argyrostigma*, we find that the formation of the discs is attended with a phænomenon which takes place in the cellular tissue itself, and which is connected with the me-

tamorphoses which the cell undergoes by the exercise of the vegetable nutrition. In fact the following phases are seen in this pith :—

First period.—The pith is continuous, full, compact, without interruption of continuity. It is composed of cells which have been spherical and which are become prismatic by their mutual compression. These cells lengthen by degrees transversely, and end by being disposed thus in horizontal planes.

At this period the cell is filled with a liquid and fecule; it overflows with nutritive substance; its pith appears green, like the germinating cotyledon of a plant.

Second period.—The pith is become more extended by the development of the branch; the fecule changes into alimentary juice; it dissolves by the operation of nutrition (does it become gum?), first disappearing from the central cells of the pith, where the nuclei are formed at the same time with some granules of chlorophylle. By the loss of this nutritive substance, such inorganic substances as salts, obey the forces of the inorganic world, and crystallize by degrees; the crystals being formed in the cells.

The intracellular liquid, or the elaborated fluid which originates in the descending sap, and which has been transmitted to the pith by the medullary rays, is absorbed to the gain of the bud. The diminution which results from this absorption begins to dry up the cells which separate from one another horizontally. Then the *slit* is formed. We might say that the force of suction, wrought by the bud, took place in the axis of the stalk; it is in fact in this axis that the slit is first formed. These slits are at first at great distances from one another.

Third period.—The same facts continuing, results accumulate on results. The circumference alone of the pith still contains any fecule, but this nutritive substance has completely disappeared from the remainder of the pith. The water of vegetation, the elaborated fluid of the sap, is more and more subtracted; towards the bud, the pith dries more and more, the slits are multiplied and grow so large as to be true lenticular *cavities,* which leave between them *medullary discs.* The latter then are formed by layers of cells nicely separated one

from another, out of a mass primitively common, but without laceration of the partitions; these, at first double for the contiguous cells, are now become isolated.

At the same time the pith loses its green colour and becomes of a clear yellow, by the drying up of the membranes of the cells, and brilliant points are formed; these are numerous crystals which originate from the diminution of the liquid in which their elements were originally dissolved.

It is so true that these changes take place in this manner, that if we cut a stalk of *Begonia argyrostigma* longitudinally, when it is fresh and the pith only slit, at the end of two days we see the slits become lenticular cavities and the medullary discs are formed at the same time that the pith drying up passes from green to yellow, and the crystals make their appearance. In fact the sap is lost by evaporation, as in the plant it disappears by the suction of the bud; but it is lost, and the same causes bring about the same results.

Fourth period.—The bud being developed and the branch formed, the pith is become useless. It is deprived of all its juice; its cellular tissue, whose cells are become large, is dried up completely; the desiccation has separated all the layers of cells, and a considerable number of discs have been formed; brown dry discs formed by the empty cells, without and within which the salts have crystallized in different forms. This is the period of death.

What we have just proved in the case of the *Begonia*, we are able to see going on, with some few modifications, in *Juglans regia*, which offers several facts worthy of remark, and of which we shall speak briefly.

The greater part of the buds of this tree are supported on short branches; in this case the pith which is compact and without cavities is also very short, so that that which is formed of discs rises very high in the branch (fig. 6.). But it is by no means necessary to stop till the end of the first year, as M. DeCandolle has said, to see this compact pith converted into disciferous pith: it happens in the first year, and that at a very early period. The dissection, fig. 6 *bis*, clearly shows that the pith in the vicinity of the buds is quite full of juices, and that its separation into discs begins in the middle *en*

cone, as if the removal of the nutritive matter first took place there.

The compact pith in the walnut tree is composed of a number of small cells nearly in the form of cubes, all equal to one another, white, transparent, having very few globules, but containing at a very early period masses of small crystals, or true muriform calculi, which occupy the centre of the cells. At a later period, when the pith separates into discs, and dies, the cells undergo very few modifications.

I sought on a walnut tree a branch whose young shoot was very long. The terminal bud was separated from the last leaf but one by an internode of nine centimetres in length. Then came a leaf at five centimetres distance, and another eleven centimetres lower down. On this branch the pith was full at twelve centimetres lower than the terminal bud; but at each leaf bearing a bud in its axil, the pith was perforated by some lenticular cavities, as may be seen at A. fig. 7. Here the action of the bud in emptying the pith is fully evident, and a better proof could not be brought that it is really to the absorbing action of the bud that we owe the division of the pith into discs.

I cut this long branch into two and dried it. The next day the compact pith had lost its liquid to so great a degree that the stem was hollowed into a gutter; the slits were greatly increased, but the membrane formed by the pith was also seen dried up and covering the bottom of the gutter formed by the half of the stem slit longitudinally; this membrane was also raised by as many hollow vesicules as there would have been lenticular cavities if the stalk had remained entire: here is a manifest proof that there is in the constitution of the pith a predisposition to separate thus into discs, and this predisposition consists in nothing more than the manner in which the layers of the cells are placed.

Figure 8. shows what happens when the pith is regularly exhausted by the suction of the bud. Then such regular discs form with two or three (or even more) roots and intermediate discoid cavities (*e*, *f*, fig. 8.). A part of the pith adheres to the ligneous tube and does not split (*d*, fig. 8.).

I examined the discs formed by this old, dry, dead pith.

The cells (fig. 9.) remain the same, cubic, somewhat transparent, and forming two or three layers in the centre with a massive root (A, fig. 9.) either surrounding the disc or divided. Some cells have their crystalline calculi also in the centre, but the greater part of such crystals are scattered outside the cells and fall off when the branch of the walnut tree is opened.

We know that this tree diffuses a powerful odour, owing to the evaporation of a very subtle volatile matter, which has a deleterious effect upon some persons, who suffer from headache when they sleep under the tree or handle any part of it. In the numerous dissections which I have made of the plant in my study I have felt this effect myself. All the parts of the plant are full of this empyreumatic matter. We know that in Circassia the tree is bored in the spring to draw off a liquid matter which coagulates and which the Circassians use in debilitant diseases and in affections of the lungs*.

I was very much surprised to find a resinous substance in the old pith of this tree, which accumulates on the discs, and there forms very singular tear-shaped masses (fig. 9. *c*.). These yellow masses have a multitude of different peculiar figures, but in general they are tuberosities supported by feet, the parts of which radiate in order to place and attach themselves on the medullary discs. On the tuberosities there are projections of tissue also radiating, and all the tissue itself of these masses is as it were granulated with a tendency to irradiation. This is explained at fig. 9. in *c*, where I have drawn one of these masses with two feet.

The existence of this substance in this place would lead us to think that in the exhaustion of the pith by the bud all the substances are not equally absorbed, and that some of them remain in the exhausted pith, which would then become not only an alimentary organ of the bud, a reservoir of air, but also a place of deposit, or, if we choose, a species of cloaca where substances henceforward useless accumulate. I know not whether pith has as yet been considered in this latter point of view, but the inorganic crystals accumulated in some

* See the excellent work of Dr. Lindley, Flora Medica. London, 1838, p. 308.

of them, and the deposition of the resinous matter, which we have seen exists in the pith of walnut trees, authorizes us to think thus.

I said above that nothing was more unequal than the distribution of the discoid piths in the different species of the same genus. If the examples which I have quoted are not sufficient, I will take the genus *Jasminum*, where *Jasminum azoricum*, L., offers a dense continuous pith filled with juice, and *Jasminum officinale* a discoid pith. That of the last species being sufficiently known, I have preferred, for multiplying examples and consequently our knowledge, to investigate the *Jasminum fruticans*, L., whose beautiful little pith offers the most delicate diaphragms that can be seen: we might suppose it to be a section of some vein with valves, when it is cut across; but this pith is one of the most interesting for exhibiting the real object which nature had in emptying the piths in favour of the bud; for here the phænomena of nutrition are so capable of appreciation, that it is one of the best examples to give in a course of vegetable physiology.

I stop then to examine the *Jasminum fruticans*.

If we take the top of the flowering stalk of this species, we find a continuous pith, the nearly cubic cells of which present a great quantity of little granules. If tincture of iodine is passed over a section of this stalk all the pith and cellular envelope instantly become blue. The fact is that both are filled with fecule, these granules being nothing else. At that time the two reservoirs of fecule, stained blue by iodine, are distinctly separated by the fibres of the ligneous system, which do not become blue.

If a subjacent internode is taken where the medullary discs are already formed, and if the preparation is passed through tincture of iodine, we first see the cellular envelope become blue, then two blue lines within the fibrous system ending at the discs of the pith, which are of a paler blue. At this period the fecule in fact still exists throughout the cellular system, but in a smaller quantity in the centre of the pith, where it has been absorbed to the advantage of the buds.

Lastly, if we take an older internode, the iodine only colours the exterior system, and two lines of the pith, those of

its circumference; in a vertical section of the stalk the discs remain without colour, but their roots become blue. Figure 10. represents this. The cells *a.* contain some fecule *b.* attached to their partition; the cells *c, d.* have their fecule in a mass in the centre of their cavity; and the cells of the discs *e, f, g.* have no longer any fecule at all. Here we may perceive, and there is no better way, the absorption of this nutritive substance, after which the pith dries up and separates its layers of cellules.

In fact, in *Jasminum fruticans,* where the pith is like a lace-net, the discs are extremely fine; which arises from their being formed by a single plane of very small cells. There is then not the slightest occasion, as has been supposed, for the cells to be great in order for the pith to slit into discs. Here they are of the smallest size.

In *Jasminum officinale* the discs are also so minute that the cells sometimes separate, and thus leave real holes by which the cavities communicate with one another. This disposition allows the pith of this plant to be injected, especially with wax made red with cinnabar, and when cold it is one of the most beautiful preparations of vegetable anatomy. I have some stems thus preserved in the museum at Liège.

The *Phytolacca decandra* presents enormous lenticular cavities, as figure 12. shows (*e.*), the intermediate discs of which are also very thick. The tissue which forms them is a prismenchyma with very large cells, which is the opposite of the jessamine, and proves that the size of these bodies has nothing to do with the separation of the pith into discs. These cells have numerous clusters of acicular crystals between them (*d,* fig. 13.), and in the cells themselves very small globules are seen. The membranes are very full of folds, but here also, when we dissect with care, we find no broken cells nor a true rent.

It is proved then, by these numerous examples, that a disorganization of tissue does not exist in the formation of these cells. The pith is exhausted by furnishing the bud with its fecule, as does the cotyledon; but if this then changes into a leaf in the epigeous plants, by turning its diachyma green, the pith on the contrary from being green becomes blanched and com-

pletely exhausted, and remains a vehicle for air and reservoir of excreted substances, henceforward of no use for vegetable life.

EXPLANATION OF PLATE II.

Fig. 1. Transverse section of the stem of a young *Begonia argyrostigma.*

A, B, C. Great grooves of the pith.

a, *b*, *c*. Small grooves of the pith.

Fig. 2. Vertical section of a similar stem.

A. Node.
B. Upper internode.
C. Lower internode.
a. Derm.
b. Mesophlœum.
c. Ligneous system.
d. Nodal diaphragm.
e. Pith.
f. Slit of the pith.

Fig. 3. Vertical cut of an old stalk of the same plant.

A. Node.
B. Upper internode.
C. Lower internode.
a. Derm.
b. Reticulated mesophlœum.
c. Ligneous system, very much developed.
d. Nodal diaphragm.
e. Medullary discs.
f. Medullary cavities.
g. Roots of the discs.

Fig. 4. Young pith very much enlarged.

a. Vessels of the medullary sheath.
b. Vertical cells with fecule.
c. Shorter feculiferous cells.
d. Prismatic cells with fecule.
c'—*d'*. Fecule.
e. Cells where the fecule disappears.
f. Crystals.
g. Nucleus.
i. Septa of very minute cells.
k. Cells of the discs.
l. Angle of the cavity.
m. Cavity.

Fig. 5. Old disc cut.

a. Dry cells folded.
c. Rare globules.
d. Folds.
e, *f*. Crystals.

Fig. 6. Cells seen from the top of the disc in *Begonia argyrostigma.*
- *a.* Folds.
- *b.* Globules.

Fig. 6 *bis.* Bud of *Juglans regia* cut open longitudinally.
- *a.* Derm.
- *b.* Mesophlœum.
- *c.* Ligneous system.
- *d.* Medullary discs.
- *e.* Compact pith.
- *f.* Pith of the terminal bud.
- *g.* Scar of the leaf.

Fig. 7. Branch of *Juglans* with very compact pith.
- A. Bud corresponding to the
  - *a.* Medullary cavities.
- *b.* Other medullary cavities.
- *c.* Compact pith.

Fig. 8. Old dead branch of *Juglans regia.*
- *a.* Derm.
- *b.* Mesophlœum.
- *c.* Ligneous system.
- *d.* Medullary discs.
- *e.* Roots of these discs.
- *f.* Medullary cavities.

Fig. 9. Isolated disc, much enlarged, taken from an old branch.
- A. Root of the disc.
- B. Disc.
- *a.* Empty cells.
- *b.* Crystalliferous cells.
- *c.* Mass of resinous matter.

Fig. 10. Discs of *Jasminum fruticans.*
- *a.* Cells which are void.
- *b.* Fecule
- *c, d.* Cells still replete with fecule.
- *e, f, g.* Discs with empty cells.

Fig. 11. Branch of *Jasminum fruticans.*

Fig. 12. Section of the stalk of *Phytolacca decandra.*
- *a.* Derm.
- *b.* Mesophlœum.
- *c.* Wood.
- *d.* Medullary discs.
- *e.* Empty spaces.

Fig. 13. Cells of the discs.
- *a.* Cells.
- *b.* Folds.
- *c.* Globules.
- *d.* Clusters of crystals.

X.—*Zoological Notices.* By Dr. A. Philippi*.

[With a Plate.]

1. On two new species of *Euplocamus*.

Two new species, which appear to be rare in the Neapolitan sea, are added to my genus *Euplocamus*, which stands between *Doris* and *Tritonia*, and with only two species of which I was previously acquainted, *E. croceus* from the Sicilian sea, and *E. claviger* (*Doris claviger*, O. F. Müller). They were discovered by M. Arcangelo Scacchi, who is the best acquainted with the Conchylia of this neighbourhood, and has rendered some services of no slight value to the cause of science by several papers published on this subject, which appear to be entirely unknown out of Italy †. Since he has for some time devoted his attention exclusively to the study of mineralogy he has allowed me to make known his discoveries to the public, and I commence with the present notices; at the same time I may observe that not only has he kindly committed to my care his drawings made from life for this purpose, but also the animals in spirit for my use. The one species I call

Euplocamus frondosus; corpore croceo, verruculoso, branchiis analibus 5, bipinnatis; lateralibus utrinque 6, anticisque 4, arborescenti divisis. Plate III. fig. 1.

The specimen preserved in spirits is greatly contracted; its length amounts to $13'''$, its breadth $8'''$, its thickness $6'''$; it is quite colourless and only exhibits a small grayish space arising from confluent points. The drawing represents an animal $28'''$ long and $11'''$ broad, truncate in front, behind narrower and somewhat tapering. Otherwise the animal is nearly quadrate, the upper lateral margins unite posteriorly before the apex, at the same time losing somewhat in distinctness, and each carries six *branchiæ*. The front and upper margin carries four of them, which are somewhat smaller than the side branchiæ,

* Translated from Wiegmann's 'Archiv.' Part 2, 1839.

† Lettero di Arcangelo Scacchi su vari testacei napoletani al Signor D. Carlo Tarentino. Napoli 1832.—Osservazioni zoologiche di A. Scacchi. Napoli 1833.—Notizie intorno alle Conchiglie ed a zoofiti fossili che si trovano nelle vicinanze di Gravina in Puglia di Arcangelo Scacchi. Articolo estratto de XII. a XIII. fascicolo degli anali civili. Napoli 1836.—Catalogus Conchyliorum Regni Neapolitani quæ usque adhuc reperit A. Scacchi. Neapoli 1836.

but are otherwise perfectly similar. Both are arborescently ramified. The *anal branchiæ* are situated nearly in the same line with the penultimate side branchiæ, are five in number, the odd one bent forwards and bipinnate. They appear not to be retractile. The anus stands directly behind them in the form of a small tube. The *mouth* is situated on the front side inferiorly, and exhibits in the specimen preserved in spirits a perpendicular fissure and several cross folds. At some distance in front of this is situated on each side an oval epidermal fold, which in an expanded state must form moderately long inferior tentacula. The *dorsal tentacula* are $5'''$ long in the drawing, and consist as in *Doris* of a cylindrical stem and a pointed foliaceous club; they are also in like manner retractile into cavities, as proved by the specimen in spirits, where only two curved apertures are to be seen in their place. The orifice for the organs of generation is on the right side, somewhat before the third branchia. The colour is orange-yellow, with some scarlet-red points. The small warts represented in the drawing cannot be distinguished on the preserved specimen. *Euplocamus croceus* approaches by its colour and other characters near to the present species; but it is certainly distinguished, 1. by smaller size and especially far less breadth; 2. the lateral branchiæ are proportionally much longer, and only ramified once; 3. the anal branchiæ are almost simple, and only furnished with a pair of short filaments towards the clavate extremity.

Euplocamus cirriger; sordide roseus, branchiis lateralibus utrinque 5, anticisque 4, filiformibus, branchiis analibus 9, filiformibus, ciliatis branchiis? succedaneis filiformibus in dorso quinque. Plate III. fig. 2.

The specimen in spirits, appearing but slightly contracted, measures $8'''$ in length, $3'''$ in breadth, $2\frac{1}{2}'''$ in height; the drawing is $18'''$ long and $6'''$ broad. The form of the body is again parallelopiped, truncate in front, narrower posteriorly; the foot however projects further out than in the other species, and terminates posteriorly with a subulate filament, which is not represented in the drawing. The upper border or the margin of the cloak also projects in the form of a narrow epidermal fringe. On each lateral margin are five long filiform

branchiæ (in the preserved specimen they still measure $2\frac{1}{2}'''$), of which the two last are furcately divided, the front margin has four similar merely somewhat shorter filaments, but besides these there are five similar, only somewhat still smaller filaments on the back, between the dorsal tentacula and the anal branchiæ, viz. three in the central line and one on each side before the latter. The *anal branchiæ* amount to nine, are filiform, directed with the exception of the single one anteriorly and furcate, simple, all ciliated on both sides. The anus is situated in the centre. The *dorsal tentacula* stand in a line with the first lateral branchiæ and are very long; as it appears they are not retractile. The frondose club is very long in them. The *mouth* is situated on the front margin close above the foot, and I do not find in them the *tentacula labialia* mentioned in the preceding species; the parts however are too much contracted to admit of my denying their presence. The *sexual orifice* is situated on the right side between the first and second lateral branchiæ.

Plate III. Fig. 1. *Euplocamus frondosus*, after a drawing of M. Scacchi.
Fig. 2. *Euplocamus cirriger*, after a drawing of M. Scacchi.

2. On the animal of *Pileopsis Garnoti*, Payr.; Patella Garnoti, *Phil. Enum. Moll. Siciliæ*. Plate III. fig. 3.

That *Pileopsis Garnoti*, Payr., is not placed in its correct genus, was evident to me when occupied with my 'Enumeratio,' but I was not more fortunate than Payrandeau, in referring it to *Patella*. The impression of the muscle compared with the whorl ought to have taught me that the vertex stands posteriorly and not in front as in *Patella*; however I may mention in excuse that the correct recognition of the impression of the muscle is very difficult with the strong lustre of the inner side. I lately had an opportunity of finding the living animals on a mass of *Cladocora calycularis*, Ehrenb. (*Caryophyllia calycularis*, Lamk.). It differs essentially from *Patella*. Instead of the round head with the two filiform tentacula, the head is flat, foliaceously expanded in front, deeply excavated in the centre where the mouth lies, and no tentacula exist; perhaps, however, it may also be said that the dorsal tentacula cohere with the ventral into a broad mass, for the

front and inferior part is easily distinguished from the upper thicker part. *Eyes* are distinct on the outside of the head. The perfect mantle surrounds the whole shell, presents no incision, no siphon, and between it and the oval foot there is not a single organ to be found. A specimen thrown into spirits gave more information respecting the internal structure as the intestines shine through the thin peritoneum. The entire hinder space of the body was occupied by the brown liver, as also a part of the right side; the ramified processes of the liver could be plainly distinguished on it. To the right was situated a reddish organ, probably the ovarium. Above the liver, posteriorly and to the left, is situated the intestinal canal with a convexity directed backwards and bending anteriorly and to the right, it disappears before the right end of the muscle which fastens the animal to the shell; in front of the liver is moreover situated a white organ, the functions of which I do not venture to indicate; and in front of this, occupying nearly half the space, appears a cavity, in which an organ with a form closely resembling a folded ruff proceeds nearly parallel with the intestinal canal, and above is adherent to the peritoneum and is evidently the branchia. I now also succeeded in passing a hair through this hole exteriorly, which even appears in front on the right side before the anal aperture in the rather thick border of the mantle, where on more accurate examination I found a small black point. On account of the minuteness of the animal no separate anal aperture and branchial aperture can be perceived externally. I could not discover an orifice for the sexual apparatus. After I had found this out it was easy for me to notice on the few shells at my disposal that they are somewhat prominent in the vicinity of the branchial aperture. From the irregularity of the shell it requires great attention to discover it. But to what genus does the animal belong? This is a question which, from the entire want in this place of literary auxiliary means, I am not able to answer. The first thought is on *Siphonaria,* but as far as I can recollect, the horseshoe-like impression of the muscle is interrupted in this genus by the siphon; in the present species the right arm of the horseshoe is merely shorter than the left. Moreover the animal is

said to be *blind* (Cfr. Rang, ‘Manuel de Malacologie,’ p. 141.). Does it belong to Eschholtz's genus *Acmæa*? or must it form a distinct one, as M. Scacchi thinks, who calls it *Clypeus* in his ‘Catalogus,’ p. 17, without however saying more of the animal than “*incola ut in* Siphonaria, *sed testa non canaliculata*?” I will add in conclusion, that the following statement of Rang, l. c. p. 142. “*nous avons vu de jeunes Patelles avoir le caractère des Siphonaires et en conserver des traces dans un âge plus avancé*,” probably relates to species of this genus, and not to young *Patellæ*.

Plate III. Fig. 3. *Pileopsis Garnoti*, Payr.

a. The animal after the removal of the shell, magnified four times. The horse-shoe-form ligamentary muscle, the liver, the ovarium, the end of the intestinal canal, and in front the respiratory cavity with the branchiæ.

b. The animal with the shell, magnified three times, to show the form of the head and the eyes.

3. On the Animal of *Galeomma*. Plate III. fig. 4.

This very remarkable Acephalous genus was established by Turton in 1825 in the ‘Zoological Journal,’ and thus characterized from the shell: shell bivalve, equivalve, equilateral, transverse; with a large oval gape at the front margin. Hinge without teeth. Ligament internal. Two very small distant muscular impressions; impression of the mantle simple. So also Deshayes in Lamarck's ‘Hist. Nat. d. Anim. sans Vertèbres,’ (2nd edit. vi. p. 179.) Animal unknown. M. Costa also found the shell and has described it somewhere in the ‘Annales des Sciences Naturelles,’ (in the absence of M. Costa I cannot state more accurately where, as the entire series of this Journal does not exist in Naples) under the curious name of *Hiatella Poliana*, which escaped M. Deshayes. M. Delle Chiaje has thought to correct his countryman by naming the questionable animal *Hiatella striata* in the tables to the 5th volume of his ‘Memorie,’ which will never see the light. M. Scacchi has described the animal very accurately, carefully, and well under the name of *Parthenope formosa* in his ‘Observazioni Zoologiche,’ p. 8 and p. 19. I have also been so fortunate as to observe for some days several living specimens. It occurs between the roots of *Zostera* or *Cavolinia oceanica*, but

appears to be rare. The animal is entirely white, semi-transparent. The *mantle* is split in its whole anterior half for the exsertion of the foot, the margin is entire; behind there is a small aperture for the exit of the water and the excrements. Where the mantle quits the margin of the shell there are on each side eight or nine short cirri or rather warts. Between the vertex and the aperture of the foot there is also one, and between the vertex and the posterior aperture three warts. The epidermis is highly remarkable; it easily frees itself from the shell which is quite enveloped by it, and hangs to the mantle (*a* in fig. 4 *d.*); it appears therefore to retain constantly its organization, while in most bivalves it very rapidly dies, yet I would not with M. Scacchi call the shell interior. The foot is nearly cylindrical and can be stretched out to a great length, but it never produces jumping motions, but crawls with its white under surface quite after the manner of the Gasteropods, even up the smooth perpendicular side of a glass, which by the bye I have also seen done by *Lucina commutata.* Thrown into spirits the animal exhibits at the base of the foot a cavity surrounded by a circular prominence, which I suspected to be an organ for the secretion of a byssus, but not a trace of byssus was to be seen either on the roots of the *Zostera* or on the glass. When the mantle is cut open in the centre an almost globular body makes its appearance, which is divided posteriorly by a shallow groove, and on each side are seen two large equal branchiæ terminating free posteriorly. On each side in front are two oval moderately large *appendices buccales.* The two adductors are not evident when the animal lies on its back, but are distinctly recognised when in the reverse position; the hinder one is roundish, nearer to the margin, and somewhat larger than the front oval one. The shell has been elsewhere sufficiently described, but I would hardly call the hinge callous, and the ligament appears to me to be quite internal. A second external one occupies the whole margin of the hinge. The two magnified figures sufficiently show the form and sculpture.

4. *Oculina ramea,* Ehrenberg; *Caryophyllia ramea,* Lamk.

Few persons have seen the animal of this common coral, nor

have I succeeded in obtaining it in a fresh state. M. Scacchi however has been so fortunate and has kindly lent me the drawing, which I shall subsequently publish if I find it impossible to sketch one myself from the living animal. The animal according to this drawing has not the least similarity to the false one of Donati, nor even with that of Shaw. Its colour is of a dirty yellow falling slightly into orange yellow, and it presents about thirty tentacula standing apparently in two series. Each one is $3\frac{1}{2}'''$ long, nearly $1'''$ thick at the base, and gradually tapering towards the apex, which is not clavately thickened. At some distance downwards from the tentacula, and extending about $3'''$ to $4'''$ in breadth, is the somewhat thick and fleshy body which exhibits numerous oblique furrows and as many strong longitudinal furrows as there are tentacula in one row, and then suddenly gives place on the drawing to the thin membrane which covers the coral stem. The mouth projects very considerably, nearly $5'''$ between the tentacula, but it can also be greatly retracted. It measures $3\frac{1}{2}'''$ in diameter, and is surrounded by numerous longitudinal folds.

5. *Chelura terebrans*, a new Amphipod Genus. Fig. 5.

On the 17th of May I found at Trieste near the *Lazaretto Vecchio* several planks just drawn from the sea, which were eaten through and through, so that they nearly wore the aspect of a sponge. The holes were of two kinds; the larger ones of at least $2'''$ in diameter, in which were a quantity of oviferous *Teredo navalis*, and the smaller of about $\frac{3}{4}'''$ in diameter, in which I found the little crustacean, which will presently be described, in such immense numbers that I could not doubt for a moment that these holes and galleries had originated from their devouring. Now if it was already interesting to me to find a second example of a wood-boring crustacean, my joy at this discovery was greatly increased from its not belonging, like *Limnoria*, to the *Isopodes*, but being an *Amphipode*, and moreover strikingly distinguished from all others by its antennæ and more especially by its remarkable tail. A great number of specimens have reached Cassel in safety, and I only brought two accidentally with me to Naples, from which I have drawn out preliminarily the following de-

scription. The animal, including the antennæ and caudal appendages, is $4\frac{1}{3}'''$ long, and without them $2\frac{3}{4}'''$, and about $\frac{3}{4}''$ broad. The head is narrowest, and as long as the two following segments, the body becomes gradually broader from the head, without however departing considerably from the linear form. The eyes are small and round, the superior antennæ of moderate length, setaceous, and with seven articulations. The inferior antennæ are one and a half times as long and consist of six articulations, the two first are very short, the remainder gradually increase in length, become flatter, and the last are densely beset with cilia, so that they appear rather to be an organ for swimming than for feeling. The *pectoral segments* are of equal length and have their lateral parts only slightly developed. The *tail* or *abdomen* consists of five segments: the two first resemble the pectoral segments; the third segment bears on the centre of the back a long curved horn which exactly resembles that of the Sphinx caterpillar, and on each side two small tubercles. The fourth segment is one and a half times as long as broad, beneath somewhat flat, above concave, covered with small protuberances and ciliated on the lateral margins. They are especially distinguished by two small hooks in the centre of the hinder margin. This segment bears on each side two pairs of curious appendages which are articulated on to its base. The front appendages are perpendicularly directed and consist of three longish rounded flaps which are all thickly beset with long hair, and of which the front one is the largest, the hinder one the smallest. The lateral pair of appendages perfectly corresponds to one of the caudal appendages of the *Gammari*, and consists of a stalk which supports two small acute laminæ. The fifth segment is very short, exhibits superiorly in a fissure the anus, above in the centre, and inserted at its base (or to the hinder margin of the fourth segment) an oval lamina, and at its extremity an enormous *pair of pincers*, which are nearly twice as long as the two last caudal segments. Their two laminæ are compressed, somewhat diverging, attenuated towards the apex, and bent in the form of a hook, and they have serrated margins. The *fourteen feet* increase posteriorly in length, but not considerably. The two front ones have at their extremity a curved

claw, and the tarsus is broad with a diverging tooth. The first pair of feet is much broader than the second. The following feet terminate with a long straight claw but slightly curved in the form of a hook at the apex only, the three posterior have merely a small foliaceous appendiculated member. I did not see the *branchiæ* at their base, but very distinctly the three pairs of *pseudo-abdominal feet*, which consist of a securiform, lamellar basal joint, and two articulated and ciliated spines; so that there can be no doubt to which order of Crustacea this animal belongs. The *cibarian apparatus* seemed to me to consist of a marginated upper lip, a pair of mandibulæ provided with biarticulated palpi, three (?) or four (?) pairs of lamellaceous maxillæ, and two sex-articulated foot-jaws.

PLATE III. Fig. 5. *Chelura terebrans.*

a. The animal lying on its side, magnified four times.

b. The fourth and fifth caudal segment from above, as it appears when it is magnified fifteen times.

c. The same from below. The third pair of false abdominal feet is evident at the basis.

d. The first foot seen magnified twenty-five times.

e. One of the posterior feet with the same power.

[To be continued.]

XI.—*Extracts from a few rough Notes of a Journey across the Pampas of Buenos Ayres to Tucuman, in* 1835. By JAMES TWEEDIE, Esq., addressed to Sir W. J. Hooker.

[Continued from p. 15.]

THIS morning, the 26th, we regained the post-road which we had left at Pergamena, at 3 leagues beyond the post house of Cabeza del Tigere, 320 miles N.W. of Buenos Ayres. Here the tract turns more to the west, keeping along the east bank of the Rio Corcouñeon, a most delightful tract to behold, being finely interspersed with woods of *Algaroba* and *Chañeos*, the river gliding on at the rate of about a mile in the hour, in a deep ravine whose sides are nearly perpendicular for 30 or 40 feet, especially the east bank where the sun is so powerful as to dry up much of the vegetation, while on the west and north-west, where it is shaded from the midday rays, the crooked course

of the river is tracked as far as the eye can reach by the abundance of willows that line the banks. There are, however, no beautiful slopes and rich holms here, such as grace the shores of the Clyde. We halted this day at the deserted posthouse of Lobaton, where I found the vegetation bearing a striking similarity to that which prevails around Bahia Blanca, distant more than 1100 miles.

27th. We crossed the little river called Salado de Ruiz Diaz, whose flat sides, white with a saline incrustation which crushes like frost under the foot, are denuded of vegetation for at least a hundred yards on either side the stream. At this place we had entered the province of Cordova for 20 miles, and after passing the river pursued a constantly rising road till we came to a posthouse bearing the same name as the river and situated at a considerable elevation. The land all around is very bare of herbage and dry, but gay with a species of *Oxalis* and the beautiful little *Nierembergia gracilis*. I also found the *Eupatorium affine*, a charming dwarf perennial. The well was the deepest I had seen on the road, 21 feet, but the water was excellent. We passed through a dry and thinly inhabited country, but looking agreeable from its natural clumps of *Algarobas*, &c. The Rio Corcouñeon with its row of willow trees lay on our right, its windings marked by these trees; and our road being straight, sometimes it was close to us, at other times far distant. We saw several deserted houses and unoccupied land, though the latter was of good quality; and passed through the town of Fraile Muerto, situated close to the river, where there were some spots of fine maize, pompions, French beans and tomatos, the latter an indispensable article here.

30th. Having pursued our journey up the river and generally almost parallel to its course for nearly 100 miles, we crossed it at Esquina del Ahogada, where its name changes from Corcouñeon to Rio Terzero, it being the third river from Cordova going to Buenos Ayres. Here commenced a strange change in the face of the country, a dense forest prevailing for a vast distance, chiefly consisting of *Algarobas*, of which there were several beautiful varieties. The tops of these trees are often charmingly adorned with the purple flowers of a species of mistletoe, whose blossoms are frequently more than an inch

long; there are many species of this kind of climber, some with clusters of white and others of green flowers, all of them finely scented; and where there was a free opening to the air we observed many trees quite covered and killed with loads of different kinds of *Tillandsia*. The road through these ancient forests is often so circuitous that we would be going towards all the different points of the compass in the course of one day: frequently again it would become so narrow that there was scarcely room for one cart to pass along, and where its high lumbering body, swinging from side to side, was completely stopped; so that it was needful to cut away some of the branches before it could proceed. Our great line of vehicles, with the feet of the numerous cattle, raised such a tremendous cloud of dust, that often one cart was indiscernible at the distance of another, and there was not a breath of air in these dense forests to carry off the dust.

On the afternoon of the third day after crossing the river our mules all left us on a sudden at full gallop; they had scented the water of a large lake 6 miles distant; but much as we were all in want of this necessary of life, nothing but absolute need could compel us to use it, the quality was so bad. I had gathered, when passing the Rio Terzero, several varieties of the *Zinnia*, an annual in English gardens; the *Goodenia tuberosa*, and some agreeably scented kinds of *Cynanchum*: little worthy of notice occurred in the dense woods, except 2 or 3 species of *Cactus*.

4th April. We came to the village of Los Ranchos, another poor place, containing apparently about 800 inhabitants; the houses are all constructed of unburnt bricks, the church partly of this material and partly of burnt bricks: opposite to this building is a large market square, but I saw nothing offered for sale except a cart load of beef and a few pompions. This place is considered half-way between Buenos Ayres and Tucuman. At sunset we crossed the Rio Secundo or second river from Cordova, and finding good grass stopped all night in a field of *Melissa* (?) sp. 6—8 feet high, here called Boldo, and in great use for dyeing, and by the addition of other substances it produces various shades of brown. This Rio Secundo was, at the time we now crossed, 200 yards

broad, of a regular depth of 4 feet all across, and gliding slowly north-east at about a mile an hour; on our return it was quite dried up, and in place of water we found nothing but white drifting sand and gravel, brought down from the mountains of Cordova. Two more days and nights travelling brought us to the Rio de Cordova, a fine stream of the clearest water that can be seen in any of these provinces. The bottom is stony and gravelly, the stones having been brought down from the mountains, 30 miles distant, by the current; for throughout these extensive plains not a vestige of stone or metal can be found.

6th. We rested at the passage of the river for most of the day, repairing carts, &c. The town of Cordova is in view, 26 miles on our left, and appears charmingly situated at the foot of a ridge of hills, stretching north-west. While travelling through the woods I noticed a *Passiflora*, and saw several species of strong-growing *Cactus*; and on the steep and dry banks many of the largest *Algarobas* were completely killed with loads of air-plants, of which great masses hung from every branch.

8th. After passing this river, the road rises considerably, proceeding more to the north; its former direction was north-west, and is now north-north-west; the tract over which we passed was miserable, dry, and barren in the extreme; a few stunted shrubs of *Chañeos, Algarobas,* and some other species of *Mimosa* were all that could be seen. One of the latter produces a quantity of clear amber gum which distils from its beautifully green bark. At the posthouses we obtained water at from 12 to 15 feet from the surface, and in one instance the cattle were served with it at the rate of a Spanish dollar for 100 beasts, the water being raised by a horse in a sheep's hide from a well 5 yards deep. In this dry tract we passed over 18 miles, which having been set on fire accidentally by a camp, had been left a naked plain of black ashes, with the bare stems of the shrubs remaining erect like blackened rods. These extensive conflagrations are common in these districts, making a splendid appearance by night. With the first shower that falls on the scorched ground a lovely crop springs up, consisting of *Oxalis*, red, yellow, and rose-coloured, mingled

with different kinds of *Amaryllis*, which spread a carpet of bloom resembling a richly stocked flower-garden.

14th. We came to the little chapel of San Juan, where, though the village consists of but 3 Ranchos, there is a *pulperia* or tippling dram-shop. A day was passed in repairing the carts, all of which had become loose and rickety from the long drought. No iron is used in the construction of these vehicles; even the wheels are unshod, the trams being made of hard *Algaroba* wood, which lasts a long time, often several years, on the stoneless roads of this country.

This place was the last post house in the province of Cordova going north-west, and here, as we were on the ridge of a mountain, we found the vegetation much more varied than of late; the *Cactus* tribe were especially numerous and varied; one specimen of the broad-branched kind struck me particularly, its white strong spines measuring from 6 to 9 inches in length; and the tree itself, of a conical shape (the cone reversed), with its huge body of bushy and numerous flat branches, could not be of less weight than 10 to 12 tons. There are also several *Mimosas* of different species; that which is called from its hooked thorn *Garro-Vato* (Grip the Goat) abounds; varying much, but always preserving a slender mode of growth and fine short pinnated leaves: unfortunately none of these were in flower. I also observed the *Jormillio*, a slender ever-flowering shrub, with small gummy leaves; the whole plant has a dry brown singy appearance; and a curious frutescent *Solanum*, whose long, oval, scarlet fruit is generally as empty as a bladder. Here also I found a beautiful shrub much resembling an apricot, its fruit; which is small and yellow, the natives assure me, when ripe, is not inferior to a good plum; but as the season was passed, I only picked up a few dry kernels, which also bore a great similarity to those of the apricot; at the lowest part of the bush was a small branch in flower: it is called here *Patta*.

In this neighbourhood I noticed the effects of the earthquake which had taken place while I was travelling in August of last year: pits, of various forms and depths, had opened, some only 4 feet deep, while of others we could not find the bottom; also a large deep rent or ravine, crossing our road,

but since nearly filled up with mud: the wells, from the same cause, now only afford muddy water, and the natives are content to use what they can obtain from a pool, which occupying the centre of a field and receiving all the washing of the neighbourhood, tastes far too strong of cattle to be palateable. Yet these indolent people make no attempt to obtain a better supply of this needful element. For the same reason they neglect to cultivate the native trees, many of which, such as peaches, growing here fine and healthy by the road sides, would prove highly valuable with little trouble; but a few pompions and maize are all that they care to rear.

In the afternoon of the 15th we arrived at the Post Del Carmen, and entered the province San Jago del Esterro, lying at the north-west point of the Cordova mountains. Here the road for a short distance was of a fine hard gravel, the first I had trodden in any of the Argentine Provinces.

The *Algaroba*, hitherto so abundant, now gave place to several other kinds of large trees, as the *Quebra Halcha*, *Colorada* or *Blanca*: this names signifies the Hatchet-breaker, as the wood is so hard that a large tree of this sort is rarely felled without breaking the hatchet; the *Colorada* was covered with large tufts of red seed, much like the sycamore; while the *Blanca* is distinguished by its small myrtle-like foliage and long pendent slender boughs, which give the whole tree the appearance of a weeping willow; its seed is a flat pap-like substance, inclosed in large flat white pods hanging in twos, threes, and fours at the tips of the slender branches like the pendulum of a clock. This tree always grows quite erect till it attains the height of 20 to 30 feet, and has a singularly majestic appearance.

We now came to a thickly wooded, but deserted country, and travelled for 50 miles without meeting with a single inhabitant, though we saw numbers of old Ranchos and the ruins of what had been good dwellings. The immense number of tigers which infest this district and destroy all the cattle, has caused the people to remove and leave to these voracious animals the exclusive possession of these extensive forests. While our beasts were feeding I took a cautious stroll into the woods and came upon what had been an Indian vil-

lage, consisting of a few straggling huts, formed of four-forked posts, on which were laid unpruned branches which were again covered with sods and loose earth, thus merely affording a protection from the sun, but none from the cold, these huts being entirely open at the sides. Not a human being could be seen, though it would appear that this encampment was but recently deserted, from the vegetables, pompions, tomatos, capsicums, and maize, which now covered the ground, as wild and promiscuous as if natives of the soil. In this wilderness I observed several of the small silver grey fox and a large species of hare, with a broad tail like that of the Cape sheep. Parrots and paroquets were in vast number, but no other birds. Here were some curious *Cacti,* of large erect growth, and 16 angles to the stem, some of the naked pole-like branches being upwards of 30 feet high, beset with spines 2 to 4 inches long. The fruit is very small in proportion to the size of the species, some single plants sending out more than a hundred of these naked pole-like branches, most of which were from 6 to 8 inches through, and generally thicker at the top than bottom.

17th. At mid-day we reached the river Saladillo de Gusman, and here we were kept waiting 15 days for its decrease, the season being that of its greatest fulness, in consequence of the melting of the early fallen snow on the Cordilleras. It may seem an extraordinary circumstance, that when travelling through a country where man and beast often suffer the utmost distress for want of water, the party should at the very same time be arrested by a river whose margins were flooded for half a mile on either side beyond the ordinary channel; but such was nevertheless the case here, as in other tropical countries; the greater the heat and drought, the more swollen are the streams, which diminish in proportion as the weather becomes cold and wet. After waiting for two weeks in vain, we discovered a place, a considerable way further down, where the height of the banks had much contracted the river, and with much labour, and after cutting down many trees, our carts were dragged to the water's edge. Another Tropa, consisting of 11 similar vehicles, having joined us on the one side, while another of 13 was drawn up on the opposite bank,

where a little village of Indian Ranchos or huts was situated close to the stream, the assemblages of drivers, passengers, and large quantities of cattle gave the place the appearance for a few days of a Highland fair. Commodities of various kinds were brought for sale, among them excellent bread, made from the flour of *Algaroba* pods, no way inferior to wheaten flour in taste, being sweet-flavoured, but yellow-coloured and slightly purgative at first to those who are unaccustomed to it. The husks after passing through the mill are steeped in water, which is then fermented and greedily drunk by the natives, though to strangers it is a disagreeable dirty mess. The remaining husks and sediment are afterwards dried and sold in small quantities for chewing, being somewhat sweet-tasted, though hardly so good as pea pods would be. These people thus lose nothing of their favourite *Algaroba*, which they gather from every tree with the greatest care, and store it up on the tops of posts, that it may be secure from the attacks of mice, &c. On observing to a native that the *Algaroba* districts of Cordova and San Jago were a most barren plain, he replied it was true, but as God had given them a dry sterile soil he had blessed them with abundance of *Algarobas*. In exchange for beef we obtained boiled sweet batatoes and chocklos or heads of Indian corn, both boiled and roasted; also some milk of goats, for no cattle are kept here.

The task of crossing this river was truly extraordinary: the waggons being unloaded, the largest hides with which they were covered were taken off, and each, kept outstretched with branches of trees and its four corners tied together, formed a kind of oblong box, something like a rough canoe, in which were then deposited as many goods as it could hold. An old Indian woman having contracted to take over our cargo at 20 reals or $\frac{2}{3}$ds of a Spanish dollar, she alone waited upon the loading of each hide, which was done by our drivers, while the dame ordered the mode in which the several articles should be placed, paying particular attention to see that the cargo should be evenly distributed and the hide set fairly on the water. This done, a young girl was employed to swim and drag it behind her by means of a small rope fixed to one of the canoes over her right shoulder, while she held and dragged by her

teeth. Each hide carries from 3 to 4 cwt. according to its size. The river is here about 100 yards wide. To me the task appeared a very luckless job; and when my turn came to go with my chest, boxes, and a fellow passenger, all launched into an ordinary bull's hide, with a girl, none of the strongest, to drag us, I felt considerable doubts of our safety. However nothing went wrong in crossing, either with us or a tropa of 11 carts, 28 in all, which were thus got over. The men, paid by the old woman, of whom there were 11, were occupied in dragging our empty waggons across, in which were fixed crates of earthenware, some heavy boilers, and other articles too large for the hide boat. The passage of the waggons was a still more troublesome business; 3 men swam across with a long rope of hide, and these men remained at certain distances with the rope over their shoulders to keep the water from having too great an impression upon it. When over, it was fixed to 6 bullocks, and the cart then tossed into the river from the opposite side, when it unavoidably disappeared, and on arriving at the other bank it was generally found to have upset under water; when it was no easy task to set it once more upon its wheels. One cart, in particular, occupied most of a day. Seven days were again consumed in reloading, &c., during which time I made several excursions among the woods by the river bank; but from the dryness of the season which had clad everything in its autumn or winter garb, very little could be found; I saw some memorable varieties of the *Cactus* family, of all shapes and sizes. There were two species, or rather perhaps vars., of *Passiflora*; *Mimosas* were also very numerous, among which was one allied to the *Algaroba*, with spines from 4 to 8 inches long; this is called in the country *Bonilla* or *Vanill*; its leaves are applied by the natives to cure a dim eyesight. This river flows from the south Andes in a north-east direction towards the Porana, and having traversed a saline tract, becomes so salt that even the cattle refused to drink it. We however obtained good and sweet water only 4 feet from the surface.

[To be continued.]

XII.—*Route from Lima by the Quebrada of San Mateo.* By John MacLean, Esq. of Lima. Communicated by the Hon. and Rev. Wm. Herbert.

Date.	Names of Places.	Thermometer at the period of observation.		Height in feet.	Hygrometer.	Boiling water.	Distance in Spanish leagues.		Productions.
								Total.	
1838.									
Dec. 8.	To Chaclacago	61·71	6 P.M.	2,265	24	207·5	...	6	Pasture, maize, and lucerne.
9.	San Pedro, Mama, and Santa Olaya	.....	.....	.....	.....	.....	3	9	Much fruit and do.
	Cocachacra	·80	11 A.M.	5,331	27	203·6	3	12	Same but little.
10.	Surco	58·67	5 P.M.	6,900	.....	200·4	3	15	Still less of either.
	Matucanas	·60	7 A.M.	8,026	.....	.....	$1\frac{1}{2}$	$16\frac{1}{2}$	Potatoes.
	Tambo de Viso	·62	9 A.M.	9,072	.....	.....	$1\frac{3}{4}$	$18\frac{1}{4}$	Ditto.
	San Mateo	·62	1 P.M.	10,984	.....	.....	2	$20\frac{1}{4}$	Do. peas, ollneos, and marhoao.
11.	Checla	39·55	4 P.M.	12,712	.....	191·8	2	$22\frac{1}{4}$	Pasture for Llamas.
	Pass of the Cordilleras at Antaranan	·51	10 A.M.	15,543	.....	.....	$4\frac{1}{4}$	$26\frac{1}{2}$	Strong tufts of grass on bare rocks.
12.	Pachachaca	35·60	4 P.M.	12,288	.....	.....	5	$31\frac{1}{2}$	Sheep pasture.
	Croya	·65	11 A.M.	12,010	.....	.....	3	$34\frac{1}{2}$	Ditto.
13.	Tarma	49·68	3 P.M.	9,183	15	195·6	6	$40\frac{1}{2}$	Lucerne, maize, and potatoes.
14.	Palcamago	·64	Noon.	10,284	.....	.....	5	$45\frac{1}{2}$	Wheat, potatoes, and many bulbs.
15.	Cacas	36·48	4 P.M.	12,280	.....	.....	$2\frac{1}{2}$	48	Sheep pasture.
17.	Ondores	39·56	2 P.M.	13,000	12	190·6	$4\frac{1}{2}$	$52\frac{1}{2}$	Do. and a few macas.
19.	Cerro de Pasco	37·55	11 A.M.	13,673	18	189·2	$9\frac{1}{2}$	62	Silver mines.
23.	Caxamarquilla	52·68	4 P.M.	10,866	.....	.....	5	67	Leagues from Lima viâ Tarma.
28.	Angascancha	·50	4 P.M.	13,323	.....	.....	...	$1\frac{1}{2}$	Llama pasture.
29.	Ninacaca	.....	.....	12,853	.....	.....	$5\frac{1}{2}$	7	Sheep do.
	Runamarca	·55	1 P.M.	14,589	.....	.....	...	.....	High bare ridge: Llama pasture.
30.	Pancartambo	52·60	2 P.M.	8,586	.....	196·3	7	14	Fine potatoes and maize.
31.	Huanacanchan	·63	10 A.M.	6,996	.....	.....	6	20	Near this the wood cutting.
	Ceja de la Montana	.....	.....	7,900	.....	.....	1	21	Leagues from Cerro de Pasco.

XIII.—*Floræ Insularum Novæ Zelandiæ Precursor; or a Specimen of the Botany of the Islands of New Zealand.* By Allan Cunningham, Esq.

[Continued from p. 26.]

PITTOSPOREÆ, *R. Br.*

1. Pittosporum, *Banks and Sol.*

612. *P. crassifolium*, foliis obovatis obtusis basi angustatis admodum coriaceis, supra convexiusculis glabris nitidis venosis, subtus ramulisque canovillosis, pedunculis terminalibus unifloris solitariis, capsulis crassis 3-valvibus. *Banks and Sol. Ms.*

Tarata, indigenis. *R. Cunn.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* On Flat Island, one of the Cavallos, and at Matauri on the east coast, opposite those islands, &c.—1833, *R. Cunningham.*

Frutex orgyalis. *Rami* stricti, fastigiati, glabri, ramulis cinereis foliatis. *Folia* alterna distincta, vel conferto-verticillata, crassa, valde rigido-coriacea. *Pedunculus* (uncialis) ex apice ramuli inter folia solitarius. *Calyx* 5-sepalus, cinereo-villosus. *Petala* 5 longitudine sepalorum. *Stamina* 5 hypogyna, petalis breviora. *Antheræ* adnatæ biloculares. *Stylus* terminalis, simplex, staminibus parum brevior. *Ovarium* villosissimum. *Capsula nucis Avellanæ* magnitudine, plerumque trivalvis, valvis obovatis lignosis resinosis. *Semina* plurima.

613. *P. umbellatum*; foliis obovatis obtusis retusisve interdum apiculatis utrinque glabris subtus pallidioribus reticulato-venosis, pedunculis terminalibus umbellatis, pedicellis unifloris calycibusque ferrugineo-tomentosis, capsulis 4-lobis 2-valvibus, caule arboreo. *Banks and Sol. Mss. Gært. Fr.* i. *p.* 286. *DC. Prodr.* i. *p.* 347.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Shores of the Bay of Islands.—1826, *A. Cunningham.* In woods around Onawero Bay, Wangaroa.—1833, *R. Cunningham.*

Arbor 20—26 pedalis, formosa, habitu omnino *Enkianthi*, ramis teretibus glabris. *Folia* in ramulis alterna vel conferta subtus pulchre reticulata, petiolata. *Petiolus* subuncialis lucido-coloratus. *Flores* terminales, rubri, umbellatim dispositi. *Calyx* 5-sepalus, sepalis lanceolatis acuminatis extus pilosis. *Petala* 5, oblonga, obtusa, nervosa, sepalis longiora apice revoluta. *Stamina* longitudine styli petalis breviora. *Capsula* globosa, magnitudine *Cerasi.*

614. *P. engeinoides*, omnino glabrum, foliis ellipticis (biuncialibus) acutis petiolatis venosis undulatis pellucidis, pedunculis terminalibus brachiato-ramosis, pedicellis umbellato-corymbosis multifloris, capsulis (minimis) ellipticis acuminatis bivalvibus, stigmate obtuso.

New Zealand (Northern Island). Shores of Onawero Bay, Wangaroa.—1833, *R. Cunningham.*

Frutex major. *Arbuscula* speciosa, aspectu fere facie *Eugeniæ*. *Rami* ramulique teretes, graciles, cortice purpurascente. *Folia* sparsa, alterna v. verticillato-conferta. *Flores* nondum vidi. *Capsula* grani *Piperis* mole, bivalvis, glabra, elliptica, acuta, minutissime tuberculata, stylo terminata.

615. *P. tenuifolium*, foliis ovatis ovato-oblongisve (1—1½ uncialibus) acutiusculis v. obtusis, adultis utrinque glabris nitidis, marginibus undulatis sæpeque convolutis crassiusculis, floribus solitariis axillaribus brevipedicellatis, pedicellis fructibusque junioribus, capsulis 3—4 valvibus. *Banks and Sol. Mss. DC. Prodr.* i. *p.* 347. *Rœm. et Sch. Syst. Veg.* v. *p.* 432. *Gærtn. Sem.* i. *p.* 286. *t.* 59. *f.* 7.—Trichilia monophylla. *A. Rich. Fl. Nov. Zel. p.* 306. *t.* 34 *bis.*

Mapauriki, indig. *R. Cunn.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Margins of forests on the immediate shores of the Bay of Islands.—1826, *A. Cunningham.* At Wangaroa, on the skirts of salt-water inlets.—1833, *R. Cunningham.*

Arbor gracilis ornata, 20 pedum altitudine. *Rami* virgati, erecti, foliosi, cortice lævi, atro-brunnei. *Folia* alterna, petiolata, (instar *Theæ*) translucentia, venulosa. *Flores* axillares, plerumque solitarii. *Pedicellus* petiolum æquans. *Calyx* laciniis ovato-lanceolatis ciliatis, corolla plus duplo brevioribus. *Petala* atropurpurea, oblonga, apice reflexa, decidua. *Ovarium* 3- v. 4-lobatum subpyriforme, densissime villosum, stylo terminatum. *Stigma* depresso-capitatum, minute papillosum.

Judging from the figure and description given by M. A. Richard of a plant which was gathered in fruit on the coast of New Zealand by Capt. D. D'Urville in 1827, and which he has referred to the genus *Trichilia* as above cited, it does appear evident that it is none other than this species of *Pittosporum*, which is everywhere abundant on the coasts of the Northern Island, and where it was originally discovered by the naturalists who accompanied our great circumnavigator in his first voyage! M. Endlicher designs in a forthcoming dissertation on the Order *Meliaceæ*, to refer *T. monophylla* of Richard, to a genus which he has proposed to name *Schoutensia*.

616. *P. cornifolium*, foliis (1—3 uncialibus) oppositis ellipticis obtusis v. ovato-lanceolatis acutis glabris summis verticillatis, pedunculis terminalibus aggregatis villosis unifloris, capsulis 2-valvibus acuminatis extus villosis, ramulis quandoque pilis cinereis conspersis. *A. Cunn. in Bot. Mag. t.* 3161.—Pittosporoides verticillata. *Banks and Sol. Mss. in Bibl. Banks.*—*β.* foliis angusto-oblongis acutis verticillatis sparsisve.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* A shrub growing as an Epiphyte on trees, especially on the lofty trunks of the Kaikatea, (*Dacrydium excelsum*, Don.) in humid woods on the banks of the Kana-Kana, and other rivers, Bay of Islands, &c.—1826, *A. Cunningham.*

Frutex virgatus, glaber *ramis* dichotomis, summis subverticillatis, omnino supra arborum excelsiorum truncos vivos, inter *Astelias* epiphyticus. *Folia*

varia. *Pedunculi* graciles, 1-flori, 2—6 ad apices ramulorum aggregati uncinales, pilis minutis patulis instructi. *Calyx* 5-phyllus, foliolis subulato-lanceolatis patentibus ciliatis. *Corolla* 5-petala, petalis lineari-lanceolatis acutis apice reflexis, deciduis. *Stam.* hypogyna. *Filamenta* tubi petalorum stylique longitudine. *Ovarium* ovato-lanceolatum dense villosum. *Stigma* sphærico-capitatum.

617. *P. reflexum* (*R. C. Mss.*) fruticosum, ramosum, ramulis villosiusculis (pilis cinereis) sæpe verticillatis, foliis linearibus confertis glaberrimis apiculo sphacelato, super concavis, modice divaricatis arcuato-reflexisve, junioribus parce ciliatis, capsulis solitariis terminalibus acuminatis bivalvibus cinereo-pilosis.

New Zealand (Northern Island). Thickets on the slopes of hills at Wangaroa, &c.—1833, *R. Cunningham.*

Flores nondum vidi. *R. C.*

618. *P. pimeleoides* (*R. C. Mss.*) fruticosum ramulis verticillatis, foliis modice patentibus angusto-lanceolatis linearibusve acuminatis, apiculo obtuso, super concaviusculis glabris subter venosis, marginibus juniorum revolutis plus minus ciliatis, capsulis solitariis aggregatisve axillaribus v. terminalibus acuminatis 2-valvibus, pilis patentibus cinereis conspersis.

New Zealand (Northern Island). Dry woods on the shores of the Bay of Islands, Wangaroa, &c.—1833, *R. Cunningham.*

Frutex 2—3 pedalis, duplo major quam in præcedenti, atque folia longiora, latiora, et quamlibet patentia non deflexa, capsulis porro crebre aggregatis.

Nihilominus an species distincta?

619. *P. radicans* (*R. C. Mss.*) caule fruticoso simpliciter ramoso subradicante, ramulis virgatis cinereo-villosis, foliis (uncialiabus) angusto-linearibus concaviusculis acuminatis erecto-patentibus rectis falcatisve, pagina superiore margineque pilis raris instructis, capsulis terminalibus solitariis pilosis. *R. C. Mss.*

New Zealand (Northern Island). Growing about the roots of the *Kauri* (*Dammara australis*) principally in a forest near the head of the Kana-Kana river, Bay of Islands,—1833, *R. Cunningham.*

This very distinct species, like the two preceding, has only been observed bearing fruit, which is described in the note that accompanied the specimen, as being very similar to that of *P. reflexum*, but inserted on a somewhat longer pedicle. The habit and leaves are however somewhat different*.

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* In herbario meo sequentes sunt pulchræ species hujus generis, quæ in Australasia jampridem lectæ erant, hucusque indescriptæ, vel minus cognitæ.

P. rubiginosum; foliis oblongo-lanceolatis lanceolatisve acuminatis venosis sparsis verticillatisve, basi subattenuatis undulato-auriculæformibus, adultis superne glabriusculis, inferne ferrugineo-tomentosis pedunculo terminali multifloro bracteato ramulisque dense rubiginoso-crinitis, floribus umbellatis pedicellatis stigmate obtuso late membranaceo, caule fruticoso gracili.

DROSERACEÆ, *DC.*

Drosera, *L.*

620. *D. propinqua* (*R. C. Mss.*) foliis radicalibus oblongo-spathulatis

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Hab. In ora æquinoctiali Novæ Cambriæ Australis: ad latus Montis Cook, prope fluvium Endeavour dictum.—1820, *A. Cunningham.*

P. linifolium; foliis elliptico-oblongis obtusis acuminatisve petiolatis subrevolutis læviter undulatis adultis super glabris nitidis, subter parce tomentosis reticulato-venosis floribus paniculato-umbellatis, pedunculis fusco-tomentosis, stigmate obtuso depresso lobato ovarioque dense piloso, capsulis bivalvibus, caule arboreo gracili.

Hab. In ora orientali inter tropicam: ad fluvium Endeavour dict., in locis saxosis humidis necnon ad ripas fluvii a littore remotis—1819, *A. Cunningham.*

Obs. Differs from *P. undulatum*, Andr., that species having ovate-lanceolate attenuated leaves, which are smooth on both sides and altogether larger aggregate peduncled flowers.

P. phillyræoides, foliis (1—1½ uncialibus) oblongis ovato-lanceolatisve mucronatis coriaceis planis utrinque glabris subtus discoloribus obscure venulosis, pedicellis lateralibus unifloris solitariis geminisve petiolo duplo longioribus. *DC. Prodr.* i. *p.* 347.—P. oleifolium, *A. Cunn. Mss.* (1822).

Hab. In ora occidentali, in arenosis aridis Insulæ Dirk Hartog, 1802, *Lechenault.*—1822, *A. Cunningham.*

Frutex robustus, erectus, ramosus, sexpedalis, habitu fere facie *Oleæ. Flores* —. *Capsula* aurantia, elliptica, compressa, bivalvis, extus glabra, rugulosa.

P. bicolor; foliis lanceolatis coriaceis nervosis obtusiusculis acuminatisve marginibus refractis, breviter petiolatis super glabris convexiusculis, subter tomentosis, pedunculis unifloris, petalis 4—5ies longioribus terminalibus axillaribusve, ramulis tomentosis. *Hook. Journ. Bot.* i. *p.* 249.—P. ledifolia. *A. Cunn. Ms.* (1819).

Hab. In insula Van Diemen, in sylvis umbrosis valde humidis, inter *Dacrydia* (*Heronensia*, Nobis) ad sinum *Macquarie Harbor* dictum, ubi in mense Januario floret.—1819, *A. Cunningham.*—1831, *Ron. Gunn, R. Gul. Lawrance.*

Frutex gracilis, concinnus, 5—6 pedum altitudine, ramis valde virgatis ferrugineo-tomentosis foliatis. *Folia* sparsa v. verticillato-conferta subtus cinereo- vel fulvo-tomentosa, pilis adpressis. *Pedunculus* ferrugineo-pilosus. *Calyx* 5-phyllus patens, villosus, coloratus. *Petala* 5 purpurea, oblonga, apice reflexa, sepalis plus duplo longiora. *Stamina* 5, tubo corollæ longiora. *Antheræ* oblongæ, obtusæ, adnatæ, anticæ, biloculares. *Stylus* longitudine staminum. *Stigma* lobatum. *Ovarium* densissime pilosum.

P. acacioides (*A. C. Mss.* 1817) foliis (3—4 uncialibus) angusto-lanceolatis basi valde attenuatis petiolatis mucronatis planis aveniis utrinque glabris concoloribus, pedunculis axillaribus solitariis geminisve petiolo duplo brevioribus, ramulis glaberrimis.—P. angustifolia, *Lodd. Bot. Cat. t.* 1859. (1832).

Hab. In ora meridionali.—1802, *R. Brown*, necnon in interiore, in desertis prope flumen Lachlan.—1817, *A. Cunningham.*

Arbuscula Deserti; 6—20 pedalis, admodum ornata, maxime gracilis, et omnino glaberrima. *Rami* attenuati debiles, plus minus dependentes. *Folia* alterna, sparsa, versus basin sensim in petiolum vix pollicarem desinentia. *Flores* pedunculati, 1—2 axillares, flavi, *Sepalis calycis* membranaceis, ovalibus, obtusis, tenuissime ciliatis, tubo petalorum ter brevioribus. *Petala*

scapo (3—4 unciali) tereti 3—4-floro multoties brevioribus, calyce glaberrima.

New Zealand (Northern Island). In boggy grounds, in the vicinity of the Keri-Keri river, Bay of Islands.—1833, *R. Cunningham.*

Obs. D. spathulatæ, Labill. maxime affinis, quæ tamen differt, scapo compresso, sex- ad duodecim-floro, atque calyce glanduloso.

621. *D. intermedia* (*R. C. Ms.*), foliis longe petiolatis profunde bipartitis, lobis linearibus, petiolo compresso, duplo brevioribus, scapo compressiusculo (sesquipedali) foliis triplo longiore 12—20-floro, floribus racemosis filiformi-pedicellatis.

New Zealand (Northern Island). In bogs in the country interjacent to the Keri-Keri and Waimaté rivers, Bay of Islands.—1833, *R. Cunningham.*

Obs. Inter *D. binatam* et *pedatam*, proxima priori, quæ petiolo semitereti, foliis duplo ad quadruplum longiore, scapoque tereti vix spithamæo, racemoque 3—6-floro, facile distinguenda, atque in *D. pedata*, foliis pedatim dichotomis petiolis paulo brevioribus, scapo (pedali) foliis vix duplo longiore, et floribus omnino majoribus, corymbosis, distincta videtur.

VIOLARIEÆ, *DC.*

Erpetion, *DC. in Herb. Lamb.*

Calycis sepalis inæqualia, omnia plus minus deorsum in appendices auriculiformes producta. *Petala* inæqualia æstivatione convolutiva, inferius basi concavum in calcar non productum. *Stamina* 5 approximata, nec coalita, ad apicem dentium tori pentagoni inserta. *Filamenta* basi dilatata oblonga, antheras demissius gerentia, lobis antherarum distinctis basi subdivergentes. *Stamina* 2 anteriora dorso appendices subulatas nectariferas in calcar intrantes gerentia. *Ovarium* superum. *Stigma* inconspicuum. *Capsula* trigona, 3-valvis, polysperma. *Semina* horizontalia, manifeste carunculata, ovoidea et nitida.

622. *E. spathulatum*, stoloniferum foliis longe petiolatis obovato-rotun-

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apice reflexa, obtusa. *Stamina* e fauce parum exserta, stylum æquantia. *Stigma* capitatum glanduloso-tuberculatum. *Ovarium* pilis cinereis laxis tenuiter instructum. *Capsula* aurantia, lato-elliptica, compressa, bivalvis, glabra, extus corrugata.

P. ligustrifolium; foliis (1—2 uncialibus) angusto-lanceolatis subspathulatisve basi attenuatis petiolatis mucronatis concavis aveniis adultis utrinque glabris, subtus pallidioribus, pedunculis 1-floris axillaribus terminalibusve petiolos æquantibus, ramulis incano-tomentosis.

Hab. In littoribus aridis Insulæ Rottnest, adversum ostium amnis Swan, oræ occidentalis.—1822, *A. Cunningham.*

Arbuscula altitudine 20 pedum, ramis gracilibus divaricatis, ramulis flexuoso-patentibus propensis foliatis canescentibus. *Folia* sparsa confertaque, lanceolata, parum attenuata, glabra, mucrone uncinato, juniora super pilis cinereis raris instructa, *Flores* non nobis cogniti. *Capsula* sordido-flava, obelliptica, compressa, bivalvis, stylo brevi terminata. *Stigma* capitatum, lobatum, lævigatum.

datis dentato-repandis glabris, petiolis asperis, pedunculis filiformibus, floribus nutantibus, calcare brevissimo. *G. Don, Syst. Gard.* i. *p.* 334.—Viola Sieberiana, *Spreng. Syst. Veg. App. p.* 68.

New Zealand (Northern Island). Among fern, near the Mission House on the Keri-Keri river, Bay of Islands.—1833, *R. Cunningham.*

[To be continued.]

BIBLIOGRAPHICAL NOTICES.

Principles of General and Comparative Physiology, intended as an introduction to the study of Human Physiology, and as a Guide to the Philosophical Pursuit of Natural History. By William B. Carpenter, M.R.C.S., late President of the Royal Medical and Royal Physical Societies of Edinburgh, &c. &c. With 240 Figures on Copper and Wood. London, 1839.

Few errors in the mode of pursuing science are more common than to commence the study of some particular branch without that preliminary knowledge which is most likely to render it interesting and profitable. This is especially the case in the sciences of natural history and physiology. How frequently we observe young persons zealously devoting themselves to some department of botany,—the collection of the Phanerogamia of Great Britain for example,—without thinking it worth while to make themselves acquainted with aught beyond their simple external characters, and thus losing the pleasure which the contemplation of the structure of these plants, and of the analogies of their organs with those of the Cryptogamia on the one hand and of animals on the other, cannot fail to afford to those who properly seek for it, besides foregoing many opportunities of contributing something to the common stock of knowledge! Scarcely less common is it to meet with those who imagine themselves to be diligent zoologists, when their endeavours are solely directed to the acquisition of the most complete collection of shells, of whose inhabitants they know nothing, or of the most perfect series of butterflies or beetles, whose wonderful transformations and beautiful internal structure are regarded by them with indifference. The *mere* collector has little idea how much enjoyment he loses by not carrying his inquiries further, that is to say, if he have a soul capable of such enjoyment, and not entirely engrossed with the *amor habendi.* Even among those who possess a truly scientific knowledge of individual branches of natural history it is but too common to discover but a superficial acquaintance with others, such

as is calculated rather to mislead than to guide them in their researches. And among physiologists it is but recently that the great truth has been generally recognised, that the study of the structure and functions of the inferior classes of organized beings is capable of affording the most important assistance in the solution of the many difficulties which attend the investigation of the phænomena of life in man.

The object of the volume before us is to supply the means of attaining such knowledge within moderate limits; and, by presenting a comprehensive survey of the whole organized creation, to afford the best preparation for the successful pursuit of any line of inquiry that may suit the taste and opportunities of the student of nature. The author has not contented himself with a superficial view, however, as from its brevity it might be supposed to be, but has endeavoured to introduce his readers to the highest departments of physiology and natural history, by a simple exposition of such general laws as have been discovered to preside over their varied phænomena, and, by a judicious selection of facts, to make the application of these laws and the path to be followed in search of others fully intelligible. Among the leading features of the work are the rank given to vegetable physiology, and the original manner in which this subject is treated. We are not acquainted with any treatise on this department of science in which the Cryptogamia receive a due share of attention. By British writers they have been especially neglected, the structure and functions of the flowering plants alone being treated of in any detail. In this work, however, we find not only a general survey of the whole vegetable kingdom, in which its principal natural groups are all delineated on the same scale, but a detailed view of each system of organs, which is traced from its first appearance in the lower members of the series up to its perfect evolution in the highest. We are thus led to perceive the gradual *specialization* of each function by the restriction of it to some portion of the organism particularly adapted to perform it, and this is shown to take place also during the evolution of the embryo of any one of the highest tribes of vegetables. We believe then that Mr. Carpenter may fairly claim the credit of having applied to the vegetable kingdom the general law based by Von Baer upon his examination of the animal world, that, both in the ascending scale of creation and in the development of any single being, "a heterogeneous or special structure arises out of one more homogeneous or general, and this by a gradual change." We shall illustrate this position by giving an abridgement of the section which treats of the absorbent system in plants, and this will afford us an opportunity of explaining another

law, propounded by our author himself, which may be regarded as a sort of corollary to the former.

In the lowest cellular plants every part of the surface appears equally concerned in the function of absorption. This is most evident in those simple protophytes usually classed among the *Algæ*, which consist of an aggregation of insulated vesicles, each of which may almost be regarded as a distinct individual. Thus the surface of one of the cells of the *Protococcus nivalis* may be regarded as *all root*. In the higher genera of this group the separate vesicles no longer maintain their individuality, but form part of one definite structure. Still the whole surface appears to be endowed with the power of absorption in nearly an equal degree; and though the semblance of a stem and roots occasionally presents itself, these appear to have no other function than to give attachment to the frondose expansion. There is no transmission of fluid from one part to another, each cell deriving from the surrounding medium, or from the surcharged cells in its immediate neighbourhood, the fluid essential to its existence. It is in the Lichens that we find the first specialization of the absorbent function, by the restriction of it to the side least exposed to the sun and air, whilst the reproductive function, which in the *Algæ* was common to nearly the whole frond, is here confined to the other surface. In some lichens we find radical filaments developed from the absorbent surface, the first indication of special organs for the purpose. In the Fungi the separation between the nutrient and reproductive organs is generally still more complete, and in the highest groups of this order a stem with very definite roots is developed. These are yet more complete in the mosses, but still nutrition may be performed by the general surface independently of them. And even where these filamentous processes of the Cryptogamia bear the greatest resemblance to roots, there is reason to believe that they absorb by their whole surface, and not by their points alone. In the vascular plants we find the function of absorption attaining its highest degree of specialization, being as it were concentrated in the growing points of the roots, which are known as the *spongioles*, and the function is more actively performed by them in proportion to the small amount of surface they expose.

Still, however, it is found that the general surface, even of a vascular plant, is concerned in this function, and that in many instances it is even capable of entirely performing it when the roots are from any cause unable to act. This is a very beautiful example of the second law to which we have alluded, and which we shall state in the author's words. "In cases where the different functions

are highly specialized, the general structure retains, more or less, the primitive community of function which originally characterized it." We have seen that in the simplest or most homogeneous beings the entire surface participates equally in the function of absorption, and we now perceive that even in the highest and most heterogeneous, where the number of distinct organs is greatest and their respective functions most completely restricted to them, some traces of this primitive community remain. We shall conclude our illustration by quoting the account given by Mr. Carpenter of the development of the same system in the embryo of a vascular plant, in which he ingeniously shows its conformity to the same laws. "In tracing the gradual evolution of the special absorbent system of the more perfect plants, we may observe many interesting relations between the progressive stages of its development and the permanent forms of the system in the lower orders. Thus the embryo at its first appearance within the ovule is nothing but a single cell, like that of the *Protococcus*, in the midst of the store of semi-fluid nutriment prepared by its parent, which it gradually absorbs by its whole surface, just as do the simplest cellular plants. At the time of the ripening of the seed we mark the rudiment of the future root, which is developed during germination; but in the early stages of this process the radicle simply prolongs itself into the ground, and appears to be equally capable of imbibing moisture through its whole length, like that of the fungi or mosses. It is not until the true leaves are evolved that the root begins to extend itself by ramification, then first protruding perfect fibrils composed of woody fibre and vessels and terminated by spongioles."

We need scarcely point out the additional interest which is given to the *facts* of science when they thus become subservient to the establishment of those generalizations in which true science consists. Again, to quote our author's language, "At every successive step we are led to comprehend new relations between facts that previously seemed confused and insulated; new objects for what at first seemed destitute of utility; and in the same proportion will the contemplative spirit be led to appreciate the vastness of that Designing Mind, which, in originally ordaining the laws of the animated world, could produce such harmony and adaptation amongst their innumerable results."

Having thus endeavoured to communicate to our readers an idea of the objects and spirit of this treatise, we shall briefly indicate its contents. It is divided into two books, the first of which is devoted to general physiology, the second to special physiology. These,

however, are preceded by an introduction of considerable length, designed to present to those who stand in need of such preliminary information a general view of the organized creation. The characteristics of organized structures are first pointed out, and the elementary tissues of plants and animals described. Here will be found various novel and interesting analogies, especially in regard to the variations which the type of the *spiral vessel* presents. An outline view is then given of the characters of each of the principal groups of the vegetable and animal kingdoms, in which the links of transition and their respective analogies are specially pointed out.

Under the head of General Physiology are discussed the nature and causes of vital actions; the dependence of life upon external stimuli; heat, light, electricity, &c.; and the laws of organic development. These are succeeded by a connected view of the functions performed by organized beings, in which their mutual relations are shown, and the distinctions between plants and animals definitely pointed out.

In the second book, comprising Special Physiology, each function is considered in detail. The evolution of its particular organ in the ascending scale of being is described, first as regards the vegetable kingdom (in the manner we have already instanced), and then the animal kingdom, and its correspondence with the development of the same organs in the embryo of higher beings is displayed. Under this head are introduced explanations of various interesting malformations or *monstrosities* which result from arrest of development; these are most frequently presented in the circulating system of animals.

The advantage which the physiologist derives from bringing into comparison the facts derived from an extensive variety of sources is perhaps nowhere more evident than in regard to the reproductive system of vegetables. It has been so much the habit of botanists to *separate* instead of *approximating*, that analogies are often obscured by the multiplication of terms; so that the inexperienced cryptogamist is bewildered by the different appellations which the same organs receive in distinct groups and by the want of any indication of their similarity beyond what he may discover by his own inquiries. Mr. Carpenter appears to us to have extremely simplified this difficult subject by showing the fundamental correspondence between the reproductive organs in all the tribes of Cryptogamia, and he has brought forward strong evidence to show that this may be traced even into the Phanerogamia, which differ from the others only in the addition of new organs, and not in the alteration of the character of the original ones. Without pronouncing a decided opinion upon this

question, we may recommend his views to the attentive consideration of our botanical readers. We understand that they have been presented in more detail to the Botanical Society of Edinburgh, and that they have been mentioned with high approbation by Professor Graham in his late retrospective address. On some points they correspond in a remarkable manner with the researches of M. Schleiden, which were not published at the time when the author first made known the general result of his inquiries*.

After what we have said of the character of this work it is almost needless to add our strong recommendation of it to our readers as one which can scarcely fail to be of service to them, in whatever department of natural history they may be engaged. Although specially designed for the medical student the author has taken much pains to adapt it to the general reader, and we trust that he may meet with his reward in the advancement of that philosophical spirit of inquiry which it is his aim to promote.

Memoirs of the Wernerian Natural History Society for the Years 1837–38. Part I. Vol. VIII. 8vo. 1839.

The Memoirs of this Society have hitherto been published in 8vo volumes at very distant intervals, thereby losing much of their interest on account of the long period which elapsed between the reading and publication of the papers, and often forcing gentlemen who had important information to communicate to lay it before some other Association which was more regular in the issue of their Transactions; we are happy therefore to see the present Part, and trust that at the end of each session at least, the more valuable communications which have been read at its meetings may be published and illustrated. We may remark that the price, 6*s*., is rather beyond that of the periodicals of the time, while the workmanship is not superior. The papers contained in this part are,

I. "Observations on the Distinctions, History, and Hunting of Seals in the Shetland Islands." By Lawrence Edmonstone, M.D. Dr. Edmonstone is of opinion that two species only frequent and are permanent natives of the Shetland isles, which he places under the names of *Phoca vitulina* and *barbata*; the supposed existence of any other large seal being perhaps attributable to the great difference in form between the males and females of his *P. barbata* or Half-fish. A

* See 'British and Foreign Medical Review,' vol. iv. p. 561. Translations of Dr. Schleiden's papers have appeared in the 'Lond. and Edin. Phil. Mag.', vol. xii., and 'Taylor's Scientific Memoirs', Part VI.

specimen of *Phoca Grænlandica* was killed in 1830, but is supposed to have fallen overboard from one of the returning Greenland ships. Of *P. annellata* and *leporina* he states, "I am much inclined to suspect that further observations will prove them to be merely varieties of the *vitulina*." A specimen of the Walrus was killed near the island of Fetlar in the summer of 1815, and another was seen in 1828 for a few days in Balta Sound. In this paper a great deal will be found to interest relative to the manners and habits of the Shetland seals, and Dr. Edmonstone would be conferring a favour on zoologists if he could send the skins and skeletons of the most marked varieties either to Edinburgh or London, where they could be compared with other species, and any disputed points finally settled.

II. "On the last changes in the Relative Levels of the Land and Sea in the British Islands." By James Smith, Esq., of Jordan Hill. A paper of much local interest, and illustrated by two plates of new recent shells from the firth of Clyde.

III. "On the *Asteriadæ* of the Irish Sea." By Edward Forbes, Esq.

IV. "Meteorological Journal for the year 1838, kept at the Manse of the parish of Abbey of St. Bathons, Berwickshire." By the Rev. John Wollow.

V. "On the Geognosy of the Isle of Eigg." By R. J. Hay Cunningham, Esq.

Scandinaviens Fiskar, målade of W. v. Wright, med text of B. Fries och C. U. Eckström. 4 et 5 Häftet. Stockholm.

The fourth part of this excellent work contains splendid drawings of *Gadus Æglefinus, Pollachius ; Raniceps niger* (with text), *Callionymus Lyra* ♂ and ♀, *C. maculatus*, besides descriptions of *Cyprinus Grislagine, rutilus, erythrophthalmus, Gadus minutus* and *merlangus*. The fifth part contains drawings of *Centronotus gunellus, Clinus maculatus*, Fries ; *Cyprinus Ballerus, Pleuronectes Limandoides, Myxine glutinosa, Scomber scombrus*, and *Squalus cornubicus*. From the accuracy of the drawings, and the completeness of the descriptions, this work will always remain the most important source for the determination of those species established by Linnæus and the Swedish naturalists.

Verzeichniss der Conchylien in der Sammlung von E. Anton. Halle. This Catalogue contains 3410 species, of which 348 are new, and are here described.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

January 22, 1839.—The Rev. F. W. Hope in the chair.

At the request of the chairman, Mr. Garnett exhibited a living Jerboa (apparently the *Dipus Ægyptiacus*), which had been sent to him from the Cape of Good Hope, but Mr. Garnett stated that he was not aware whether it had been captured in that part of Africa.

Professor Owen concluded his paper entitled, "Outlines of a Classification of the Marsupialia." "The rich stores of the Menagerie and Museum of the Zoological Society," observes Mr. Owen, "having afforded me frequent opportunities of examining the anatomy of various and rare species of the Marsupial order; the endeavour to express in general propositions the more important facts relative to their organization; to state in which particulars so many agreed or differed; has naturally compelled me to acquire certain ideas respecting their Zoological distribution."

In the first part of the paper, Professor Owen defines the general characters of the *Marsupialia*; he then proceeds to consider their mutual affinities; and, as closely connected with this subject, commences with some observations on their size, their geographical distribution, and their habits.

The carnivorous Marsupial animals belonging to the genera *Thylacinus* and *Dasyurus* are compared to the *Carnivora* in the placental series; and the Bandicoots (*Perameles*), and Myrmecobians are represented as typifying, or playing corresponding parts with those allotted to the placental *Insectivora*. Those Marsupials which have an omnivorous diet, live in trees, are provided with a prehensile tail, and have a thumb on the hinder extremities, are said to typify the *Quadrumana*, and the tailless Koala is compared to the arboreal Sun-Bears of the Indian Archipelago.

"Another genus of *Marsupialia*, the Wombat," says Mr. Owen, "presents the dentition which characterizes the placental *Rodentia*; and the Petaurists, like the Flying Squirrels, have a parachute formed by broad duplications of the skin extending laterally between the fore and hind legs.

"The Kangaroos are the true herbivorous *Marsupialia*, and many interesting physiological conditions present themselves to the mind in contemplating the singular construction and proportions of these animals. It would appear that the peculiarities of their gestation rendered indispensably necessary the possession of a certain prehen-

sile faculty of the anterior extremities, with a free movement of the digits and a rotatory power of the fore-arm, in relation to the manipulations of the pouch and of the embryo developed therein. At the same time a herbivorous quadruped must possess great powers of locomotion in order to pass from pasture to pasture and to avoid its enemies by flight. These powers, as is well known, are secured to the herbivorous species of the placental *Mammalia*, by an ungulate structure of four pretty equally developed members. Such a structure, however, would have been incompatible with the procreative œconomy of the Kangaroo. It is therefore organized for rapid locomotion by an excessive development of the hinder extremities; and these alone serve as the instruments of flight, which is performed by a succession of extensive bounds. The tail also is of great power and length, and in the stationary position, the body is supported erect on the tripod formed by the tail and hind legs; while in easy progression the tail serves as a crutch upon which and the fore feet the body is sustained while the hind legs are swung forwards.

"As the Australasian continent, the great metropolis of the Marsupial quadrupeds, still remains but very partially explored; and as new species and even genera of Marsupials continue at each expedition to reward the researches of the scientific traveller; and as moreover the recovery of two lost but distinct genera from the ruins of a former world makes it reasonable to suppose that other types of Marsupials remain still hidden in the crust of the earth; it can hardly be expected that the zoologist should be able to arrange in a natural series, with easy transitions according to the order of their affinities, the few and diversified forms of this implacental subclass which are at present known. The greatest number of correspondencies, as it appears to me, will be expressed by taking the modifications of the digestive system as the guide to the formation of the primary groups of the *Marsupialia*.

"The continent, however, in which the Marsupials 'most do congregate' is characterized by the paucity of organized matter upon its surface, and few of them, consequently, are nourished by a very well-defined diet. No large carnivorous quadruped could in fact have existed in the wilds of Australia prior to the introduction of civilized man and his attendant herds: and we find, in fact, that the native genera which are the most decidedly carnivorous, do not include species larger than the dog: we can only reckon among these strictly carnivorous species the Thylacines and the Dasyures; and, on the other hand, not more than two or three Marsupial

genera feed exclusively on vegetable substances. The rest of them derive a promiscuous nutriment from dead or decayed animal and vegetable matter, crustacea, and the refuse of the sea-shore, insects in their perfect and larva states, live birds, young and succulent sprouts, leaves, fruits, &c. The terms, therefore, which will be given to the different primary subdivisions in the present classification of the *Marsupialia* must not be understood to indicate strictly or exclusively the nature of the food of the species severally included in these groups, but rather their general tendency to select for their support the substances implied by those designations."

Tribe I. *SARCOPHAGA.*

The genera in this tribe are the most decidedly carnivorous of all the *Marsupialia*, and are characterized by an important anatomical condition, viz. the absence of an *intestinum cæcum*.

Genus 1. *Thylacinus.*

Incisors $\frac{4-4}{3-3}$; canines $\frac{1-1}{1-1}$; præmolares $\frac{3-3}{3-3}$; molares $\frac{4-4}{4-4}$: = 46.

The incisors are of equal length, and regularly arranged in the segment of a circle with an interspace in the middle of the series of both jaws. The external incisor on each side is the strongest.

The laniary or canine teeth are long, strong, curved, and pointed, like those of the dog tribe.

The spurious molares are of a simple, blunt, conical form, each with two roots; the last with a small additional posterior cusp. The true molares in the upper jaw are unequally triangular with three tubercles. Those in the lower jaw are compressed, tricuspidate, the middle cusp being the longest, especially in the two last molares, which resemble closely the sectorial teeth (*dens carnassiers*) of the Dog and Cat. The fore feet are 5-digitate, the hind feet 4-digitate.

On the fore foot the middle digit is the longest, the internal one or *pollex* the shortest, but the difference is slight. On the hind foot the two middle toes are of nearly equal length and longer than the two lateral toes, which are equal. All the toes are armed with strong, blunt, and almost straight claws. The only known species of this genus, the Thylacine (*Thylacinus Harrisii, Didelphys Cynocephalus*, Harris), is a native of Van Diemen's Land, and is called by the colonists the 'Hyæna.'

Genus *Dasyurus.*

Incisors $\frac{4-4}{3-3}$; canines $\frac{1-1}{1-1}$; præmolares $\frac{2-2}{2-2}$; molares $\frac{4-4}{4\ 4}$: = 42.

The eight incisors of the upper jaw are of the same length and

simple structure, and are arranged in a regular semicircle without any middle interval. The six incisors of the lower jaw are similarly arranged but have thicker crowns than the upper ones; the canines present the same or even a greater relative development than in the Thylacine. In an extinct species of *Dasyurus* they present the same form and relative properties as in the Leopard. The spurious molares have two fangs and a pointed compressed triangular crown with a rudimental tubercle at the anterior and posterior part of its base. The grinding surface of the true molares in the upper jaw is triangular; the first presents four sharp cusps, the second and third each five, the fourth, which is the smallest, only three. In the lower jaw the last molar is nearly of equal size with the penultimate one, and is bristled with four cusps, the external one being the longest; the second and third molares have five cusps, three on the inner and two on the outer side; the first molar has four cusps: these are all sharply pointed in the young animal, in which the tubercle of the posterior molar of the lower jaw is divided into two small cusps.

The carnivorous character of the previous dentition is most strongly marked in the Ursine Dasyure, or Devil of the Tasmanian colonists, the largest existing species of the genus, and a most pestilent animal in the poultry yard or larder.

Genus *Phascogale.*

Incisors $\frac{4-4}{3-3}$; canines $\frac{1-1}{1-1}$; præmolares $\frac{3-3}{3-3}$; molares $\frac{4-4}{4-4}$: = 46.

In the present dental formula may be discerned a step in the transition from the Dasyures to the Opossums, not only in the increased number of spurious molares, but also in shape and proportions of the incisors. In the upper jaw the two middle incisors are longer than the rest, and separated from them by a brief interval; they are more curved and project more forward. The three lateral incisors diminish in size to the outermost. The middle incisors of the lower jaw also exceed the lateral ones in size, and project beyond them but not in the same degree, nor are they separated from them by an interval as in the upper jaw. The canines are relatively smaller than in the Dasyures. The spurious molares present a similar form, but the third is much smaller and simpler than the two preceding ones. The true molares resemble in their structure those of the Dasyures. The general character of the dentition of these small Marsupials approximates to the insectivorous type in the Shrew, Hedgehog, &c., among the placental

Mammalia; and corresponds with the food and habits of the species which thus lead from the Zoophagous to the Entomophagous tribe.

Other links which once bound these tribes more closely together are now lost, and are indicated only by the few fossil remains which have rendered the Stonesfield oolite so celebrated. One of these extinct genera, which I have called *Phascolotherium*, presents the same numerical formula, apparently, as in the *Thylacinus* and *Phascogale*; but, if another incisor existed in each ramus of the lower jaw, as seems to be indicated by the fossil, then the dentition will agree with that of the genus *Didelphis*.

Incisors $\frac{?-?}{3-3}$; canines $\frac{?-?}{1-1}$; præmolares $\frac{?-?}{3-3}$; molares $\frac{?-?}{4-4}$.

or

$\frac{4-4}{}$

The incisors and canines are separated by vacant interspaces, and occupy a large proportion of the dental series: the true molares resemble those of *Thylacinus*.

Tribe II. *ENTOMOPHAGA.*

This is the most extensive and varied of the primary groups of the Marsupial order. In the system of Cuvier, the species of this tribe are united with those of the preceding to form a single group characterized by the presence of long canines and small incisors in both jaws; but in most of the Entomophagous genera of the present classification, the canines present a marked inferiority of development, and the species are consequently unable to cope with animals of their own size and grade of organization, but prey upon the smaller and weaker classes of invertebrate animals. Their intestinal canal is complicated by a moderately long and large cæcum; and, while in the *Sarcophaga*, the feet are organized, as in the ordinary placental *Digitigrades*, they present in the present tribe a variety of well-marked modifications, according to which the species may be arranged into ambulatory, saltatory, and scansorial groups.

Ambulatoria.

The only known existing representative of this family is the animal described by Mr. Waterhouse, which constitutes the type of his genus *Myrmecobius*, of which the following is the remarkable dental formula:

Incisors $\frac{4-4}{3-3}$; canines $\frac{1-1}{1-1}$; præmolares $\frac{3-3}{3-3}$; molares $\frac{5-5}{6-6}$: = 52.

From which it will be seen, that the number of molares, sixteen in the upper and eighteen in the lower jaw, exceeds that of any other known existing Marsupial, and approaches that which characterizes some of the insectivorous armadilloes. The resemblance to

Dasypus is further carried out in the small size of the molares, their separation from each other by slight interspaces, and their implantation in sockets which are not formed by a well-developed alveolar ridge. The molares, however, present a distinct tuberculate structure; and both the true and false ones possess two separate fangs as in their Marsupial congeners: they are, however, the least produced of any Marsupials; only the triturating tubercles appearing above the gum.

The false molares present the usual compressed triangular form, with the apex slightly recurved, and the base more or less obscurely notched before and behind. The canines are very little longer than the false molares; the incisors are minute, slightly compressed and pointed; they are separated from each other and the canines by wide intervals.

The Myrmecobians are insectivorous, and shelter themselves in the hollows of trees, frequenting most, it is said, those situations where the Port Jackson Willow abounds. In the structure and proportions of the hinder feet, *Myrmecobius* resembles the Dasyurine family; and in the slightly developed canines, the smooth external surface of the skull, the breadth between the zygomata, and the absence of the interparietal ridges, as well as in the general external form and bushy tail, it offers an especial approximation to the genus *Phascogale*.

Intermediate however to *Myrmecobius* and *Phascogale* would seem to be the station held by the interesting extinct genera above alluded to. In *Phascolotherium* the affinity is manifested in the simple form, small size, and straggling disposition of the incisors and canines: in the other genus, *Thylacotherium*, it is displayed in the size and number of its molares.

This, one of the most ancient mammiferous genera hitherto discovered, presents eleven molares on each side of the lower jaw, which resemble in structure and close arrangement those of *Phascogale* and *Didelphis*, while they are intermediate in their proportional size to these and *Myrmecobius*. The exact condition of the incisors and canines of the *Thylacotherium* has not yet been displayed in the fossil jaws which have been discovered.

SALTATORIA.

Genus *Perameles* (Bandicoots).

Incisors $\frac{5-5}{3-3}$; canines $\frac{1-1}{1-1}$; præmolares $\frac{3-3}{3-3}$; molares $\frac{4-4}{4-4}$: = 48.

This dental formula characterizes a number of Rat-like *Insectivora* commonly known in Australia by the name of Bandicoots; the hind

legs are longer and stronger than the fore, and exhibit in a well-marked manner the feeble and slender condition of the second and third digits counting from the inside, and the sudden increase in length and strength of the third and fourth digits, which are chiefly subservient to locomotion: the mode of progression in the Bandicoots is by bounds; the hind and fore feet being moved alternately as in the Hare and Rabbit; and the crupper raised higher than the fore quarter. The teeth which offer the greatest range of variation in the present genus are the external or posterior incisors and the canines: the molares, also, which originally are quinque-cuspidate, have their points worn away, and present a smooth and oblique grinding surface in some species sooner than in others.

The Bandicoots which approach nearest to the *Myrmecobius* in the condition of the incisive and canine teeth are the *Perameles obesula* and *P. radiata*. There is a slight interval between the first and second incisor, and the outer or fifth incisor of the upper jaw is separated from the rest by an interspace equal to twice its own breadth, and moreover presents the triangular, pointed, canine-like crown which characterizes all the incisors of *Myrmecobius;* but the four anterior incisors are closely arranged together and have compressed, quadrate, true incisive crowns. From these incisors the canine is very remote, the interspace being equally divided by the fifth pointed incisor, which the canine very slightly exceeds in size. In *Peram. nasuta* the incisor presents the same general condition, but the canines are relatively larger.

The marsupial pouch in the Bandicoots, at least in the full-grown females of *Per. nasuta, Per. obesula,* and *Per. lagotis,* has its orifice directed downwards or towards the cloaca, contrariwise to its ordinary disposition in the Marsupials: this direction evidently relates to the position of the trunk when supported on the short fore and long hind legs. In the stomach and intestines of a *Perameles obesula,* I found only the remains of insects; and in the examination of the alimentary canal of a *Per. nasuta,* Dr. Grant obtained the same results.

Genus *Chœropus.*

The singular animal on which this genus is founded is briefly noticed and figured in Major Mitchell's Australia, (vol. ii. pl. 38. p. 131.) and the individual described is preserved in the Colonial Museum, at Sydney, N. S. Wales, (No. 35. of Mr. George Bennett's Catalogue). It would appear that the two outer toes of the fore-foot, which are always very small in the true Bandicoots, are en-

tirely deficient in the *Chæropus*, unless some rudiments should exist beneath the skin; at all events only two toes are apparent externally, but they are so armed and developed as to be serviceable for burrowing or progression. The inner toe is wanting on the hind foot. Dental formula:

Incisors $\frac{4-4}{3-3}$; canines $\frac{1-1}{1-1}$; præmolares $\frac{3-3}{3-3}$; molares $\frac{4-4}{4-4}$: = 46.

All the teeth are of small size; the canines resemble the spurious molares in size and shape, and these are separated at intervals as in *Myrmecobius*. The marsupium opens downwards in the *Chæropus*, as in the true Bandicoots. The species described has no tail. The genus would seem by its dentition to rank between *Myrmecobius* and *Perameles*. Its digital characters are anomalous and unique among the *Marsupialia*.

SCANSORIA.

Didelphidæ, Opossums.

These Marsupials are now exclusively confined to the American Continents, although the fossil remains of a small species attest the former existence of the genus *Didelphis* in Europe contemporaneously with the Palæothere, Anoplothere, and other extinct Pachyderms whose fossil remains characterize the Eocene strata of the Paris Basin. The dental formula of the genus *Didelphis* is,

Incisors $\frac{5-5}{4-4}$; canines $\frac{1-1}{1-1}$; præmolares $\frac{3-3}{3-3}$; molares $\frac{4-4}{4-4}$: = 50.

The Opossums resemble in their dentition the Bandicoots more than the Dasyures, except in the structure of the molares.

The two middle incisors of the upper jaw are more produced than the others, from which they are separated by a short interspace. The canines are well developed, the upper being always stronger than the lower. The false molares are simply conical; the true ones beset with sharp points, which wear down into tubercles as the animal advances in age.

In the type of the subgenus *Cheironectes*, besides being web-footed, the anterior extremities present an unusual development of the pisiform bone, which supports a fold of the skin, like a sixth digit; it has indeed been described, as such, by M. Temminck; this process has not of course any nail. The dentition of the Yapock resembles that of the ordinary *Didelphis*. All the Opossums have the inner digit of the hind foot converted by its position and development into a thumb, but without a claw. The hinder hand is associated in almost all the species with a scaly prehensile tail.

In some of the smaller Opossums the subabdominal tegumentary folds merely serve to conceal the nipples, and are not developed into

a pouch; the young in these adhere to the mother by entwining their little prehensile tails around hers, and cling to the fur of the back; hence the term *dorsigera* applied to one of these Opossums*.

Tribe III. *CARPOPHAGA.*

Stomach simple; cæcum very long.

In this family, the teeth, especially those at the anterior part of the mouth, present considerable deviations from the previously described formulæ; the chief of which is a predominating size of the two anterior incisors, both in the upper and lower jaw. Hitherto we have seen that the dentition in every genus has participated more or less of a carnivorous character; henceforth it will manifest a tendency to the Rodent type.

The Phalangers, so called from the phalanges of the second and third digits of the hinder extremities being inclosed in a common sheath of integument, have the innermost digit modified, to answer the purposes of a thumb; and the hinder hand being associated in many of the species with a prehensile tail, they evidently, of all *Frugivora*, come nearest the arboreal species of the preceding section. In a system framed on locomotive characters they would rank in the same section with the Opossums. We have seen, however, that they differ from those Entomophagous Marsupials greatly in the condition of the intestinal tube. Let us examine to what extent the dental characters deviate from those of the Opossums.

In the skull of a *Phalangista Cookii*, now before me, there are both in the upper and lower jaw four true molares on each side, each beset with four three-sided pyramidal sharp-pointed cusps; thus these essential and most constant teeth correspond in number with those of the Opossum: but in the upper jaw they differ in the absence of the internal cusp, which gives a triangular figure to the grinding surface of the molares in the Opossum; and the anterior single cusp is wanting in the true molares of the lower jaw.

Anterior to the grinders in the Phalanger, there are two spurious molares, of similar shape and proportions to those in the Opossum; then a third spurious molar, too small to be of any functional im-

* Few facts would be more interesting in the present branch of zoology than the condition of the new-born young, and their degree and mode of uterine development in these Opossums. Since the marsupial bones serve not, as is usually described, to support a pouch, but to aid in the function of the mammary glands and testes, they of course are present in the skeleton of these small pouchless Opossums, as in the more typical Marsupials.

portance, separated also, like the corresponding anterior false molar in the Opossum, by a short interval from those behind.

The canine tooth but slightly exceeds in size the above false molar, and consequently here occurs the first great difference between the Phalangers and Opossums; it is however, only a difference in degree of development; and in the Ursine and other Phalangers, as well as in the Petaurists, the corresponding tooth presents more of the proportions and form of a true canine.

The incisors, which we have seen to be most variable in number in the carnivorous section, are here three instead of five on each side, in the upper jaw, but their size, especially that of the first, compensates for their fewness.

In the lower jaw, there is the same number of true molares and of functional false molares, which form a continuous and tolerably equable series, as in the Opossums, on each side; then two very minute and rudimental teeth on each side represent the small spurious molar, and small canine of the upper jaw; and anterior to these, there is one very small and one very large and procumbent incisor on each side.

The constant teeth in this group are the $\frac{4-4}{4-4}$ true molares, and the $\frac{3-3}{1-1}$ incisors. The canines $\frac{1-1}{1-1}$ are constant in regard to their presence, but variable in size; they are always minute in the lower jaw. With respect to the spurious molares, $\frac{1-1}{1-1}$, they are always in contact with the true grinders, and their crowns reach to the same grinding level; sometimes a second spurious molar is similarly developed as in the *Phal. Cookii*, and as in all the flying Phalangers, or Petaurists, but it is commonly absent or replaced by a very minute tooth, shaped like a canine: so that between the posterior spurious grinder and the incisors we may find three teeth, of which the posterior is the largest, as in *Phal. Cookii*, or the smallest, as in *Phal. cavifrons;* or there may be only two teeth, as in *Phal. ursina* and *Phal. vulpina*, and the species, whatever that may be, which Fr. Cuvier has selected as the type of the dentition of this Genus.

In the lower jaw similar varieties occur in these small and unimportant teeth; *e. g.* there may be between the procumbent incisors and the posterior false molar, either four teeth, as in *Phal. Cookii;* or three, as in *Phal. cavifrons;* or two, as in *Phal. ursina, Phal. maculata, Phal. chrysorrhoos;* or lastly, one, as in *Phal. vulpina*, and *Phal. fuliginosa.*

The most important modification is presented by the little *Phal. gliriformis* of Bell, which has only three true molares on each side of each jaw.

Genus *Petaurus*.

There are many species of Marsupials limited to Australia, and closely resembling or identical with the true Phalangers in their dental characters and the structure of the feet. I allude to the Petaurists or Flying Opossums; these, however, present an external character so easily recognizable, and influencing so materially the locomotive faculties, as to claim for it more consideration than the modifications of the digits or spurious molares, which we have just been considering in the *Phalangista*. A fold of the skin is extended on each side of the body between the fore and hind legs, which, when outstretched, forms a lateral wing or parachute, but which, when the legs are in the position for ordinary support or progression, is drawn close to the side of the animal by the elasticity of the subcutaneous cellular membrane, and then forms a mere tegumentary ridge. These delicate and beautiful Marsupials have been separated generically from the other Marsupials under the name of *Petaurus**: they further differ from the Phalangers in wanting the prehensile character of the tail, which in some species of *Petaurus* has a general clothing of long and soft hairs, whilst in others the hairs are arranged in two lateral series.

Now in the Petaurists there is as little constancy in the exact formula of the dentition as among the Phalangers. The largest species of *Petaurus*, *Pet. Taguanoides*, *e. g.*, is almost identical in this respect with the *Phalangista Cookii*, which M. Fr. Cuvier has therefore classed with the *Petauri*. Those teeth of *Pet. Taguanoides*, which are sufficiently developed, and so equal in length, as to exercise the function of grinders, or in other words, the functional series of molares, include six teeth on each side of the upper jaw, and five teeth on each side of the lower jaw. The four posterior molares in each row are true, and bear four pyramidal cusps, excepting the last tooth in the upper jaw, which, as in *Phal. Cookii*, has only three cusps. In the upper jaw, the space between the functional false molares and the incisors is occupied by two simple rudimentary teeth, the anterior representing the canine, but being relatively smaller than in *Phal. Cookii*. The crowns of the two anterior incisors are relatively larger. In the lower jaw the sloping alveolar surface between the functional molares and large procumbent incisors is occupied, according to M. Fr. Cuvier, by two rudimentary minute teeth: I have not found any trace of these in the two skulls of *Pet. Taguanoides* examined by me. In *Phal. Cookii* there are three minute

* First by Dr. Shaw in the *Naturalist's Miscellany*.

teeth in the corresponding space, but these differences would not be sufficient ground to separate generically the two species if they were unaccompanied by modifications of other parts of the body. In *Petaurus sciureus* and *Petaurus flaviventer* the dentition more nearly resembles that of *Phalangista vulpina*. In the upper jaw the functional molar series consists of five teeth on each side, the four hinder ones being, as in *Pet. Taguanoides*, true tuberculate molares, but diminishing more rapidly in size, as they are placed further back in the jaw: the hinder tooth has three tubercles, the rest four; their apices seem to be naturally blunter than in *Pet. Taguanoides*. Between the functional false molar and the incisors there are three teeth, of which the representative of the canine is relatively much larger than in the *Pet. Taguanoides*; the first false molar is also larger, and has two roots; the second, which is functional in *Pet. Taguanoides*, is here very small; the first incisor is relatively larger and is more produced. In the lower jaw the functional series of grinders consists of the four true tuberculate molares only, of which the last is relatively smaller, and the first of a more triangular form than in *Pet. Taguanoides*. The space between the tuberculate molares and the procumbent incisor is occupied by four small teeth, of which the one immediately anterior to the molares has two roots, the remaining three are rudimentary and have a single fang. Among the species exhibiting this dental formula, viz., incisors $\frac{3-3}{1-1}$; canines $\frac{1-1}{1-1}$; præmolares $\frac{3-3}{3-3}$; molares $\frac{4-4}{4-4}$: $=40$; are *Pet. sciureus*, *Pet. flaviventer*, and *Pet. macrurus*.

The Pigmy Petaurist differs from the preceding and larger species in having the hairs of the tail distichous or arranged in two lateral series like the barbs of a feather; and in having the spurious molares large and sharply pointed; and the true molares bristled each with four acute cusps. This tendency in the dentition to the insectivorous character, with the modification of the tail, induced M. Desmarest to separate the Pigmy Petaurist from the rest of the species, and constitute a new subgenus under the name of *Acrobata*.

In four adult specimens, and two of which had young in the pouch, I find the following dental formula to be constant;—incisors $\frac{3-3}{1-1}$; canines $\frac{1-1}{1-1}$; præmolares $\frac{3-3}{3-3}$; molares $\frac{3-3}{3-3}$: $=36$.

The three quadricuspidate grinders of the upper jaw are preceded by three large spurious molares, each of which has two fangs, and a compressed, triangular, sharp-pointed crown, slightly but progressively increasing in length, as they are placed forwards. An interspace occurs between these and the canine, which is long, slender, sharp-pointed, and recurved. The first incisor is longer than the two be-

hind, but is much shorter than the canine. In the lower jaw the true molares are preceded by two functional false ones, similar in size and shape to the three above; the anterior false molar and the canine are represented by minute, rudimental, simple teeth; the single incisor is long and procumbent, as in the other Petaurists.

Genus *Phascolarctus*.

The absence of anomalous spurious molares and of inferior canines appears to be constant in the only known species of this genus. The dental formula in three of this species, (*Phasc. fuscus* Desm.,) is: Incisors $\frac{3-3}{1-1}$; canines $\frac{1-1}{0-0}$; præmolares $\frac{1-1}{1-1}$; molares $\frac{4-4}{4-4}$: =30.

The true molares are larger in proportion than in the Phalangers; each is beset with four three-sided pyramids, the cusps of which wear down in age; the outer series in the upper teeth being the first to give way; those of the lower jaw are narrower than those of the upper. The spurious molares are compressed, and terminate in a cutting edge; in those of the upper jaw there is a small parallel ridge along the inner side of the base. The canines slightly exceed in size the posterior incisors; they terminate in an oblique cutting edge rather than a point, their fang is closed at the extremity; they are situated as in the Phalangers close to the intermaxillary suture. The lateral incisors of the upper jaw are small and obtuse, the two middle incisors are of twice the size, conical, subcompressed, beveled off obliquely to an anterior cutting edge, but differing essentially from the *dentes scalprarii* of the *Rodentia,* in being closed at the extremity of the fang. The two incisors of the lower jaw resemble those of the upper, but are longer and more compressed: they are also formed by a temporary pulp, and its absorption is accompanied by a closure of the aperture of the pulp cavity, as in the upper incisors. The Koala therefore, in regard to the number, kind, and conformation of its teeth, closely resembles the Phalangers, with which it agrees in its long cæcum, but the stomach has a cardiac gland as in the Wombat. The extremities of the Koala are organized for prehension; each is terminated by five digits; the hind feet are provided with a large thumb, and have the two contiguous digits enveloped in the same tegumentary fold; the anterior digits are divided into two groups, the thumb and index being opposed to the other three fingers. The fore-paws have a similar structure in some of the small Phalangers; it is very conspicuous in some of the Petaurists. The Koala, however, differs from the Phalangers and Petaurists in the extreme shortness of its tail and in its more compact and heavy general form. It is known to feed on the buds and leaves of the trees in which it habitually resides.

Tribe IV. *POEPHAGA.*

The present tribe includes the most strictly vegetable feeders; all the species have a complex sacculated stomach and a long simple cæcum.

Guided by the modifications of the teeth we pass from the Koala to the Kangaroo family (*Macropodidæ*),—animals of widely different general form. The Potoroos, however, in this group, present absolutely the same dentition as the Koala, some slight modifications in the form of certain teeth excepted. The spurious molares, in their longitudinal extent, compressed form, and cutting edge, would chiefly distinguish the dentition of the Potoroo, but the Koala evidently offers the transitional structure between the Phalangers and Potoroos in the condition of these teeth, of which one only is retained on each side of each jaw, in both *Phascolarctus* and *Hypsiprymnus*.

The dental formula of the genus *Hypsiprymnus* is: incisors $\frac{3-3}{1-1}$; canines $\frac{1-1}{0-0}$; præmolares $\frac{1-1}{1-1}$; mol. $\frac{4-4}{4-4}$: =30.

The two anterior incisors are longer and more curved, the lateral incisors relatively smaller than in the Koala. The pulps of the anterior incisors are persistent.

The canines are larger than in the Koala; they always project from the line of the intermaxillary suture; and while the fang is lodged in the maxillary bone, the crown projects almost wholly from the intermaxillary. In the large *Hypsiprymnus ursinus* the canines are relatively smaller than in the other Potoroos, a structure which indicates the transition from the Potoroo to the Kangaroo genus. In the skeleton of this species in the Leyden Museum the canines present a longitudinal groove on the outer side.

The characteristic form of the trenchant spurious molar has just been alluded to; its maximum of development is attained in the arboreal Potoroos of New Guinea (*Hypsiprymnus ursinus*, and *Hyps. dorsocephalus*); in the latter of which its antero-posterior extent nearly equals that of the three succeeding molar teeth.

In all the Potoroos the trenchant spurious molar is sculptured, especially on the outer side, and in young teeth by many small vertical grooves. The true molares each present four three-sided pyramidal cusps, but the internal angles of the two opposite cusps are continued into each other across the tooth, forming two concave transverse ridges. In the old animal these cusps and ridges disappear, and the grinding surface is worn quite flat.

In the genus *Macropus* the normal condition of the permanent teeth may be expressed as follows:—incisors $\frac{3-3}{1-1}$; canines $\frac{0-0}{0-0}$; præmolares $\frac{1-1}{1-1}$; molares $\frac{4-4}{4-4}$: =28.

The main difference, as compared with *Hypsiprymnus*, lies in the absence of the upper canines; yet I have seen them present, but of very small size, and concealed by the gum, in a small species of Kangaroo (*Macropus rufiventer*, Ogilby.). This, however, is a rare exception; while the constant presence and conspicuous size of the canines will always serve to distinguish the Potoroo from the Kangaroo. But besides this, there are other differences in the form and proportions of certain teeth.

The upper incisors of the *Macropi* have their cutting margins on the same line, the anterior ones not being produced beyond that line as in the *Hypsiprymni*; the third or external incisor is also broader in the Kangaroos, and is grooved and complicated by one or two folds of the enamel continued from the outer side of the tooth obliquely forwards and inwards, into the substance of the tooth. In most species the anterior fold is represented by a simple groove; the relative size of the outer incisor, the extent and position of the posterior fold of enamel, and consequently the proportions of the part of the tooth in front or behind it, vary more or less in every species of *Macropus*: there are two folds of enamel near the anterior part of the tooth in *Macr. major*; the posterior portion is of the greatest extent, and the entire crown of the tooth is relatively broadest in this species. The middle incisor is here also complicated with a posterior notch and an external groove. These modifications of the external incisors have been pointed out in detail by M. Jourdan; and subgeneric distinctions have been subsequently based upon them; but they possess neither sufficient constancy nor physiological consequence, to justify such an application. M. Fr. Cuvier has proposed a binary division of the Kangaroos founded on the absence of permanent spurious molares and a supposed difference in the mode of succession of the permanent molares in the Kangaroos, combined with modifications of the muzzle or upper lip, and of the tail.

The dental formula which I have assigned to the genus *Macropus* is restricted by that naturalist in its application to some small species of Kangaroo, grouped together under the term *Halmaturus*, originally applied by Illiger to the Kangaroos generally. The rest of the Kangaroos, under the generic term *Macropus*, are characterized by the following dental formula:—incisors $\frac{6}{2}$; mol. $\frac{4-4}{4-4}$: =24.

The truth, however, is, that both the *Halmaturi* and *Macropi* of Fr. Cuvier have their teeth developed in precisely the same number and manner; they only differ in the length of time during which certain of them are retained. In the great Kangaroo, for example, the per-

manent spurious molar which succeeds the corresponding deciduous one in the vertical direction, is pushed out of place and shed by the time the last true molar has cut the gum: the succeeding true molar is soon afterwards extruded; and I have seen a skull of an old *Macropus major* in the Museum at Leyden, in which the grinders were reduced to two on each side of each jaw by this yielding of the anterior ones to the vis a tergo of their successors.

Tribe V. *RHIZOPHAGA.*

The characters of this tribe are taken from the stomach, which is simple in outward form, but complicated within by a large cardiac gland; and from the cæcum, which is short and wide, with a vermiform appendage.

Genus *Phascolomys.*

In its heavy shapeless proportions, large trunk, and short equably developed legs, the Wombat offers as great a contrast to the Kangaroos as does the Koala, which it most nearly resembles in its general outward form and want of tail. But in the more important characters afforded by the teeth and intestinal canal the Wombat differs more from the Koala than this does from either the Phalangers or Kangaroos. The dental system presents the extreme degree of that degradation of the teeth intermediate between the front incisors and true molares which we have been tracing from the Opossum to the Kangaroos: not only have the functionless spurious molares and canines now totally disappeared, but also the posterior incisors of the upper jaw, which we have seen in the Potoroos to exhibit a feeble degree of development as compared with the anterior pair; these in fact are alone retained in the dentition of the present group, which possesses the fewest teeth of any Marsupial animal. The dental formula of the Wombat is thus reduced both in number and kind to that of the true *Rodentia*:

Incisors $\frac{2}{2}$; canines $\frac{0}{0}$; præmolares $\frac{1-1}{1-1}$; molares $\frac{4-4}{4-4}$: = 24.

The incisors, moreover, are true *dentes scalprarii*, with persistent pulps, but are inferior, especially in the lower jaw, in their relative length, and curvature, to those of the placental *Glires*: they present a subtrihedral figure, and are traversed by a shallow groove on their inner surfaces.

The spurious molares present no trace of that compressed structure which characterizes them in the Koala and Kangaroos; but have a wide, oval, transverse section; those of the upper jaw being traversed on the inner side with a slight longitudinal groove. The true molares have double the size of the spurious ones: the superior

ones are also traversed by an internal longitudinal groove, but this is so deep and wide, that it divides the whole tooth into two prismatic portions, with one of the angles directed inwards. The inferior molares are in like manner divided into two trihedral portions, but the intervening groove is here external, and one of the faces of each prism is turned inwards. All the grinders are curved, and describe about a quarter of a circle; in the upper jaw the concavity of the curve is directed outwards, in the lower jaw inwards. The false and true molares like the incisors have persistent pulps, and are consequently devoid of true fangs: in which respect the Wombat differs from all other Marsupials, and resembles the extinct *Toxodon*, the dentigerous *Bruta*, and herbivorous *Rodentia*.

Although none of the *Marsupialia* possess teeth composed of an intermixture of layers of ivory, cement and enamel through the body of the crown; yet the layer of cement which covers the enameled crown is thickest in the vegetable-feeding Marsupials, and is remarkably distinct in the Wombat.

I may add that the Wombat deviates from the other Marsupials in the number of its ribs: as these are very constant in the rest of the order, the difference in the Wombat, which has 15 pairs, instead of 13 or 12, is the more deserving of notice. The Koala, like the Phalangers and Kangaroos, has 13 pairs of ribs.

Professor Owen next proceeds to compare the classification of the *Marsupialia* here proposed with that of Cuvier, given in the second edition of the *Règne Animal*, and states the reasons which have led him to devise a new arrangement.

The following is a tabular view of Professor Owen's classification.

CLASSIFICATION OF THE MARSUPIALIA.

Tribes.	Families.	Genera.	Subgenera.
SARCOPHAGA.			
Three kinds of teeth; canines long in both jaws; a simple stomach; no *intestinum cæcum*.	*Dasyuridæ*. .	Thylacinus. Dasyurus. Phascogale.	
Extinct transitional forms		Phascolotherium. Thylacotherium.	Fossil.
ENTOMOPHAGA.			
Three kinds of teeth in both jaws; a simple stomach; a moderately long *intestinum cæcum*.	*Ambulatoria*. .	Myrmecobius.	
	Saltatoria. .	Chæropus. Perameles.	
	Scansoria. .	Didelphis. . . .	Cheironectes.

Tribes.	Families.	Genera.	Subgenera.
CARPOPHAGA. Anterior incisors large and long in both jaws; canines inconstant; a simple stomach; a very long *intestinum cæcum*.	*Phalangistidæ*. .	Phalangista. . .	Cuscus.
			Pseudocheirus.
		Petaurus.	Tapoa.
			Acrobata.
	Phascolarctidæ. .	Phascolarctus.	
POEPHAGA. Anterior incisors large and long in both jaws; canines present in the upper jaw only, or wanting. A complex stomach; a long *intestinum cæcum*.	*Macropodidæ*.	Hypsiprymnus.	Halmaturus.
		Macropus.	Macropus.
RHIZOPHAGA. Two scalpriform incisors in both jaws; no canines. Stomach with a special gland; cæcum short, wide, with a vermiform appendage.	*Phascolomyidæ*.	Phascolomys.	Fossil.
		Diprotodon.	

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE,—NINTH MEETING, HELD AT BIRMINGHAM.*

Section of Zoology and Botany.

August 27.—J. E. Gray, Esq., V.P., in the Chair.

Secretaries :—Mr. E. Forbes and Mr. Patterson.

Mr. Goodsir read a paper, 'On the Follicular Stage of Dentition in the Ruminants, with some remarks on that process in the other orders of Mammalia.' The paper concluded with a recapitulation of the principal facts contained in it. 1. In all the mammalia examined (pig, rab-bit, cow, and sheep, &c.), the follicular stage of dentition was observed. 2. The pulps and sacs of all the permanent teeth of the cow and sheep, with the exception of the fourth molar, are formed from the minor surfaces of cavities of reserve. 3. The depending folds of the sacs of composite teeth, are formed by the folding in of the edges of the follicle towards the base of the contained pulp, the granular body assisting in the formation of these folds. 4. The cow and sheep (and probably all the other ruminants,) possess the germs of canines and superior incisives, at an early period of their embryonic existence.—'On the preparation of Fish,' by Mr. Wilde.—'On the Ciliograda of the British Seas,' by Edward Forbes and John Goodsir.—'On some new Species of Entozoa, discovered by Dr. Bellingham,' by Mr. Wilde.—'On the Acceleration of the Growth of Wheat,' by G. Webb Hall.

Aug. 28.—'On an Experiment in the Growth of Silk at Nottingham, made this year,' by Mr. Felkin.—The Secretary read a paper

* Monday's proceedings will be found at p. 46.

by Mr. Brand, 'On the Statistics of British Botany.'—'Some Observations on Whales, in connexion with the account of the Remains of a Whale recently discovered at Durham,' by Mr. George T. Fox.

Aug. 29.—Dr. Pritchard read a paper 'On the Extinction of the Human Races.' He expressed his regret that so little attention was given to Ethnography, or the natural history of the human race, while the opportunities for observation are every day passing away.—'A Report on the Distribution of the Pulmoniferous Mollusca in Britain, and the causes influencing it.' Drawn up at the request of the Association, by Mr. E. Forbes.—Mr. J. E. Bowman exhibited specimens of a species of Dodder (*Cuscuta epilinum*), first found in Britain, two years ago, by himself, and again in a new locality within the present month. He believes it is to be found exclusively upon flax, and has been overlooked for *C. Europæa*.—'On the Cultivation of the Cotton of Commerce.' By Major-Gen. Briggs.

Aug. 31.—Some remarks were made on the introduction of a species of *Auchenia* into Britain, for the purpose of obtaining wool, by Mr. W. Danson.—Prof. Jones made some observations on an apparatus for observing Fish (especially of the family *Salmonidæ*) in confinement. Mr. Charles C. Babington made a verbal communication concerning some recent additions to the English Flora.—A letter was read from Mr. Garner, on the *Beroe pileus*, stating that he had not seen in this animal true luminosity, but only a peculiar luminosity in the dark. The external rows of cilia he believed might produce it.

[We have not thought it desirable to fill our pages with imperfect abstracts of the papers read in the Section of Botany and Zoology, hoping, with regard to the most important, to be enabled, as last year to give them entire.—Edit.]

BOTANICAL SOCIETY OF LONDON.

December 7, 1838.—John Edward Gray, Esq., F.R.S., President, in the Chair.

Dr. H. A. Meeson read a paper 'On the advantages to be derived by the Medical Profession from the study of Botany.'

Mr. John Green communicated some 'Observations on the severity of last winter on Vegetation in connexion with Meteorology.'

December 21, 1838.—John Edward Gray, Esq., F.R.S., President, in the Chair.

A donation of some British Algæ was announced, presented by Mr. Adam White.

Mr. Joseph Freeman read a paper 'On the Geographical Distribution of Plants.'

A paper was also read from Mr. Adam White, being 'Note on Peloria,' and a Pelorian variety of *Pinguicula vulgaris* was exhibited, found by Mr. White on Royden Fenn, near Diss, Norfolk, in 1835.

January 4, 1839.—John Edward Gray, Esq., F.R.S., President, in the Chair.

Mr. Daniel Cooper, A.L.S., Curator, read a paper, being 'Remarks on the Dispersion of Plants in the environs of London, and the formation of plans exhibiting the distribution of species over localities,' which led to some discussion.

January 18, 1839.—John Edward Gray, Esq., F.R.S., President, in the Chair.

Mr. G. E. Dennes, F.L.S., exhibited specimens of *Aspidium rigidum*, sent to him by the Rev. W. T. Bree, and cultivated from a root brought by him from Ingleborough, Yorkshire, in 1815.

Mr. Daniel Cooper, A.L.S., exhibited a Shirt from Sweden, made from the liber of Linden.

A paper was read from M. I. J. Sidney, Esq., 'On the Botany of Morpeth, Northumberland,' and containing a list of the Plants to be found in that district.

The Curator also continued his paper 'On the dispersion of Plants in the environs of London, and the formation of plans exhibiting the distribution of species over localities.'

February 1, 1839.—John Edward Gray, Esq., F.R.S., President, in the Chair.

A paper was read from Dr. H. A. Meeson, "On the Formation of Leaves." He began by observing that leaves cannot be expansions of the epidermis, because if so they must then of necessity be composed entirely of cellular tissue, whereas they are known to abound in vascular tissue. If leaves be expansions of the bark it must necessarily follow that all modifications of them must be the same, therefore petals, sepals, stamina and pistils must be expansions of this substance. But these organs exist in endogens, a class of plants manifestly without bark, and in exogens their texture is so completely different from that of the bark that it would be absurd to compare them. Dr. M. considered leaves to be the essential part of a plant; they exist in the embryo, and by expanding and unfolding themselves suck up sap through the radicle, and having exposed it

to the action of the air and light, convert a portion of it into proper juice. A plant is nothing more than a multitude of buds or fixed embryos, which send their roots downwards to form their bark and wood. The leaf should be considered the most essential part of the plant, from which all its other parts are either directly or indirectly formed, as it is not an expansion of anything, but a very important organ, having as it were a distinct existence of its own.

A discussion ensued, in which Dr. Macreight, Dr. Willshire, and other Members joined.

WERNERIAN NATURAL HISTORY SOCIETY.

The Wernerian Natural History Society, in a notice dated Edinburgh, 20th April 1839, offers Honorary Premiums, value 10*l.* each, open unconditionally to all scientific naturalists. It is understood that the successful Essays on the subjects proposed, and such Drawings and Specimens as accompany them, become the property of the Society; and that, in the event of the Society not publishing the Essays, the authors may be allowed to publish them on their own account.

Hydrography.—1. On the temperature, magnitude, chemical composition, and geological relations of the *Springs* of Scotland. 2. On the temperature, colour, chemical composition, mechanical admixture, magnitude, velocity, and alluvial formations of any one of the following *Rivers* in Scotland, viz. the Tweed, Tay, Dee in Aberdeenshire, or Spey.

Geology.—3. On the erratic blocks or boulders of Scotland and its Islands; their mineralogical and paleontological characters, and physical and geographical distribution; with illustrative maps.—4. On the mineralogical constitution and chemical composition of the Trap-Rocks of Scotland; with specimens.—5. On the chemical composition of the altered or metamorphic rocks met with in granite, porphyry, serpentine and trap districts; with specimens.—6. On the fossil organic remains found in the transition strata and carboniferous systems of Scotland; with drawings of new species and specimens required.—7. On the so-called *Raised Sea-Beaches* met with in Scotland, its Islands, and elsewhere. Specimens of the shells, &c. required.

Zoology.—8. On the entomology of the Three Lothians, and the river district of the Forth; with specimens.—9. Drawings and Descriptions of the microscopic animals inhabiting the waters of any of the following arms of the sea and lakes, viz. Firth of Forth, Firth of Clyde or Loch Fyne; or of Loch Lomond or Loch Tay.—10. On the natural history and comparative anatomy of the land and water

molluscous animals of the Firth of Forth district; with drawings, and, if possible, preparations.—11. On the anatomy and physiology of the respiratory and digestive organs of birds, from actual observation, with a special reference to the habits and manners, and the natural arrangement of families and genera; with characteristic specimens.

Botany.—12. On the botany of the mountains of Scotland, in connexion with their geological structure; with specimens and a map of the distribution. The range of elevation, and the northern and southern limits of species should be attended to, and any facts illustrating the geographical distribution of plants recorded. It would also add greatly to the interest of the communication if it were accompanied with a coloured geognostical map of the districts. The Essays to be written in English, French, or German.

[The subjects are rather numerous; and perhaps a fewer, with higher premiums, for some at least, might have been better. The preparations and drawings to illustrate some of them could not be made for double the amount of the premium: and many would be willing to compete for an honorary distinction who would not like to give up their collections.—Ed.]

MISCELLANEOUS.

NOTICE OF AN UNCOMMONLY TAME AND SENSIBLE PINE MARTEN (*MUSTELA MARTES*). BY ST. K. VON SIEMUSZOVA-PIETRUSKI.

In June 1836 I obtained a very young Pine Marten, which in a short space of time became so domestic that he truly deserved the admiration of all who had an opportunity of seeing him. This pretty little animal went about freely through all the rooms of the house without doing harm to any one, played in the court-yard with my Danish dogs, often sprang upon their backs, and rode frequently upon the good patient beasts after the manner of monkeys in a very comical style for a good distance. The dogs too were very fond of the Marten, and never showed signs of their inherited hatred of such animals. In time he became so much attached to my person that he followed me everywhere, even into the neighbouring villages, just as only a dog or badger would do (see my remarks upon the badger in Wiegmann's Archiv, 1837, Part II.). In these walks it was very interesting to observe how he was able to overcome his natural innate propensity for climbing up trees; for it very frequently happened that the desire of climbing up a tree seized him; yet as

soon as he perceived that I had gone on, the little animal hastened after me directly. Even upon long excursions to the old forests of the Carpathian mountains, at a distance of three and four (German) miles, the Marten was my faithful companion; he swam through rivers and brooks with perfect ease like an otter: but the most remarkable thing besides was, that he never went very far from me; only once do I remember having lost him for some hours. This happened in the following manner.

On the 30th of August the gentle Marten followed me, as he always did on an excursion, into the part of the Carpathians which is called the Potoninen. I was busied in collecting the beautiful *Carabus Sacheri* in an enchanting spot, and quite forgot my Marten, who had found a nest with young blackbirds (*Merula montana*, Brehm.) just by, and was quietly devouring them. After a fortunate booty of Coleoptera I then wished to climb a lofty hill called Paraska, but I missed the Marten and continued my way without him. How great was my joy, upon my return, after eight long hours, to find the sensible animal again in the very meadow where I had lost him!

If I was absent from home this Marten would take no food the whole day long; and when I returned showed his joy by merry leaps and caresses.

He ate everything that came to table, bread, fruit, cheese, milk, but he was fondest of raw flesh; he drank wine with great relish, and plentifully. This even hastened his death, for once he drank so much, that on the following day he was found dead on the house floor.—*Wiegmann's Archiv für* 1839, 3tes Heft.

CLANGULA BARROVII, A NATIVE OF ICELAND.

On my last visit to Iceland, in the summer of 1837, I arrived there by way of Copenhagen on the 22nd of June, and landed at a place called Ociford, situate on the north side of the island. I immediately commenced making excursions into the interior for the purpose of procuring specimens and observing the habits of those birds which we are little acquainted with in Britain. I met with eleven species of ducks breeding there, and was fortunate in procuring the eggs of each, viz. *Anas mollissima, A. glacialis, A. Marila, A. Strepera, A. Boschas, A. acuta, A. Crecca, A. Penelope, A. nigra, A. histrionica.* The whole of the above visit Britain in the winter season, some remaining to breed, while others retire to higher latitudes; others again we are only acquainted with as rare and uncertain visitants to our shores.

But what I principally wish to call the attention of the ornithologist to, is the fact of my having met with a species of Golden Eye, not, as far as my observation goes, the same with that which visits the British coast. It answers to the description of the Rocky mountain Garrot, *Clangula Barrovii*, Richardson, although Faber and other naturalists who have visited Iceland have applied to it the name of the Common Golden Eye (*Anas Clangula.*). I met with this species in both my visits, but never with *A. Clangula*: therefore I am inclined to think that the latter does not inhabit that island, but its place is supplied by its near allied species *Clangula Barrovii*. This latter species may always be known from *Clangula vulgaris* by its superior size and the large crescent-shaped patch before each eye, which in *C. Barrovii* springs from below the gape, stretching along the base of the bill to the forehead: the bill of the latter, which is broader at the base, has also the nail on the upper mandible much broader. The weight of the male bird of *C. Barrovii* is about 2 pounds; the length from tip of bill to end of tail 20 inches; breadth when the wings are extended 28 inches. Weight of female 1¾ lb.; length 18½ inches; breadth 26¼ inches. It breeds in June, forming its nest by the margin of the freshwater ponds, generally among the willows, but sometimes placing it on the bare ground amidst the loose stones. The nest is composed of a few stems of grass loosely put together, lined with down from the breast of the female; the eggs vary in number from 6 to 10, and are of a whitish-green, similar in colour to those of the Common Wild Duck, and larger than those of *Clangula vulgaris*.—W. Proctor, Durham, 20th August, 1839.

On the moulting process in the cray fish.

We have extracted the following interesting notice from the elegant and valuable work of Prof. Rymer Jones*, which we had occasion to notice in one of our preceding numbers. "The phænomena which attend the renovation of the external skeleton are so unimaginable that it is really extraordinary how little is accurately known concerning the nature of the operation. The first question which presents itself is, how are the limbs liberated from their confinement? for, wonderful as it may appear, the joints even of the massive *chelæ* of the lobster do not separate from each other, but notwithstanding the great size of some of the segments of the claw, and the slender dimensions of the joints that connect the different pieces, the cast-off skeleton of the limb presents exactly the same appearance as if

* General Outline of the Animal Kingdom, Part VII. September 1839.

it still encased the living member. The only way of explaining the circumstance, is to suppose that the individual pieces of the skeleton, as well as the soft articulations connecting them, split in a longitudinal direction, and that, after the abstraction of the limb, the fissured parts close again with so much accuracy that even the traces of the division are imperceptible. But this is not the only part of the process which is calculated to excite our astonishment: the internal calcareous septa from which the muscles derive their origins, and the tendons whereby they are inserted into the moveable portions of the outer shell, are likewise stated to be found attached to the exuviæ; even the singular dental apparatus situated in the stomach, of which we shall speak hereafter, is cast off and re-formed! And yet, how is all this accomplished? how do such parts become detached? how are they renewed? We apprehend that more puzzling questions than these can scarcely be propounded to the physiologist, nor could more interesting subjects of inquiry be pointed out to those whose opportunities enable them to prosecute researches connected with their elucidation."

In a note annexed to this paragraph he describes the appearances of an *Astacus fluviatilis*, which he had obtained soon after casting its shell, and of its newly cast-off covering. "All the pieces of the exuvium are connected together by the old articulations, and accurately represent the external form of the complete animal; the *carapace*, or dorsal shield of the cephalo-thorax alone being detached, having been thrown off in one piece. The pedicles of the eyes and external corneæ, as well as the antennæ, remain *in situ*, the corresponding parts having been drawn out from them as the finger from a glove, and no fissure of the shell or rupture of the ligaments connecting the joints is anywhere visible in these portions of the skeleton. The ordinary tubercles, and the membrane stretched over the orifice of the ear, occupy the same position as in the living crayfish. The jaws, foot-jaws, and ambulatory feet retain their original connections, with the exception of the right *chela*, which had been thrown of before the moult began; and the segments of the abdomen, false feet, and tail-fin exactly resembled those of the perfect creature;—even the internal processes derived from the thoracic segments (*apodemata*) rather seemed to have had the flesh most carefully picked out from among them than to have been cast away from a living animal: but perhaps the most curious circumstance observable was, that attached to the base of each leg was the skin which had formerly covered the branchial tufts, and which, when floated in water, spread out into accurate representations of those exquisitely

delicate organs. No fissure was perceptible in any of the articulations of the small claws, but in the chela each segment was split in the neighbourhood of the joints and the articulated ligaments ruptured. The lining membrane of the stomach was found in the thorax, having the stomachal teeth connected with it; from its position it would seem that the animal had dropped it into the place where it lay before the extrication of its limbs was quite accomplished. The internal tendons were all attached to the moveable joint of each pair of forceps, both in the chela and in the two anterior pairs of smaller ambulatory legs.

" On examining the animal, which had extricated itself from the exuvium described above, the shell was found soft and flexible, but contained a sufficiency of calcareous matter to give it some firmness, especially in the claws. The tendons of the forceps were still perfectly membranous, presenting a very decided contrast when compared with the old ones affixed to the discarded shell. The stump of the lost chela had not as yet begun to sprout, and the extremity was covered by a soft black membrane. The jaws were quite hard and calcified, as likewise were the teeth contained in the stomach."

METEOROLOGICAL OBSERVATIONS FOR AUGUST, 1839.

Chiswick.—Aug. 1. Fine. 2, 3. Hot. 4—6. Very fine. 7. Rain, with thunder at night. 8. Overcast and fine. 9—14. Very fine. 15. Hazy: drizzly. 16. Very fine: cloudy: rain at night. 17. Rain. 18. Very fine: heavy rain at night. 19. Rain. 20. Hazy: fine. 21. Clear and fine. 22—26. Very fine. 27. Overcast: slight rain. 28. Hazy. 29. Cloudy: rain at night. 30. Rain: fine. 31. Cloudy: rain.

Boston.—Aug. 1. Fine: rain early A.M. 2, 3. Fine. 4. Cloudy: rain P.M. 5, 6. Fine. 7. Rain. 8, 9. Fine. 10. Fine: rain P.M. 11. Rain. 12. Cloudy. 13. Fine. 14. Rain. 15. Fine. 16. Cloudy: rain early A.M.: rain, thunder and lightning P.M. 17. Fine: rain A.M. and P.M. 18. Fine. 19. Rain: extraordinary rain early A.M. 20. Cloudy: rain A.M. and P.M. 21, 22. Fine. 23. Cloudy. 24. Cloudy: rain early A.M. 25. Fine. 26. Cloudy. 27. Fine: rain early A.M. 28. Cloudy: rain P.M. 29. Cloudy. 30. Cloudy: rain early A.M. and P.M. 31. Rain: rain early A.M. and P.M.

Applegarth Manse, Dumfries-shire.—Aug. 1. Pleasant day: getting cloudy P.M. 2. Rain nearly all day. 3. Calm and temperate: cloudy P.M. 4. Fine clear day. 5. Fine: at noon sultry: air electrical. 6. Wet all day. 7. Occasional showers. 8. Fine: pleasant breeze: sky clear. 9. Slight rain A.M.: cleared up. 10. High wind: dry A.M.: showery P.M. 11. Fair and fine A.M.: showery P.M. 12. Dull, but fair. 13. Clear and calm all day. 14. Very wet from 11 A.M. 15. Damp and drooping all day. 16. Occasional drizzling all day. 17. Dry and partially clear. 18. Warm and close: showery P.M. 19. Dropping day. 20. Chill morning: fair: showery P.M. 21. Fair throughout: hoar frost A.M. 22. Fine day: heavy dew A.M. 23. Rain at noon and continued all day. 24. Dropping day. 25. Fair till afternoon: cloudy and close. 26. Fair throughout. 27. Beautiful harvest day. 28. Fair A.M.: came on heavy rain P.M. 29. Heavy rain: flood in the river. 30. Fine day: occasionally slight drizzle. 31. Very wet till 5 P.M., when it cleared.

Sun 27 days. Rain 18 days.

Wind southerly 18 days. Northerly 8 days. Westerly 4 days. Easterly 1 day.

Calm 15 days. Moderate 8 days. Brisk 4 days. Strong breeze 2 days. Boisterous 2 days.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. ROBERTON; *by* Mr. THOMPSON *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. VEALL *at Boston, and by* Mr. DUNBAR *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1839. August.	Barometer.						Thermometer.									Wind.				Rain.				Dew point.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc. Fahr.	Chiswick. Self-register.		Chiswick.		Boston. 8½ a.m.	Dumfries-shire.			London: Roy. Soc. 9 a.m.	Chiswick 1 p.m.	Bost.	Dumfries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	8½ p.m.	9 a.m.	Max.	Min.	Max.	Min.		9 a.m.	9 p.m.										
☾ 1.	29·974	30·085	29·939	29·38	29·86	29·86	60·6	66·4	54·4	76	50	59	60	60	W.	SW.	NW.	S.	·213	...	·05	...	57
2.	30·120	30·095	30·049	29·52	29·89	29·92	65·3	76·2	56·2	82	53	66	60	56	S.	S.	SW.	S.	...	...	...	...	59
3.	30·096	30·138	30·063	29·43	29·94	30·10	68·8	74·4	59·9	85	57	70	61	58½	WNW.	SW.	calm	S.	...	...	...	...	61
4.	30·222	30·325	30·204	29·60	30·20	30·30	62·0	78·6	61·3	74	46	62	60	55	NNW.	W.	calm	W.	...	...	...	...	61
5.	30·348	30·296	30·200	29·71	30·28	30·20	61·8	71·0	52·6	74	49	60	61½	58	NW.	NE.	N.	W.	...	...	·02	...	59
6.	30·228	30·201	30·049	29·56	30·01	29·73	65·5	71·3	56·4	74	58	63	58½	56	S.	W.	calm	SW.	...	·01	...	1·12	60
7.	29·844	29·855	29·774	29·17	29·52	29·69	63·4	71·7	60·0	70	51	57·5	59	58½	SSW.	SW.	W.	SW.	...	·15	·15	...	59
8.	29·998	30·026	29·965	29·34	29·72	30·02	61·2	71·2	53·7	74	47	63	60	52½	NW.	W.	W.	W.	·288	...	...	...	60
● 9.	30·188	30·147	30·100	29·54	29·94	29·85	64·0	76·3	53·9	75	53	62	56	58	SSW.	W.	calm	W.	...	...	...	...	59
10.	30·152	30·121	30·087	29·45	29·77	29·67	64·6	71·3	56·2	74	54	63	58½	55½	SW.	W.	W.	SW.	...	...	...	...	60
11.	30·060	30·252	30·043	29·35	29·82	30·15	63·7	70·2	55·9	70	48	59·5	57½	54½	SW.var.	NW.	W.	NW.	...	·01	·03	...	59
12.	30·314	30·287	30·263	29·72	30·24	30·20	59·3	67·0	53·2	71	49	55	56	55	NW.	NW.	calm	NE.	...	·04	·39	...	57
13.	30·208	30·198	30·081	29·65	30·23	30·02	58·3	62·6	53·3	70	52	58	56	58	NW.	NW.	calm	SE.	...	...	...	...	50
14.	30·014	30·001	29·951	29·44	29·98	29·80	63·8	70·0	57·3	70	54	57	52	52	SE.	S.	calm	E.	...	...	·05	0·96	58
15.	29·696	29·689	29·621	29·18	29·80	29·71	61·0	68·7	57·8	74	52	65	55	54	E.	E.	S.	SE.	...	·04	...	...	55
16.	29·654	29·632	29·619	29·07	29·67	29·69	64·3	65·0	56·9	77	54	63	56	53	S.	W.	calm	NE.	·019	·58	·07	...	59
☽ 17.	29·670	29·862	29·657	29·10	29·80	29·90	61·8	70·0	56·4	71	50	63	55	50½	S.	SW.	E.	NE.	·686	·08	·15	...	59
18.	30·030	30·030	29·988	29·45	29·99	30·00	69·3	67·8	52·9	71	53	59·5	59	51	N.	NE.	N.	NE.	...	·24	·08	...	57
19.	29·946	30·040	29·932	29·45	29·98	30·01	60·2	66·0	55·8	61	45	56	57	49	WNW.	NW.	E.	NE.	·347	·12	1·89	...	58
20.	30·080	30·205	29·968	29·59	30·11	30·17	52·5	59·4	49·4	63	37	52	53½	47	W.	N.	calm	N.	·133	·01	...	...	51
21.	30·244	30·221	30·207	29·74	30·18	30·16	54·2	56·3	45·4	66	39	51	54½	50	NW.	N.	N.	SW.	·025	...	·15	0·60	50
22.	30·230	30·247	30·213	29·72	30·13	30·14	57·7	60·2	49·7	73	55	56	56½	61	S.	SW.	calm	SW.	...	...	...	...	49
23.	30·266	30·246	30·184	29·67	30·15	30·06	62·4	65·3	57·2	77	49	63	60	57	S.	NW.	calm	S.	...	...	...	...	56
○ 24.	30·140	30·136	30·013	29·47	29·91	29·82	62·5	70·8	57·6	75	50	63	58	56	S.	SW.	calm	SSW.	...	...	·13	...	59
25.	30·026	30·001	29·971	29·38	29·83	29·79	62·3	70·5	60·0	77	46	64	57½	57	W.	W.	W.	SW.	...	...	...	...	59
26.	29·966	29·950	29·838	29·33	29·73	29·70	65·3	71·5	54·8	73	54	60·5	58	54	W.	SW.	calm	SW.	...	...	...	...	59
27.	29·818	29·958	29·792	29·20	29·69	29·88	68·8	70·3	55·8	70	45	58	56	57½	NW.	NW.	W.	NW.	...	·15	·07	...	58
28.	30·072	30·053	30·029	29·48	29·91	29·74	55·4	65·0	50·9	72	56	57	56	56½	SW.	NW.	calm	SW.	·066	...	...	1·40	54
29.	29·942	29·923	29·878	29·30	29·59	29·60	62·3	65·3	54·9	71	56	62	57	56	S.	SW.	SW.	SW.	...	·02	·12	...	60
30.	29·846	29·828	29·762	29·20	29·64	29·65	61·7	68·3	59·9	67	51	62	60	55½	SE.	S.	W.	SE.	·133	·10	·12	...	59
☾ 31.	29·530	29·544	29·172	28·98	29·29	29·03	61·8	66·8	57·0	63	55	57	53½	53½	SSW.	SW.	calm	SE.	·058	·30	·02	...	61
Mean.	30·030	30·051	29·955	29·42	29·892	29·888	62·1	68·6	55·4	72·25	50·58	60·2	57·6	55·					Sum. 1·968	1·85	3·47	4·08	Mean. 57·5

ANNALS OF NATURAL HISTORY.

XIV.—*Description of Animal Life in Nova Zembla.* By K. E. von Baer.*

Not only the total want of trees, but also of every kind of shrub that would be large enough to attract the eye without being looked for, gives to the polar landscapes a peculiar and deeply impressive character.

In the first place all power of measurement is lost to the eye. From the want of the usual objects of known dimensions, trees and buildings, distances appear much less than they are, and for the same reason also the mountains are thought lower. This observation has often been made before and was not unknown to me, yet I found the deception, for which I was prepared, much more complete than I had expected. I knew indeed that on this very account an expedition which King Frederick the Second of Denmark fitted out for Greenland failed in its object.

Mogens Heinson, who at that time was considered an able seaman, commanded the ship: he came within sight of the coast of Greenland, and steered with a favourable wind towards it; but after sailing several hours in the same direction it appeared to him that he came no nigher to the shore. An apprehension seized him that some hidden force at the bottom of the sea held him fast; he turned the ship about and went back to Denmark, with the account that he had not been able to reach the coast of Greenland, having been enchained by a magnetic rock. With this experience and with the naïve declaration of Martens concerning Spitzbergen, "The distances seem quite near, but when they are to be walked over in the country it is quite another matter, and one soon becomes very weary," I was well acquainted, and yet I found the delusion much greater than I could have supposed, and to my

* Translated from Wiegmann's Archiv, part 2. 1839.

eye so perfect that no consideration could rid me of it. I am also convinced that it does not depend upon the want of the accustomed objects alone, but likewise on a peculiar transparency of the air, for it is never so complete on cloudy as on bright days, and not so striking in level as in mountainous regions. In days or hours which are quite clear the air appears to be almost without colour, and as the heights in sight are partly covered with snow, and constituted in part of a dark stone, which appears darker by the contrast, so the small degree of colour which the air may possess cannot be perceived. The mountains therefore apparently advance quite near to the eye, and this perhaps in a greater degree to one who has been accustomed to see hills through a different aërial perspective.

Another effect of the want of trees and even of a vigorous growth of grass is the sensation of loneliness, which seizes not only on persons of reflection but even upon the roughest sailor. It is by no means a sensation of fear, but rather a solemn and elevating one, and can only be compared with the mighty impression which a visit to alpine regions always leaves behind.

The once-conceived idea that the morning of creation was dawning for the first time, and that life was yet to follow I found it impossible to repress. Nevertheless an animal is now and then seen to stir in Nova Zembla. Sometimes a great sea gull (*Larus glaucus*) is seen to hover in the air at some distance from the coast, or a swift lemming runs along the ground. These however are not sufficient to give life to the landscape. In calm weather a want of sounds and motion is felt, if, as in our case, an expedition be made into the interior, after the departure of the numerous geese which pass their moulting season on the sea shore. Besides, even the few land birds in Nova Zembla are mute, and the insect tribe, proportionally much scantier, is also noiseless. Even the polar fox is only heard at night. This total want of sounds, which especially prevails on serene days, reminds one of the stillness of the grave; and the lemmings, which coming forth from the earth, glide along in straight lines, and then again quickly vanish into it, appear like spectres. From the little motion one sees, in spite of these signs of animal life, it seems

to be wanting. In other regions the leaves of tall plants and trees usually make even a gentle breeze perceptible to us, but a slight wind does not ruffle these lowly plants of the high north; one might take them to be painted. A very few insects only are busy seeking to satisfy their little wants upon them. Of the numerous family of beetles only one individual has been found, a *Chrysomela*, which is perhaps a new species. On sunny days and in warm spots for instance, about the small projecting points of rock, a humble-bee is seen flying about, but it hardly hums, as is the case with us in moist weather. Flies and gnats are rather more numerous; but even these are so rare, so peaceful and languid, that in order to see them they must be sought for. I do not recollect having heard that any one of us had been bitten by a gnat, and one may truly long for the bite of a Lapland gnat, merely for the sake of perceiving life in nature. The most manifest proof of the rarity of insects in this country appears from the following circumstance, that we neither found the least trace of insect larvæ in a dead Walrus which had lain above fourteen days on the sea shore, nor in the bones of animals which had been killed in former years, even though they were not without dried flesh on some parts. The common saying in our funeral service, that man becomes a prey to worms, is not true with respect to the extreme north, and whoever dreads this lot has only to be buried in Nova Zembla or Spitzbergen, where even the universal decomposing forces of nature will act upon him but very slowly *.

The abundance or scarcity of insects is, next to the vegetable kingdom, the surest measure for the climate of a country. Both need for their subsistence a certain quantity and a certain duration of warmth. This never fails in the torrid zone, but as we approach the north it does so in an increasing degree. Insects are however less easily transplanted than plants. That we know of no true insects from Spitzbergen may well be ascribed to this cause. M. Lehmann nevertheless observed ten species in Nova Zembla, and of these seven which are not parasitic. Fabricius described many more spe-

* At some depth the bodies remain frozen, but even above the earth they decay remarkably slowly.

cies from Greenland, and amongst these even several butterflies, and Scoresby has added to them some few new species from East Greenland. But West Greenland, which in common life has been considered as the type of all northernmost countries, from its having already been known for a longer time through the Moravian missionaries, must, especially in its southern districts, be a more highly favoured country, for it has (even if we pay no attention to the old fabulous accounts) at the present time, under 61° N. latitude, birch trees from 12 to 18 feet high, and of the thickness of a man's thigh, and among these mountain ash. (Egede, Account of the Greenland Mission, p. 78.) Egede found the corn, which he had sown as an experiment under the 64° of latitude, not only in ear but already with small grains on the 13th of September (*Ibid*, p. 106 and 112). Things therefore wear a very different appearance from those in Nova Zembla, and the meteorological observations show sufficiently that it is much warmer there. But even regions which enjoy a much lower mean yearly temperature than Nova Zembla are much richer in animal life, if the summer do but develope more heat. To select a less known example I will refer to Nyshne-Kolymsk, with a mean temperature of 10° C. According to Wrangell's observations the boundary of the lofty woods is not far off, and perhaps they would extend to this place were it not for the nearness of the coast, for at Nyshne-Kolymsk there are stunted Siberian cedars and bushes in plenty. During the short summer there the gnats are an intolerable plague.

The coast of Nova Zembla is rendered far more lively than the interior of the country by the sea-birds which make their nests there. Their number and variety is indeed not so great as upon the Norwegian coast or some isles and cliffs of Iceland, but even here one finds the coast thickly filled with them in some spots, and they receive any one who approaches with loud cries. Above all, the Foolish Guillemot (*Uria Troile*), which is perhaps as numerous as all the other birds put together, dwells in such colonies, sitting in thick troops and in many rows one above another upon the scarcely perceptible shelves of perpendicular rocks: they rouse themselves when any one approaches, and cause the sides of the dark rock to appear spotted

with their uplifted white bellies. The Russians call such a brooding place a bazaar. Thus this Persian word has been transplanted by Russian Walrus-fishers to the rocks of the frozen ocean and applied to birds in default of human inhabitants. Upon the points of isolated cliffs, and enduring no other birds near it, lives the large grey sea gull (*Larus glaucus*), which the Dutch whale-fishers, I know not why, whether from respect or a want of it, have named the Burgomaster. It seems to feel itself the lord of this creation, for before a whole company of fishermen it is bold enough to pick and choose from the fish that have been thrown upon the shore.

These birds are the best proofs that there is more to be had from the bottom of the sea than on land. In fact here the chief sum of animal life is sunk under the surface of the ocean. Small Crustacea are particularly numerous here, and above all the *Gammari*, which gather as thickly around a piece of flesh thrown into the water as do the gnats in Lapland about a warm-blooded animal. With a sieve one may take them up by thousands. When we threw lines in Matotschkin-Schar, the Walrus-fishers, who never took this trouble assured us that it would be quite in vain, for in the first place there were hardly any fish there, and moreover the *Kapschaki* (thus they call the *Gammari*) completely consume within a few hours sometimes the bait and sometimes the fish as soon as it is dead. In fact we seldom drew up anything but our empty lines.

Scanty as is the vegetation, it yet feeds a quantity of lemmings. Gentle declivities are frequently burrowed through in every direction by them. But the number of animals is not near so great as might be supposed from the quantity of burrows; for by far the greater part are empty, which one may soon be convinced of by tracking them with dogs, but nevertheless their number is so considerable as to force us to ask how so many lemmings can find support upon such a vegetation. But it is also not impossible that the vegetation appears so small to the observer because the lemmings make a considerable portion of it invisible. If they devoured the roots not much of the vegetable kingdom of Nova Zembla could long remain, and the lemmings themselves would soon perish from want of nourishment. But those captured by us could in no

way be brought to eat the smallest root. Since, therefore, when they are at large they certainly devour the flowers only and green parts, and since the plants of this country are all perennial, in the following year they again put forth a stem. I was still more surprised that when suffering the greatest hunger they would touch no Cryptogamia. It is a pity that the small number of ferns which have been found did not allow us to make trial whether these practical vegetable physiologists direct themselves according to the presence of spiral vessels or follow the divisions of the Linnæan system. There are two kinds of them; one seems to be *Mus grœnlandicus*, Traill, or *Mus hudsonius*, Auct. They quite agree with the description which Richardson gives in the 'Fauna Boreali-Americana;' less with that of Pallas. The other species likewise appears to me distinct from the Scandinavian lemming; in the colour the difference is truly striking. Pallas, who however seems only to have seen young animals, has enumerated it as a Russian variety of the Scandinavian lemming. The first is particularly distinguished by its tameness, for, four-and-twenty hours after it had been caught, it hardly made any attempt to escape when held free upon the hand, and one never sees two individuals of this species quarrelling together. The second, yellowish-brown species is much more ready to fight.

Next to the lemmings the polar foxes are also tolerably numerous. They find in the lemmings, in young birds, and in the sea-animals which are thrown up on the shore, a plentiful sustenance.

On the contrary, polar bears are seldom seen in summer, either because they avoid the places where they scent men, or because they only collect together on those parts of the coast where there is ice. The rein-deer also appear to have become rare, on the western coast at least, from the numerous winterings of late years of the seal-fishers. Not only were very few killed during our residence, but one of the companies which had passed the winter before in Nova Zembla, and had been advised to procure a provision of flesh by hunting the rein-deer, had not been able to obtain any. Wolves and common foxes, which, at least in the southern part of Nova Zembla, also sometimes occur, appear never to have been nume-

rous even there. With this enumeration the list of land Mammalia would be complete, if MM. Pachtussow and Ziwolka had not, during their winter stay, seen a little white animal within their hut, which they in their journal call a mouse. As the animal seen, according to M. Ziwolka's testimony, must have been larger than a common domestic mouse, and therefore could not be an individual of the white variety of this animal brought by chance in some ship, I am doubtful as to what it can be. On one hand it is stated that the North American lemmings become white in winter, but yet not so completely white as the animals of the weazel genus; on the other hand it might also be possible that the little animal noticed was a weazel. In Spitzbergen also a little white mammal has been observed, whose systematic determination is uncertain.

The sea Mammalia are of more importance, and expensive expeditions are yearly fitted out for the purpose of catching them by the inhabitants of the coast of the White Sea; but unhappily the booty is so uncertain that they may be compared to a game at hazard. If the sea is unusually free from ice the losses are very great. One day however may repay the loss of a whole year. For this reason these undertakings have always been renewed for centuries, even though they sometimes entirely fail. The result of a fortunate year is usually this, that in the following one too many ships go to Nova Zembla, and either destroy to too great an extent these mostly gregarious animals, or at least scare them away. Thus in the year 1834 some expeditions were very fortunate, after a previous cessation; in the year 1835 about 80 ships went to Nova Zembla, for which may be reckoned at least 1000 men. In the year 1836 the number of the ships diminished to one half. In the current year there were hardly more than 20 ships; but only one, which entered the sea of Kara, made a great profit: one or two captured nearly enough to pay the cost of their fitting out, and of the rest the greater part lost far more than a half.

The most important animal for this chase is the Walrus, and after the Walrus the Dolphin (*Delphinus Leucas*), known under the name of the white whale, but which is here called

Bjelucha or Bjeluga. Among the seals the sea-hare (Morskoi sajaz), *Phoca leporina*, Lep, *Ph. albigena*, Pall., but probably not distinct from the *Phoca barbata* of Fabricius, gives the richest produce, both as regards its size and quantity of fat, as well as its thick skin. *Phoca grœnlandica* bears among the Russians very different names, according to age and sex: the old full-coloured male is called Luisan or Luisun; the female, Utjälga; the not yet full-coloured animals, of a year old, they call Sjärunok and Sjärka, and the young ones, according to their different colours, Pljächanko, Chochlutschka, Bjäka. But they are not quite accurate in the application of these names to the young animals, for they also apply them to the young of a third species of seal which occurs here, and which when full-grown is called Nerpa. This seal, occurring everywhere singly on the coast, is probably Fabricius's *Phoca hispida*.

A fourth species of seal which belongs to these seas, though not to the coast of Nova Zembla itself, but to the Timanic coast and to the entrance of the White Sea, and even there is not frequently seen, the Tewjak, is said to cover its face with a cap: it is therefore probably the Klappmüts of the Dutch, or *Phoca cristata*, Erxl., *Cystophora borealis*, Nilsson.

Of Cetacea this sea contains in the first place a species of whale of the subdivision of fin-fish (*Balænoptera*), with very short whiskers, which I saw in Archangel. They rarely appear in the vicinity of Nova Zembla, and one never hears of their being stranded on this coast. Nearer to the north coast of Lapland, where they are almost yearly thrown on shore in the Motowsker bay, they are so frequent that I much wonder why the earlier attempts for the regular pursuit of this animal, difficult it is true to slay, have not been renewed and perseveringly carried on. It is worthy of remark that the Greenland whale never appears to stray into the district of Nova Zembla. For this reason we must believe that the whale-fishery which the Northmen carried on, according to Ohthere's testimony*, in the ninth century, in the neighbourhood of the North Cape, was for this very fin-fish. Far more rare is the

* See King Alfred's Translation of Orosius, ed. Barrington, p. 241, Forster's note at the end.

Narwal (*Monodon Monoceros*), and only in the neighbourhood of ice. Of Dolphins, this sea contains, besides *Delphinus Leucas, Delphinus Orca* (Kossatka), and a small species which the Russians call Morskaja Swinja; but I have not been able to learn whether this is *Delphinus Delphis,* or *Delph. Phocæna.*

The sea mammalia in Nova Zembla would therefore be exactly the same as those known in the Spitzbergen-Greenland sea, if the Greenland whale reached as far.

On the other hand, Spitzbergen and Nova Zembla are strikingly different in their winged inhabitants. The latter country indicates by its birds the vicinity of the continent. It is richer in species, but less interesting to the naturalist; for many of these species are none other than those which yearly pass through our country, and indeed in part remain with us; whilst another part of them go as far as Nova Zembla in order to devote themselves to the business of brooding where they may be undisturbed. Of land birds we found the Snowy Owl (*Stryx Nyctea*), which indeed passes the winter there; the Snow Bunting (*Plectrophanes nivalis*), *Strepsilas collaris, Tringa maritima,* and a Falcon, which was not very rare in Kostin-Schar, but which could not be shot and more closely examined. Earlier accounts also make mention of an Eagle, but the Walrus-catchers whom I questioned said they knew nothing of it. Perhaps however it is the same as the Falcon.

Among the web-footed birds which pass the season here the Saatgans are so common, at least in the southern island, that the collecting their fallen wing-feathers is an object of profit; the Ice-duck (*Anas glacialis*) is frequent, and the Singing Swan (*Cygnus musicus*) not rare.

According to the assertions of the Walrus-catchers, only one species of goose comes to Nova Zembla, and we in fact got sight of no other than the Saatgans and the Brent Bernicle (*Anser torquatus*), which latter however does not pass for a goose among the Russians. The Eider duck or Eider goose is also not rare. The web-footed herbivorous birds however collect in much greater numbers upon the island of Kolgujew, which is described as covered with swans and geese, than in Nova Zembla, where the vegetation is too scanty. On this ac-

count expeditions are sometimes sent hither to kill and salt these birds. A merchant of Archangel told me that once 15,000 geese were killed here in two hunts.

To the web-footed birds of Nova Zembla belong moreover *Uria Troile* (in unspeakable numbers), *Uria Grylle*, *Colymbus septentrionalis*, *Sterna Hirundo*, *Larus glaucus*, *Larus canus*, *Larus tridactylus*, *Lestris catarractes*, a *Procellaria*, which we however could not procure. *Somateria spectabilis* and *Larus eburneus* are stated to occur only on the northern coast. There also, according to the descriptions we heard, is probably found *Mormon Fratercula* and *Mergulus Alle*. It appeared very singular to me that no one had seen, south of Kostin-Schar, a bird of the family of *Alcadæ*, as *Alca Pica* does not belong to the most northern birds, and even *Mormon Fratercula* occurs on the Norwegian coast.

There is no trace of the whole class of Amphibia in Nova Zembla. The Batrachia and Sauria evidently cannot exist for want of insects. Of fish, the extreme north, even where very rich in individuals, contains generally but very few species, and partly for this reason, because the fresh water does not possess its peculiar forms so numerous in warmer regions, but only the fish that ascend from the sea at certain periods. Thus Scoresby says of Spitzbergen and of the neighbouring sea, that it has but four kinds of fish. My catalogue of the fish of Nova Zembla contains ten, all of which, with the exception of the Omul (*Salmo Omal*, Pall.), which is said to occur on the east coast, we have ourselves seen. Among these the most important is the Alpine trout (Golez—*Salmo alpinus*, Fabr.), which ascends in autumn into the mountain lakes, and in many years is caught in immense quantities and exported to distant countries. All the other fish are inconsiderable or of no value for commerce, and even in the œconomy of nature only *Gadus Saida*, Sep., and *Cyclopterus Liparis* are of any importance.

XV.—*On the Fructification of* Lycoperdon, Phallus, *and their allied Genera.*—By the Rev. M. J. Berkeley, M.A., F.L.S.

[With a Plate.]

A great step has been taken towards a more satisfactory arrangement of Fungi by the discovery of the real structure of the fruit-bearing organs in *Hymenomycetes*. The species of the group *Tremellini* have not yet been sufficiently studied, and it is possible that fresh light may be thrown upon the *Sclerotiacei*, but, since the separation of *Discomycetes*, the other Fungi of the class agree admirably in structure. It is probable however that two groups of considerable importance, though not abounding in species, are still to be added to *Hymenomycetes*. The structure of *Trichogastres* and *Phalloidei* is confessedly very imperfectly understood. This has arisen partly from the extreme difficulty of ascertaining it with the older microscopes, but more especially from the plants having been seldom examined in a sufficiently early stage of growth. Till Klotzsch* gave under the name of *Hymenangium* an analysis of *Rhizopogon virens*, which indeed is not arranged by Fries amongst the *Trichogastres*, nothing at all was known of the manner in which the reproductive organs are developed. The learned mycologist does not seem to have suspected its relation to the *Trichogastres*. He informs us that Dr. Walroth has found in Grunewald a genus allied to it, and that *Gautiera* of Vittadini belongs also to *Hymenomycetes*. Both are probably subterraneous Lycoperdons.

If a young plant of *Lycoperdon cælatum* or *L. gemmatum* be cut through and examined with a common pocket lens it will be found to consist of a fleshy mass perforated in every direction with minute elongated reticulato-anastomosing labyrinthiform cavities. The resemblance of these to the tubes of certain *Boleti* in an early stage of growth first led me to suspect that there must be some very close connexion between them. If a very thin slice now be taken, while the mass is yet firm, and before there is the slightest indication of a change of colour, the outer stratum of the walls of these cavities is found

* Dietrich's Flora Regni Borussici, vol. vi. t. 382. Berlin, 1838.

to consist of pellucid obtuse cells placed parallel to each other like the pile of velvet, exactly as in the young hymenium of an Agaric or *Boletus*, but without any trace of those processes which have been considered by some authors as male organs, Occasionally one or two filaments cross from one wall to the other, and once I have seen these anastomose. At a more advanced stage of growth four little spicules are developed at the tips of the sporophores, all of which, as far as I have been able to observe, are fertile and of equal height*, and on each of these spicules a globose spore is seated. It is clear that we have here a structure identical with that of true *Hymenomycetes*, a circumstance which accords well with the fleshy habit and mode of growth.

There is some difficulty in ascertaining the exact structure of the species just noticed, as the fruit-bearing cells or sporophores are very small, and when the spicules are developed the substance becomes so flaccid that it is difficult to cut a proper slice even with the sharpest lancet. I have however satisfied myself as to the true structure by repeated observations. But should any difficulty arise in verifying it in the species in question, there will be none in doing so in *Lycoperdon giganteum*, Batsch, which more properly belongs to the genus *Bovista*.

In this species the fructifying mass consists of the same sinuous cavities, which are however smaller, so that the substance is more compact, and I have not seen them traversed by any filaments. In an early stage of growth, the surface of the hymenium, that is of the walls of the cavities, consists of short threads composed of two or three articulations which are slightly constricted at the joints, from which, especially from the last, spring short branchlets often consisting of a single cell. Sometimes two or more branchlets spring from the same point. Occasionally the threads are constricted without any dissepiments. The terminal articulations are obtuse and soon swell very much, so as greatly to exceed in dia-

* M. Klotzsch figures however in his *Hymenangium virens* the sporophores as scattered and projecting beyond the surface of the hymenium, and he represents also what he calls anthers. This latter circumstance is confirmed by Corda inthe Algemeine Botan. Zeitung, though he differs from M. Klotzsch as to their form.

meter those on which they are seated. When arrived at their full growth they are somewhat obovate and produce four spicules which at length are surmounted each with a globose spore. When the spores are fully developed the sporophores wither, and if a solution of iodine be applied, which changes the spores to a rich brown, they will be seen still adhering by their spicules to the faded sporophores. The spores soon become free, but the spicule often still adheres to them as figured by Dr. Greville, 'Sc. Crypt. Fl.' t. 336, but they are not attached to the intermingled filaments. In *Bovista plumbea* the spores have very long peduncles. I regret that I have not been able to meet with a specimen in a fit stage of growth to show them adhering to their sporophores. Up to the time when the sporophores have nearly arrived at their full growth, the structure is essentially the same as in *Lyc. giganteum*, as will be seen from the subjoined figures.

Young specimens of *Geastrum* show the same anastomosing cavities as *Lycoperdon* and *Bovista*; I have not however at present been able to meet with a specimen sufficiently young to show the development of the spores. The only species which occurs abundantly in this neighbourhood is *G. Bryantii*, and in this species the fruit-bearing cells are already withered in extremely small specimens long before the volva is ruptured.

I regret not to have had an opportunity of examining *Scleroderma* and *Elaphomyces* in a sufficiently early stage of growth, but as M. Klotzsch has demonstrated the existence of true subterranean *Hymenomycetes* it is probable that they will be found to agree in structure. With respect to *Batarrea Tulostoma*, *Cauloglossum* and *Podaxon*, they are so evidently allied to *Lycoperdon* that there can be no doubt that they also are *Hymenomycetes*. *Polysaccum* according to Corda has spores furnished with an hilum, and seated upon short distinct cells springing from the flocci. It is probably therefore an ally of *Lycoperdon*. This however, and the genera not named above, referred to *Trichogastres*, require due examination.

I now come to the consideration of the genus *Phallus*, and I have here to regret that my observations are confined to *Phallus caninus*, but as far as that goes the proof is satisfac-

tory that it belongs to the class *Hymenomycetes*. The difficulty of examination is here again considerable and the structure can be ascertained in young individuals only, in which the stem is confined to the pileus, and the fructifying mass still spread over its apex. I shall here quote a passage from Brongniart's 'Essai d'une classification naturelle des Champignons,' p. 24, who it is to be observed places the Clathroidées amongst his "champignons proprement dits." Speaking of the fructifying mass he says, "Cette couche est formée de cellules membraneuses très minces, aux parois desquelles les sporules paraissent fixées. Mais comment ces sporules sont elles enveloppées? Sont elles nues et libres dans ces cellules, ou sont-ce des sporidies ou même des thèques fixées à leurs parois? C'est ce que nous ignorons." This I believe is the sum of our knowledge on the subject up to the present time. I have not at least met with anything additional, but there are several German journals to which I have not access.

As in *Lycoperdon*, the fructifying mass consists of a highly sinuated hymenium. The walls are composed of elongated somewhat spathulate cells surmounted with from four to six spicules, each of which bears an oblong spore. The sporophores here again appear to be all fertile and of nearly the same height, but I cannot speak so positively on this point from the extreme difficulty of cutting a clean slice from a mass which at all times is very flaccid. It will be observed that when the number exceeds four the additional spicule is seated between two, which form one side of a square (⁘) and that if a sixth is present it is placed opposite to the fifth (⁙).

Here again then we have an Hymenomycetous fungus, and there can be no doubt that the same structure will be found in all the *Phalloidei*. Nor is there any reason why they should not follow directly after the *Trichogastres* through *Batarrea*, the only difference being that the filaments which form the trama, that is the substance between the two surfaces of the hymenium, in the one case become rigid, in the other deliquescent. We have already seen that the sporophores in *L. giganteum* become flaccid and collapse, and it is probably in consequence of this that the mass becomes pulpy, a circumstance noticed by Fries as analogous to the deliquescence in

Phalloidei; and the deliquescence of *Coprini* and other agarics shows that the matter is not of very great importance.

It is to be wished that some one favourably situated and with more leisure than I have to devote to such researches would follow up the present observations in genera which have not been examined. When this is done the affinities of the two groups we have been considering may perhaps be satisfactorily explained. A previous problem however, and unfortunately one of some difficulty, remains to be solved, namely, the structure of *Myxogastres* in an early stage of growth. At present I have not been able to ascertain this, but the difficulties are perhaps not insuperable. It is probable that *Ptychogaster* ? Cord. Ic.' 2. fig. 90 will prove the key to the affinities of *Trichogastres* and *Myxogastres*.

EXPLANATION OF PLATE V.

Fig. 1. Portion of fleshy mass of *Lyc. cælatum*.
2. Three sporophores with their spicules and spores.
3. Do. showing their mode of attachment to the filaments of the trama. This however is not constant.
4. Filament occasionally found amongst the sporophore.
5. Sporophores seen from above with their four spicules.
6. Abortive sporophores of the cavities of the stem or base of the fungus. These it is to be observed are much larger than those which are fertile.
7, 8. Filaments which at length produce the sporophores in *Lyc. giganteum*.
9. Sporophores. In two the spicules are just developed.
10, 11, 12. Do. in various stages of growth.
13. Do. become flaccid. The portion examined was treated with iodine.
14. Spores.
15, 16, 17. Filaments which produce the sporophores in *Bovista plumbea*. In 17 there are no dissepiments.
18. Sporophores not yet perfected.
19. Young plant of *Phallus caninus* cut vertically. Nat. size.
20. Filaments of which the jelly of the volva is composed. Occasionally they contain as at (*a*) a row of globules, and some are terminated with a globule as at (*b*).
21. A vertical slice from the apex of the rudimental stem, showing the manner in which its substance is continuous with the trama.
22. A horizontal slice.
23. A vertical slice from the outside of the pileus.
24, 25. Sporophores with their spicules and spores.
26. A single spore.

All the figures are more or less highly magnified with the exception of 19.

XVI.—*Horæ Zoologicæ*. By Sir W. Jardine, Bart.

"Donec ergo meliora innotuerint, hisce utere, lector optime, quorum finis est, ei Scientiæ parare viam, qua nulla utilior, nulla nobilior."

It is proposed to bring together in a series of short papers the zoological information which may from time to time come into the possession of the author. Many curious forms continually present themselves which are left unnoticed, because their descriptions alone would not be of sufficient extent to form a "paper" for our periodicals. It will be his endeavour to illustrate these as often as possible, so that their descriptions may serve as a mark for others, from which to note those points in their history which are unknown, or which from the outward form only may be supposed or hinted at. There is much important information gained in correspondence with naturalists in foreign countries, which can scarcely be communicated except in detached portions. The notes which accompany collections from abroad are in some instances so extensive as to be useful in forming skeleton lists for some departments of the Fauna of particular districts and become extremely interesting in connexion with the geographical distribution of species;—and the examination of specimens received in spirits will furnish many subjects for illustration, which may tend to increase our knowledge of the structure of genera, the proper station of which in our systems is scarcely yet determined.

No. I.—*On the History and Habits of* Crotophaga.

For some time past we have annually received considerable collections of birds from the island of Tobago by the attention and exertions of Mr. James Kirk, who since 1825 has superintended the management of various estates there. The specimens which have been received will enable us soon to give a synopsis of the birds inhabiting the above-mentioned island, which will show a much more extensive list than what might be expected within such limited bounds, and will be found to contain several birds interesting both on account of their form and their hitherto supposed comparative rarity. But the col-

lections are still more enhanced in value by the notes which Mr. Kirk has now commenced to send to us, and which are the result of observations made during leisure time since he resided in Tobago; and it is now our object to communicate a part of these, without delaying for the completion of our proposed synopsis.

Crotophaga is a genus belonging to the new world, evidently composed of comparatively few species, one of those remarkable small groups where the distinctions rest on minute variations of the markings and proportions, while the general form keeps extremely similar, and one distribution of colour and of general tint prevails in all the members. At this time the specific distinctions are not well understood, and it will be extremely difficult for even an experienced ornithologist to separate the species without the possession of an extensive series from various localities. Mr. Swainson has described four species in addition to the greater and lesser Ani (*C. Ani* and *major*, of Systems), considering that mentioned by Lesson and Quoy and Gaimard as identical with one of them *. The characters are taken from the form of the bill and the markings and rugosities, or the want of them, on its surface; but, without wishing to throw any doubt on the claim these have to species, we would remark that the changes which the bill may undergo from youth to maturity, both in regard to its outline and markings, have scarcely been ascertained. By most writers and travellers the *Crotophagæ* have been described as gregarious, noisy †, often familiar, frequenting Savannas and pastures, feeding on insects as well as seeds and grains, fre-

* Animals in Menageries, p. 321.

† "They live chiefly upon ticks and other small vermin, and may be frequently seen upon the cows and oxen in the fields; they are often observed to fly on their backs, unless they lie down for them, which if much troubled with ticks they generally do when they see the birds about them, but if the beast be heedless they hop once or twice round it, looking very earnestly in the face every time they pass, as if they seemed to know that it was only necessary to be seen to be indulged. They are very noisy birds, and are of the most common sorts in all the pastures of Jamaica; their flight is low and short."—*Brown's Nat. Hist. of Jamaica*, p. 474. Fol. edit. 1756.

"In Jamaica it haunts the woods on the edges of the Savannahs, and is very common, making a loud noise upon the sight of mankind—Directs the planters in search of their runaway slaves."—*Sloane's Jamaica*, ii. p. 298. Fol. edit. 1725.

quently alighting on the backs of the flocks in search of the vermin with which they are infested, breeding in a community, and sometimes using a common nest, in which several together deposit and hatch their eggs, the nest being placed upon trees, bushes, or upon the ground *. In reading over Mr. Kirk's remarks upon the Tobago species it will be found that they generally agree with the notes we have given from various travellers, &c. But we find no trace of their ever building upon the ground, or of using a common nest †; the latter fact, if it ever takes place at all, being probably confined to some other species. In the system which Mr. Swainson has so successfully wrought out, *Crotophaga* is placed among the *Cuculidæ* to form a connexion with the *Rasores*, and among that order of birds only do we find a few species which incubate in a common nest. In other parts of their manners and structure,

* "*Crotophaga* for instance resembles the *Rasores*; both have such a weak flight that they seldom proceed far upon the wing; both habitually live and *build their nests upon the ground*, and both associate in flocks. Among hundreds of the common Ani which we have seen in South America we never beheld one perch upon anything higher than a bush, and this was but seldom, as they are habitually terrestrial birds, totally differing in œconomy and habits from the European or American cookoos."—*Lardner's Cabinet Cyclopædia*, 'Birds,' ii. p. 161.

"Il en est de même (se laisse facilement approcher) des nichées d'anis, qui, vivant en famille, s'expose à la file sur un même branche aux coups du chasseur."—*Quoy et Gaimard, Voy. de Freycinet*, p. 19.

"At Bahia, or rather its vicinity, the chattering crows (*Crotophaga*) are looked upon superstitiously, and their bills are reckoned a good antidote against poison."—*Dampier's Voy.*, iii. p. 50. 8vo edit. 1729.

† "Hujus speciei aves amplissimos in sepibus nidos construunt et quinquaginta simul in uno eodemque nido ova ponunt et incubant."—*Brisson, Synop. Method.* ii. p. 92.

The author of the article 'Ani' in the 'Dictionaire Classique d' Histoire Naturelle' gives the summary of our previous notes, but is more minute on the subject of nidification: "Un seul et même nid, dont l'étendue est augmentée selon les besoins, recoit ordinairement toutes les couveuses de la troupe. Ce nid est construit solidement entre de larges bifurcations d'un buisson épais ou d'un arbre touffu; il se compose de branches sèches et d'herbes fines entrelacées; ses bords sont assez relevés, et son diamètre est quelquefois d'un pied et demi. Il arrive presque toujours que, pendant l'incubation, les œufs se mêlent; alors les couveuses en rassemblent indifféremment sous leur aile vivifiante autant qu'elle peut en couvrir, et dès que ces œufs sont éclos, les parens, hors d'état de reconnaître leur véritable progéniture, donnent chacun à leur tour la becquée à tous ceux qui se présentent." —i. p. 367. Art. *Ani*.

We regret being unable to quote the description of Azara; our copy of that work is unfortunately deficient in the last volume, and the Edinburgh libraries do not possess it.

particularly their activity on the ground and propensity to hide from danger, we are reminded also of the *Grallatores*; many members of both orders run with great swiftness and thread their way with ease through thick herbage and tangled reeds. The *Rallidæ* among the latter show much activity, and naturally live in places rank with vegetation, and the knife-like bill of *Crotophaga*, the superciliar bristles, and the strong shafts to the feathers of the forehead, all bear analogy to the defences upon the bill and head of the rails and their allies. The internal structure of the bird, which we shall notice hereafter, exhibits little affinity to either of these orders. Mr. Kirk has thus described their manners in a letter received from him during the last winter:—

"This bird, with his grotesque bill, is only of recent appearance in this island. I am informed that the first pair seen here was in the years 1822 or 1823: at that period however there were few individuals here who devoted the smallest portion of their leisure to the pursuit of natural history, and hence a strange bird might for a short time have evaded the observation of those who took no interest in such matters. But when we look to the noisy and obtrusive habits of the bird itself, combined with its singular whistling note and very singularly shaped bill, and seeing its haunts are strictly confined within the limits of our cultivation, and more especially to low lands in the vicinity of what *we* call clear pastures or low shrubberies, swamps, &c., we are constrained to believe that a single pair could scarcely have located themselves for any length of time in any quarter of the island without exciting the curiosity and arresting the attention of some individual.

"On my arrival here, in January 1825, there were only a very few specimens to be met with, and those few were shy, an attribute which seems to desert them as they increase in numbers, for the general impression entertained by any calm observer (*en passant*) would be that they could kill at any hour or any day at least five or six at a single shot, and that that may sometimes be done I will admit while they cluster upon the tops of dry shrubs morning and evening pluming and adjusting their feathers, for it is to trees or shrubs containing the least foliage that they chiefly resort for this purpose.

Before I commenced this memorandum regarding the habits of the *Crotophaga* I entertained a very different opinion as to the facility of procuring them from what I do at this moment; and it may be worth relating here for your information, that, with the view of complying with your request, I went out on two successive days to procure perfect specimens to send home in spirits; but, strange as it may appear, out of fourteen birds which I shot I could only lift three, and those so much destroyed, as to render them useless for the purposes for which they were intended. From this I wish to convey that if the bird is not actually shot dead, its propensity to hide is such, that if there is a cane-piece, a vine, or grass plot within reach, the last expiring effort is to hide its head, and you will the more readily conceive our difficulty by this information, that what we call comparatively clear pastures may nevertheless (from the rapidity of the vegetation, where we can only perhaps afford to clear them once yearly) be covered with prickly creeping vines of all descriptions, three or four feet high; and it often happens, that in consequence of the hurry to procure the specimens just shot, the ornithological sportsman finds himself lacerated from the foot to the face, being lanced with a thousand hooked prickles at the same moment; it was in such a situation that I found myself on the 26th of September last, under the oppressive heat of a vertical sun.

"The young also evince great dexterity in hopping from branch to branch; for long ere they are able for flight they leave the nests, and may frequently be seen perched on the top of a shrub or thicket of vines with a congregation of adult birds; but as the parents retire from the intruder by flight, the young birds prepare by long and rapid leaps to get to the ground, and in such a situation suffice it to say that you might calculate with as much certainty upon the capture of a rat in full possession of all its faculties as upon that of the young *Crotophaga*. Only two days ago, in a comparatively clear pasture, where there was nothing but grass about twelve inches long, I handed one to my servant, who by some means or other let it slip through his fingers in my presence, and notwithstanding our united exertions and that of a third party the bird made its escape. Since, another has been procured and the man-

ners attentively watched. It is exceedingly wild and bites wickedly, and frequently draws blood with its claws. It readily devours grasshoppers (if alive), these constituting their principal food. In a wild state I have known them devour tadpoles with avidity in dry weather, and I have often been informed that they have been seen to pick the ticks from the stock in the pastures: this I will not contradict, but never saw; I watched them for upwards of an hour yesterday, and the result was, that three of these birds took their station around an ox, within three or four feet distance, sitting on the alert, hopping gradually forward with every motion of the ox as he browsed along, and springing on every insect that started before him.

"On looking at this curious bird a question naturally presents itself to the beholder, What can be the use of such a singularly sharp rigid bill? and although at first sight we are apt to pronounce this bill grotesque and deformed, we shall find on more mature consideration that the superintending care and providence of an all-wise Creator is manifest here as in all his works, for no other conformation could have suited his purposes so well. As they have been destined like other species to labour for their food, and as it has more particularly been their lot to search for it upon the ground and in a climate where the foliage is thick and luxuriant, the manifestation of the supreme wisdom is apparent when he views with what ease the *Crotophaga* can pounce upon his prey through the thickest foliage: by lowering the head the knife-ridged bill is so brought in contact with the grass, &c., as to throw the herbage to each side, enabling the bird to pursue the insect without the slightest resistance.

"They are in no ways anxious to be exalted, for they seldom choose a high tree when there is a suitable shrub in the vicinity; and although there are great numbers now in every estate where cultivation has been extended, yet they seldom fly in flocks of more than twenty, and even to that extent they may scarcely be called flocks, like the Rooks of Europe, or the Yellow-tail (*Cassicus cristatus*) of Tobago; but seem rather to follow each other in short flights from shrub to shrub, sounding their note as they proceed, which is a whistle of two syl-

lables, shorter but not unsimilar to the first note of the Curlew while soaring aloft, the latter part of the note of the Keelbills being in a sharper key and ending with the letter *p*, or somewhat like the syllables *whoorip*. They are very often come upon by surprise while searching for their food amongst vines and long grass; on such occasions a single bird evinces the greatest distress by violent efforts of wing and elaborate and frequent irregular repetition of its usual note; while on the contrary to see them descend from an eminence, a tree, or shrub, &c., nothing can exceed the ease and gracefulness of their movements as they glide through the air without a motion of wings except a slight alternate raising and depressing of these members, with a gently elevated tail.

"I have heard it observed that these birds make one general nest, and that numbers of them contribute in adding to the stock of eggs; this I cannot contradict, but do not credit. On this point I am not sufficiently informed, for although I have been in search after their nests for several years and offered rewards for procuring them, yet where there are hundreds of the birds,—and they are apparently increasing with rapidity,—our stock-keepers have never succeeded in finding me one nest. I however fortunately fell in with one last year, in the beginning of October (1837). It was built in the fork of a lime tree, covered with a thicket of misseltoe vine, and situate within fifteen feet of the dwelling-house door of one of our labourers. His description went to say that towards evening and morning a flock of the birds used to assemble upon the tree and in its vicinity, where they kept up a considerable noise. I made it my study to watch them on several occasions, but was unable to gather anything of importance. I robbed the nest of one egg daily to the amount of nine, and on my tenth visit found the nest with two broken eggs lying at the root of the tree. It was rudely constructed of coarse materials, chiefly small sticks, with the more pliable portions placed inside, but was totally destitute of any soft substance as a lining. Another nest was discovered towards the end of the same month constructed in a similar manner, but placed on this occasion on a pretty high tree, also covered with a creeping vine; this being left undisturbed

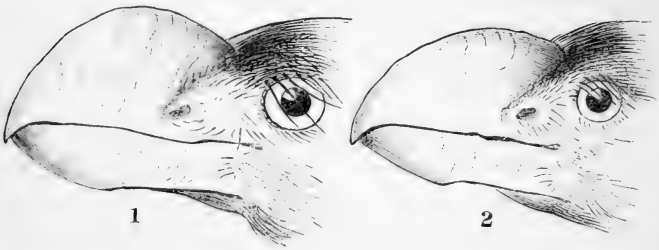
five eggs were laid, from which two young birds were produced*. From what I have observed on those two instances I am inclined to believe that the report of their uniting in the construction of the nest and their hatching in concert is erroneous, but I shall endeavour ere long to procure more information when I shall again address you."

On the 22nd of March last Mr. Kirk again wrote to me, after having still further attended to some of the disputed points of the habits of *Crotophaga*. "In some of my former letters I mentioned that I should advance nothing on hearsay as authentic, and to that I have steadily adhered. Since my account of the *Crotophaga's* manner of breeding, as reported in my last, I have had an opportunity of further corroboration by the examination of another nest with seven eggs, taken from a thicket of shrubs and vines about six feet from the ground. The nest, as I have already observed, is of such rude manufacture, that I could not forward it without enclosure in a parcel to prevent the falling asunder; by an examination of it however I am convinced that you would require no further evidence to bring you to the conviction that the *Crotophaga* of Tobago builds on shrubs, nay even on a tree at times, and *never* on the ground." In regard to the nature of its food and manner of seizing it, Mr. Kirk also remarks, "I have watched the bird eagerly for the last six months, I may say every day, and although I have been told by some of my neighbours, on whose integrity I can depend, that they have seen them picking ticks from the legs and belly of our oxen in the pasture, it has never yet fallen to my lot to witness it, nor did I ever find *one tick* in their stomach. I have however seen one lately upon a sheep's back while lying in the pasture, but I have seen the magpie of Europe in the same position. I do not attempt to deny the probability of their eating ticks, but I maintain that grasshoppers form their chief food, and that these are principally obtained by attendance upon the stock while browsing through the foliage. They are also in dry weather close attendants about small rivulets, principally in the morning and evening, where they

* The eggs are white or greenish white; the longitudinal diameter from $1\frac{3}{8}$ inch to $1\frac{4}{8}$ inch and a half.

feed upon tadpoles, and may be descried, if the grass be not too long, huddled together in a flock of from twenty to thirty, and so close as to resemble an old coat or cloak at a little distance."

From the near alliance which the species of *Crotophaga* present to each other it may be necessary to describe the Tobago birds as minutely as possible, which we are enabled to do by the possession of skins and specimens in spirits, forwarded to us by our active and intelligent correspondent. From the form and markings of the bill exhibited in the annexed wood-cut we feel inclined to refer it to the *C. rugirostra* of Swainson, though from the manner in which the dimensions are given in that ornithologist's 'Two Centenaries' we are not so sure that our birds agree in the latter point.



C. rugirostra, Sw.? Wrinkled-billed Keel-bill; provincially in Tobago, "Old Wife."

Entirely black, glossed with violet reflexions on the wings and tail; feathers of the head, neck and body with conspicuous glossy margins; bill wrinkled transversely downwards; total length from 13 *to* 15 *inches.*

The specimens received vary in total length from 13 to rather more than 15 inches, in one of about $14\frac{1}{2}$ inches in length; the depth of the bill is 1 inch; the length to the extremity of the rictus $1\frac{1}{4}$; length of the wing from the shoulder to the end of the fourth or longest quill 6 inches, of the tail from its insertion $7\frac{3}{4}$; from beyond the wings $4\frac{1}{2}$; expanse of the wings $16\frac{1}{2}$; of the tarsus $1\frac{5}{8}$; the centre toe, including the claw, nearly the same. In the specimens received in spirits the bill

is of a grayish-black, at the base of the maxilla inclining to bluish-black; it varies in the elevation or development as seen in the cut. No. 1, drawn from a bird fully 15 inches in length, being much arched. No. 2, considerably less developed, belonging to a smaller specimen ($13\frac{1}{2}$ inches) either in the moult or scarcely having attained full plumage. The mandible in both is wrinkled transversely downwards. The eye is protected by strong superciliary bristles, but the space between it and the rictus is nearly bare of feathers, a few scattered bristly plumes only covering it. The ridge of the bill enters among the plumes of the forehead, which run down in a narrow point on each side towards the nostrils, and at this part and above the eyes they show strong rather elongated shafts, somewhat similar to what we perceive in some of the *Rallidæ*, and are without doubt intended to protect the face while they seek for their prey among the thick herbage. This structure in a less degree extends also over the head, cheeks, throat and sides of the neck, the feathers being there rigid and somewhat lanceolate in form. The ground tint of the plumage of the body is a dull black, each feather being margined with a glossy band of a yellowish metallic lustre on the head and neck, on the back and lower parts of steel-blue and violet. These bands, on the vent, flanks, and under tail-covers are wanting. The wings and tail are of a shade of black deeper than that of the body, and are richly tinted with violet reflexions; the secondaries, greater covers, and tail in some lights showing darker narrow transverse bars; the tail is rounded and very ample; the feathers broadening towards the tips, and in its whole appearance reminding us of that member in several of the Rasorial genera; in all our specimens it consisted only of eight feathers; the legs and feet are black, the tarsus and middle toe very nearly of equal length, the claws slightly hooked. The exterior toe is subversatile, but the structure of the foot is in other respects ambulatorial. Mr. Kirk states that the eyes are "very dark, apparently blue, except in sunlight, when they assume a very dark hazel-like colour."

When the *Crotophaga* is skinned the first impression is that of a general weakness of the muscular parts, and it is so with

the exception of the greater pectoral muscle, which is wide and thick, and covers broadly a sternum comparatively weak and with the keel slightly developed, causing the breast to appear as possessing great power. The principal muscles which are employed in moving the wings are weak, those of the limbs proportionally fuller and stronger, and from the knee downwards tendinous and as if much used. The trachea is simple along its whole length, and the tongue is rather large and resembles that of the *Corvinæ*. The œsophagus on leaving the mouth is widened, but immediately contracts to a simple tube, again widening into a narrow proventriculus interiorly striated with longitudinal rugæ, until within half an inch of the true stomach, where it exhibits a glandular slightly papillose inner surface. The true stomach when distended with food is nearly circular, flattened on the sides, and on the outside appears muscular and strong; on laying it open however the walls are found to be extremely thin, almost membranaceous, and scarcely exceed in thickness any other part of the canal. The intestine is terminated by a wide cloaca, and is furnished at the distance of two inches from the extremity with two oval cæca, $1\frac{1}{4}$ inch in length, joined to the tube by a narrow constriction, but widening at the ends to double the width of the common canal. In the whole of the internal structure, so far as our knowledge of that of *Cuculidæ* extends, the *Crotophagæ* will resemble them, and will bear out Mr. Swainson's views of their position. The intestinal canal approaches nearest afterwards to the conformation of that of some of the *Fissirostres*; but with the exception of largely developed cæca, which however to a great extent prevail among the *Insessores*, we see no approach to either the *Rasores* or *Grallatores*. In the letter which accompanied the specimens in spirits Mr. Kirk states "As the *Crotophagæ* now sent have been principally secured while attending on the herds of cattle and sheep, it might justly be expected that their stomachs will contain *ticks*, but I could prognosticate that you will find them on examination to contain principally large grasshoppers, and I found one examined lately to contain a few seeds of the Guava fruit." The stomachs when opened were found to contain principally

Grylli and *Cimices*, mixed with the small hard stones of a red berry or red pulpy fruit; in some instances the latter formed almost the exclusive contents, but in none have we been able to discover any of the parasites which infest sheep or cattle.

[To be continued.]

XVII.—*Extracts from a few rough Notes of a Journey across the Pampas of Buenos Ayres to Tucuman, in* 1835. By James Tweedie, Esq., addressed to Sir W. J. Hooker.

[Concluded from p. 104.]

May 8th. In the afternoon left this our dreary 3 weeks' abode, and the cattle being in good condition, travelled all night through a dark dense forest, where the road or rather path was so narrow that 2 carts must wait, should they chance to meet, until the trees have been felled so as to permit of a passage. The numerous feet and wheel tracks raised such a dust as hung over us in heavy clouds all the way, a perfect calm prevailing in the air, and the travellers, carts, and cattle were all of one colour, enveloped or buried in a covering of dry dust. In the morning, about daylight, my driver falling asleep, the bullocks deviated a little from the path and upset my waggon. Fortunately, though I fell from a considerable height and some heavy bales of cloth tumbled upon me, I escaped with only a slight bruise on one of my legs. Next day travelled through a saline country where there was no water and only salt shrubs for the poor animals to eat, and arrived in the evening at the little village of Atamisco, so named from a finely scented shrub, which grows in great abundance about it. Scarcely any vegetable was seen except some coarse herbage, upon which flocks of goats were browsing.

10th. In the morning we arrived at the Rio Pitambella, where we were again occupied 2 days crossing it in 2 canoes fixed together by poles tied across them, by which means each load was carried over at one time. The empty carts were drawn across by bullocks as at the Rio Saladillo. At this pass, having once more time to botanize for 3 days, I found

several species that were new to me, especially of grass, some strong plants of *Goodenia tuberosa, Barba del muerto,* 2 sp., and many things I did not know. While here, I entered my 60th year, and falling into a sort of melancholy fit, at remembering that I was now 9000 miles distant from my native country, and at the present time surrounded with a class of people more barbarous than the worst tribes of savages, men who rejoice in the difficulties and dangers of others, nothing affording them more delight than seeing a person fall from his horse or attacked by an infuriated bull, events which here very frequently happen ;—these being, I say, the prevailing sentiments of my mind on the anniversary of my birth, my fellow-traveller, a Dr. Mernoz, recommended as a cordial to the spirits, a drop of wine ; so extracting the cork of, alas! my last bottle of Madeira, he and I sat down to enjoy it, and soon drained the flask.

13th. Having now completed crossing our last difficult river in the way to Tucuman, a more pleasant tract of country opened upon us, consisting of gently undulated ground with some fine varieties of trees and shrubs, principally of *Mimosas.* For 2 days, however, we travelled through a parched district, where neither food nor water for the beast could be procured. No cattle were to be seen between the Rio Pitambella and San Jago, a distance of 26 leagues, except a few goats, the kids of which we bought at about sixpence each.

17th. At sunset halted on the summit of an elevated ridge, about 1 league from San Jago, intending to enter the town before the morning ; but a cloud of hail with a strong gale of wind passing over us in the night, the cattle were so much scattered by it among the dry forests in search of food, that we could not collect them till sunset. On looking out of my dusty den in the cart at sunrise, the air having been beautifully cleared by the gale of the night, I beheld one of the most sublimely grand sights that could be imagined ; the towering summits of the snow-covered Andes, their sharp peaks of various forms, heights, and sizes, stretching up among the long lines of light clouds that lazily hung in the atmosphere ; their backs romantically variegated with black and white, the thinner snowy mantle having been melted by the sun from the

projecting points, while the valleys still lay dark and dense in frozen shade. This view of those alpine regions was most gratifying to me, and my ever-busy memory presently recalled to me a similar scene, when, in my youthful years, I had stood upon the hills of the Upper Ward of Lanarkshire, and with my face turned towards north-west, gazed on the mountains of Argyleshire and the Western Highlands, where, in the spring, the snow, melting from the exposed parts of the rocks, leaves alternate streaks of black and white. This ridge of the Cordilleras lies in the province of Catam, distant, at the time, upwards of 50 miles in a straight line on our left hand, and in a direction W.N.W.

18th. Halted about a mile and half from San Jago, having adopted another road, by which we should avoid going through the town, but sent 2 waggons thither with goods, which being obliged to cross the river San Jago, did not return to us till noon of the second day, 5 hours being required to pass the river. In this district vegetation varied considerably: in all other places of the woods, the plains were covered with a yellow-berried suffruticose plant, which gave the ground at a distance much the appearance of the holms of Clyde when gay with rag-weed; but though this shrub abounded so much, almost to the exclusion of other vegetation, neither bird nor beast appeared to touch its foliage or fruit. Here I found a strong broad-leaved *Asclepias*, on the edge of the river several smaller perennial species; but the most attractive tree here is the *Mistol*, a large branching tree something like a big pear tree of the Tollo family of Buenos Ayres; the fruit much resembling a Kentish cherry, and which the natives gather carefully and dry as they would do figs: when these fruits are used they are steeped in warm water and then worked up into a dough of maize meal, kernels and all, and rolled into balls about 4 oz. weight, which are eaten, baked and prepared in various ways, being the principal food on which the natives depend, except a few goats; for the dearth of water and pasture, with the prevalence of dense forests and salinos, prevent the rearing of cattle. Except a few spots near the town, where maize and pompions are grown, I saw hardly any cultivated ground for many leagues around San Jago.

Being now only 10 leagues from the town of Tucuman and my patience quite exhausted, I quitted the tropa, and accompanying the owner of 32 mules which were going to the mines of Peru, I started with him on the 20th. It proved no easy job for the 4 men and the proprietor to drive these animals, they strayed so much into the thorny brushwood; and though the driver was faced from top to toe with a hide protector, he had much difficulty in making his way through the woods, especially where the *Chaneos* abounded. These delays however allowed me to botanize and to gather a few seeds, for of flowering specimens there were none. About 9 o'clock we halted in the woods and kindled a fire to prepare our asado for supper, but the night proved so extremely cold that we could not sleep, so we started at about 3 in the morning and travelled till sunrise, when we arrived at the site of a few ranchos. Here we tied our horses to trees, entered the most decent looking dwelling, which proved to be the principal inn, as I suppose, of the country, for few were the habitations of any kind that we had seen, and called for something for breakfast. The morning being very chilly we were ushered into the principal apartment, which was nothing more than a roughly finished hut, covered with a sort of long grass, its sides not even plastered with mud, only stuffed with straw and sticks between the posts; in the centre was a large fire of sticks, a welcome sight for our cold persons; this fire-place was a circle of large coarse stones, 6 feet in diameter, placed in the centre of the room, and holding as many ashes as seemed a twelvemonth's accumulation. Four women, 6 naked children, and a lot of dogs, cats, and poultry surrounded the fire, all contending which should get the largest share of an overplus of boiled pompions which had been left from last night's supper. One old woman was busy scraping the outer skin from more pompions for the family's breakfast, while the others sat idly looking on. The mode of preparing the pompions for food was to slit the largest in halves, and then putting them into the hottest part of this enormous fire, to fill the hollow or concave side with hot charred wood. While they they were thus roasting the landlord desired that the cow should be brought in and milked, which was done ac-

cordingly, the black boy who performed the operation using the only utensil apparently in the house to receive the milk, namely, the huge pot or boiler from which the dogs had been licking the relics of pompions, some of which still adhered to its sides: this was set on the fire; and by the time the milk was, boiled the pompions were sufficiently roasted, when scraping off with difficulty the black and ashy skin, I put some of the pulp into the milk and managed to make a tolerable breakfast. This is the way in which people live in this country; nothing better or more cleanly is to be procured for fare; we all gathered round the pot of hot milk which was set on the ground, when also the roasted pompions were laid at our feet, all covered with black wood ashes; for plates and spoons we had horns, halved and a little bent; for seats, the skulls of horses; and for a table, the clay floor of the hut. There was no choice: we paid about sixpence each for our meal and set off again. After travelling till mid-day, the weather being hot and dry, we stopped for 2 hours at noon, turning the cattle out to feed and lying down ourselves to sleep, and pursued our way in the afternoon, the country being so open and level that we drove the mules before us almost at a gallop. The owner of these animals had left us in the morning, accompanied by his servant, preferring another route to Tucuman, and I remained with the driver, that I might have the more time to botanize. At night we stopped at a posthouse called Vinora, 19 leagues from Tucuman, where we rested till the afternoon of the next day; during which time I examined the productions of the neighbourhood. I saw some fine trees of the great fan palm, a strange species of *Cestrum*, with very large yellow flowers, and a *Solanum*, apparently brownish, with white fruit of the size and appearance of hens' eggs; the latter was generally growing in open grass fields, where the plant, about 3 feet high, very thorny, and loaded with this singular looking fruit, was a striking object. Also a suffruticose *Buddlea*, which the natives call sage, and use as such.

23rd. Quitting Vinora after mid-day, we reached in the evening a farm, where many goats were feeding and where we purchased a fine fat kid for about one shilling, and obtained permission to turn our horses and mules into an inclosure,

after which we kindled a good fire at the gate and roasted our kid for supper. We were accompanied for some time by a young couple on their way to be married at Tucuman, no clergyman living nearer to perform the ceremony, for which they had to travel 57 miles. However there was a saving of trouble in this case, as the double object was answered of getting their child baptized, a fine boy nearly 2 years old.

24th. Started very early this morning, having been refreshed by a comfortable night's rest, for we had slept by the side of our large wood fire, sheltered on the weather side by long clean grass waving above us. Our cattle too were recruited by the fine grass they had eaten during the night, and we took to the road in high spirits at the prospect of soon finishing our long and arduous journey, a hope which was realized about 4 in the afternoon, when we entered Tucuman. The 2 last days' journey was the most pleasing and interesting of all; the noble Andes lay on our left hand, thick fog covering part of their sides, above which their snowy summits soared bright and clear; often we approached within a few miles distance of the mountains. The vegetation too became more varied as we advanced into the warm and more humid climate which Tucuman enjoys, so as to be quite interesting. Having reached the farm-house belonging to the owner of our carts, who had arrived only the day before, he welcomed us kindly to his dwelling: the first thing offered to a stranger here is a cigar, then matte; after which we visited his orangery, where I saw some trees of almost incredible magnitude and with equally incredibly enormous crops of fruit, whether considered as to number, size, or quality. Some of these trees could not be less than 40 feet high, with tops high in proportion, the points of the lower branches resting on the ground; and the oranges of an uniformly large size, equally interspersed all over and among the whole trees. The beautiful hue of the fruit, which was generally ripe, added to the interesting appearance of these trees. He had no other garden, but noble fields of sugar cane and some rice grounds: a mill for cleaning the latter article was also on the farm. At night this kind person sent one of his servants to conduct us to the only coffee-house in the town of Tucuman, with orders to re-

quest that the owner would treat me as a friend of his ; but no such recommendation was needful, for I found both the master and mistress of the house most worthy and agreeable people, as were indeed the mass of the population in this fine country, where the inhabitants are generally as friendly as their country is pleasant.

25th. Having arrived yesterday, I had the opportunity this morning, as I anticipated, of seeing what I supposed would be a grand military show, it being the anniversary of the freedom of this country from the Spanish yoke, an event which is celebrated with rejoicings throughout the Argentine provinces, especially at Tucuman, where independence was first proclaimed, and where a brick pillar still marks the exact spot of this proclamation. I consequently supposed that the military would sport their best uniforms on the occasion, and that something very grand should be exhibited: but at about 8 in the morning 200 men assembled in the Gran Plaz of the town, these being the militia of the country, as there is now no standing army; their uniform was rags, of all colours, however, and most of them were bare-footed; the other had old shoes or torn slippers, with hats much like the fragments of bee-skeps, the crown being generally covered with coarse uncut wool, undyed and in the state in which it comes from the sheep's back. Clothes they had none, but rough pouchos, loosely hanging over the body, a tattered dirty shirt beneath, but no jacket or trousers. They fired a *feu de joie* and dispersed. At night the town was illuminated with lumps of tallow, put into square thick pieces of *Agave* leaves, a hollow being made in them, and filled with the grease. These chandeliers were set on the window sills in place of lamps or lanterns. (For a further description of Tucuman, with its fine scenery, &c. see the pamphlet of Alvardi published in 1834.)

Appendix.

Our return to Buenos Ayres was somewhat different from our former route, the course being first more southerly and then more to the north. Two miles after leaving Tucuman,

one of our carts having overset in a Bocacha pit, a day's travelling was lost, and the next morning, when crossing the Rio de Tucuman, 5 miles only from the town, the fracture of an axle caused a similar delay. Three days after we recrossed the same stream near Vinora, and it may be needful to remark that we had to pass over it at four different places, at all of which it bears different names. Thus, its first appellation is Rio de San Magill, this being the name of the ridge of the Cordilleras where it rises, and indeed the proper name of the town of Tucuman itself, which is situated close to that mountain pass. At San Jago the river is called the same: and again, at the village of Pitambola, the Rio de Pitambola, while further down the number of willows that clothe its banks give it the appellation of Rio Saucio, under which name it enters the Paraña near Santa Fè. Having crossed it at Vinora, we entered upon a fine road, lately cleared by the government of San Jago, the first and only benefit I ever heard of their rendering to the country. Immediately after leaving this forest we enter the town of San Jago, a most miserable place, nothing growing about it but some bare trees, on the branches of which the goats were browsing. Two miles after quitting it I observed a red cloud rising in the S.W.; it was an immense flight of red locusts, which passing over us made the sun appear like blood. Next day the wind having shifted, these insects were driven again on our line of road, where they were mostly resting on the tops of the trees, which looked as if studded with red blossoms. Nothing else worthy of notice occurred till we came to the Rio Secunda: when we were going to Tucuman this was a river 4 feet deep and nearly 200 yards wide, but now presented only a bed of drifting white sand.

Near Cruz Alta we observed the smoking ruins of some Ranchos which the Indians had burnt the preceding day, and therefore took a more northerly direction to keep out of their way.

Crossing Rio Carcauñon, one of the shaft bullocks got loose; and the other having all the weight of the great cart and load thrown upon him, one of his horns with part of the skull was dashed in and the poor animal drowned. This was an unlucky day, another bullock having suddenly dropped down

and died, and in lassoing one to fill the place of the latter, one of its legs was broken; so that three beasts were lost.

On reaching Ponto Morgues, 21 miles from Buenos Ayres, I took a horse and left the Tropa, which did not get to town till 5 days after, so bad are the roads close to the great metropolis of the Argentine Republic. I made my way home that very night that I left the carts, 7 months after setting out, and so much was I disfigured with the effects of weather and sun, to say nothing of dirty and tattered garments, that several of my old acquaintances did not know me.

Thus I have given a detail of my pleasure trip across the vast plains of Buenos Ayres, a journey during which I may say that I have travelled on my own feet nearly 2000 miles, viz. from the Rio Segero on the N.E. to the foot of the Cordillera on the N.W., and seen, said, and done many things, with which it would be superfluous and impertinent to trouble you.

XVIII.—*On the* Laurus Cassia *of Linnæus, and the Plants producing the Cassia Bark of Commerce.* By Robert Wight, M.D.*

My attention was first directed to this subject by a communication from Government, in which I am requested to endeavour to ascertain "whether the common Cassia Bark of the markets of the world is a thicker and coarser portion of the bark of the genuine cinnamon plant or tree, or whether it is the bark of a plant not analogous to the cinnamon plant or tree."

Before it was possible to return a satisfactory answer to this question, it seemed incumbent on me to ascertain what plant Linnæus meant to designate under the name of *Laurus Cassia,* and whether it was probable the plant so called could supply all the bark passing under that name in the markets of the world. This primary, but most difficult inquiry was rendered indispensable by the, generally supposed, ridiculous assertion of Mr. Marshall, that the leaves, and the bark of the trunk and branches of the *Laurus Cassia* of Linnæus, so far from being

* From the Madras Journal of Literature and Science, 1839. No. 22.

aromatic and spicy like cinnamon, are bitter and have in a slight degree the taste and odour of myrrh. This assertion, wide as it may appear of the truth, is yet founded in fact, and what may appear still more extraordinary, has led to a discovery, which, without such aid as he has given, would not probably have soon been made by a professed botanist, a title to which I believe Mr. Marshall does not aspire. He appears to have been led to the discovery, that the *Laurus Cassia* of Linnæus did not produce aromatic bark, simply through the native name, and wonders how it could have received from him the name of *Cassia*, and had qualities attributed to its bark which it does not in the slightest degree possess. I think I can now answer the question, and explain the mystery which has so long hung over this species, and been hitherto rendered only more obscure by each attempt to bring it to light.

It is well known to modern botanists, that many of their earlier predecessors were but indifferent describers of plants, and often very loose in their quotations of figures as synonyms, a sin of which Linnæus was often about as guilty as any of his cotemporaries. He seemed to have had an idea, that their figures were generally at best but approximations to the truth, and that if a figure exhibited even a remote similarity to a plant before him, especially if from the same country, he might with safety quote it as a synonym. Bearing this in mind, we can easily account for a number of errors to which his incorrect synonyms have given rise. The present instance affords an excellent example of what I have here stated, and one which, but for the discovery of Mr. Marshall, might have long remained undetected.

In Herman's herbarium of Ceylon plants, he (Linnæus) found one bearing the native names of "Dawalkurundu, Nikadawala," under which it is referred to, or described in Herman's 'Musæum Zeylanicum.' This he considered a species of *Laurus*, apparently from habit alone, and in his usual brief precise style, calls it, "Laurus foliis lanceolatis trinerviis, nervis supra basin unitis;" having previously called the true cinnamon, "Laurus foliis ovato-oblongis trinerviis basi nervos unientibus." The difference between the two, as indicated by the names, seems very slight, merely depending on the one

having lanceolate leaves with the nerves united above the base; while in the other the leaves are said to be ovate-oblong with the nerves distinct to the base—differences small indeed, and such as could never be found of much avail in distinguishing the one plant from the other, since they are both constantly met with in different leaves on the same tree. Such being the case, it is not much to be wondered at that botanists should have been surprised by the boldness of Mr. Marshall's announcement, that two trees, believed to be of the same genus, and so nearly alike in their external forms, should yet differ so very widely in their properties. But so it is, and nothing can be more certain than that the fact is as he states it.

In proceeding to trace the history of the two species, aided by the light Mr. Marshall has thrown on them, our difficulties vanish like mist before the noon-day sun, though Mr. Marshall himself has found it "difficult to conceive how the Dawalkurundu obtained the appellation of *Laurus Cassia* from Linnæus." It was because Linnæus's specimen of Dawalkurundu was neither in flower nor in fruit. Had it been so, he was too acute an observer ever to have confounded it with the plants with which he has associated it in his synonyms. This explanation, it may be answered, is mere assumption on my part—it certainly is so, but supported by so strong circumstantial evidence, as not to leave a doubt of its correctness. Linnæus has in his 'Flora Zeylanica' given a short description of each of these species: his description of the cinnamon is principally confined to the flower, and is most precise. In his description of the other, the flower is not once alluded to. Here he declares, that he knows not by what mark to distinguish it from the '*camphorifera Japonensium*,' which in its foliage it greatly resembles, but nothing can be more distinct than its inflorescence; that of the camphor tree being a panicle, having a stalk as long as the leaves; while in Dawalkurundu it may be described as a subsessile capitulum, that is, 5 or 6 sessile flowers congested on the apex of a very short peduncle, and surrounded by an involucrum of 4 or 5 leaves; several of which capitula usually form verticels round the naked parts of the branches where the leaves have fallen. He

begins his description of *Laurus Cassia** by stating that he at first considered it a variety of the antecedent (cinnamon); but now that he knows not by what mark to distinguish it from '*camphorifera Japonensium*,' for the leaves are thinner than those of cinnamon, the nerves uniting above the base as in *camphorifera*, and are sprinkled beneath with a greyish dew (*subtus rore cæsio illinita*) as in the camphor tree, and are at the same time lanceolate and of a thinner texture than the preceding (cinnamon). The whole of his description in short agrees most exactly with Mr. Marshall's description of the Cingalese Dawalkurundu, and leaves not a doubt that both had the same plant in view, and consequently that Mr. Marshall is so far correct in saying that the bark of the *Laurus Cassia* of Linnæus possessed none of the qualities attributed to it. So far all is clear; but now the chapter of errors begins.

Had Linnæus been permitted to exercise his own unbiassed judgement in this case, it is not improbable he would have avoided the error of assigning to a plant which, with all his acuteness, he knew not how to distinguish from the camphor tree, the credit of producing Cassia, or at all events would not have done so without some expression of doubt, so as still to leave the question an open one. But, upon consulting other authorities, he found in Burman's 'Thesaurus Zeylanicus' the figure of a species of *Cinnamomum* or *Laurus* as he called the genus, to which Burman had given the name of *Cinnamomum perpetuo florens*, &c. and assigned the native name of Dawalkurundu, not as it appears from the specimen itself having been so named, but because being different from the true cinnamon of which he had seen specimens and figures, he thought it an inferior, wild or jungle sort, which must of necessity be the plant that Herman had described in his 'Musæum Zeylanicum,' though the inflorescence differed much from the description, (a very essential point, which Burman remarked and endeavours to explain away,) and therefore gave it the

* "Hanc speciem olim pro antecedentis varietate habui, nunc vero, qua nota hanc a *camphorifera* Japonensium distinguam, non novi; Folia enim *Cinnamomo tenuiora*, nervis ante basin coeuntibus ut in *camphorifera*; subtus rore cæsio illinita, ut Camphora, et simul lanceolata ac tenuiori substantia quam præcedentis."—*Linn. Flor. Zeylanica*, p. 62.

same Cingalese name. Linnæus's specimen not being in flower, and the resemblance between the specimen and figure being in other respects considerable, he had not the means of detecting the discrepancy, and unsuspectingly adopted Burman's figure and name as a synonym to his plant. In Rheede's 'Hortus Malabaricus,' (1 tab. 57) he found the figure of another cinnamon, even more closely resembling his plant in its general aspect than Burman's figure: this he also associated as a synonym; and Rheede's plant being lauded on account of the aromatic properties of its bark and leaves, which resemble the true cinnamon, though it is not the genuine cinnamon tree, he seems to have considered himself quite safe in associating this also, and called the three species, this tria juncto in uno plant, *Laurus Cassia*, and assigned it as the source of the officinal "*Cassia Lignea cortex*."

After this exposition of the origin of the species *Laurus Cassia*, it can scarcely be a matter of surprise that no two botanists have ever agreed as to the plant which ought to bear the name; nor, that not one of them should ever have surmised what plant Linnæus had constituted the type of his species. It is not my intention on the present occasion to extend these remarks, by tracing the various conjectures that have been promulgated on the subject; suffice it to say that no one, so far as I am aware, has taken a similar view as that now explained. It only further remains for me to give some account of the three species thus erroneously associated.

The first mentioned, Dawalkurundu, Linnæus's own plant and the type of the species, is, I believe, the *Laurus involucrata* of Vahl, and of Lamarck in the 'Encyclopédie Méthodique,' and has in Professor Nees's Monograph of the Indian *Laurinæ* (Wall. Plant. As. rariores), received the name of *Tetradenia Zeylanica*, but is the *Litsea Zeylanica* of a former work of his, a name which I presume must be restored, owing to the other being preoccupied. The slight difference of structure does not seem to render a new genus necessary.

The second and third have both been referred, by the same eminent botanist, to his variety of the true cinnamon, the *Cinnamomum Zeylanicum*, a decision to which I cannot subscribe, as I cannot perceive that either of these figures are referable

to any form of that species, and they besides differ specifically from each other.

The *Cinnamomum perpetuo florens* appears to me a perfectly distinct species, very nearly allied to, if not actually identical with, Nees's own species *C. sulphuratum*, of which I have now got specimens from Ceylon. This I infer from the appearance of the plant as represented in the figure, for if any dependence is to be placed on the description, it is impossible to admit it into the genus. On this however, I do not feel disposed to place much reliance, as it was not the practice a century ago, when the description was written, to examine the structure of flowers with the same care that is now bestowed. Should it be objected, that the species I quote as the *C. perpetuo florens* is clothed with yellowish pubescence, which is not mentioned by Burman, then I have another from the same country (Ceylon) perfectly glabrous, agreeing in the form of its leaves, but differing in having more numerous and smaller flowers, which may be substituted, and that I do not think, more than the other, a variety of the genuine cinnamon tree.

The Malabar plant *Carua* (Hort. Mal. 1. tab. 57), on the other hand, I consider a very passable figure of a plant, in my herbarium named, by Nees himself, *Cinnamomum iners*; but, whether or not I am right in the species to which I have referred it, I can have no hesitation in giving it as my opinion that it is not referable to any form of the *C. Zeylanicum*; neither can I agree with him in thinking the plant figured under the name of *Laurus Cassia* in the 'Botanical Magazine,' No. 1636, is referable to the Ceylon species, but is I think very like the Malabar one, the only species of the genus to which the name *Cassia* should be applied, if that name is still to be retained in botanical nomenclature, as being the only one of the three associated species known to produce that drug. To another plate of the 'Botanical Magazine' (*Laurus Cinnamomum*, No. 2028) I also refer here, and feel greatly at a loss to account for its introduction into that work under a different name from the preceding. The plant which Nees formerly considered the *Laurus Cassia*, but now calls *Cinnamomum aromaticum*, from China, is a very nearly allied species, but is distinct, and furnishes much of the bark sold in the Euro-

pean markets under the name of Cassia, though it has nothing whatever to do with the *Laurus Cassia* of Linnæus, which, from the preceding history appears strictly confined to Ceylon and India proper, and that name, not being referable to any one species, ought unquestionably to be expunged from botanical nomenclature, its longer continuance there only tending to create confusion and uncertainty. This brings me to the next question—namely, what plant or plants yield the Cassia bark of commerce?

The foregoing explanation, in the course of which two plants are referred to as yielding Cassia, greatly simplifies the answer to this one. The first of these is the Malabar Carua figured by Rheede, the second Nees's *Cinnamomum aromaticum.* The list, however, of Cassia-producing plants is not limited to these two, but I firmly believe extends to nearly every species of the genus. A set of specimens, submitted for my examination, of the trees furnishing Cassia on the Malabar Coast, presented no fewer than four distinct species; including among them the genuine cinnamon plant, the bark of the older branches of which, it would appear, is exported from that coast as Cassia. Three or four more species are natives of Ceylon, exclusive of the cinnamon proper, all of which greatly resemble the cinnamon plant, and in the woods might easily be mistaken for it and peeled, though the produce might be inferior. Thus we have from Western India and Ceylon alone, probably not less than six plants producing Cassia; add to these nearly twice as many more species of *Cinnamomum,* the produce of the more Eastern States of Asia and the Islands of the Eastern Archipelago, all remarkable for their striking family likeness, all I believe endowed with aromatic properties, and probably the greater part if not the whole contributing something towards the general result, and we at once see the impossibility of awarding to any one individual species the credit of being the source whence the *Cassia lignea* of commerce is derived; and equally the impropriety of applying to any one of them the comprehensive specific appellation of Cassia, since all sorts of cinnamon-like plants, yielding bark of a quality unfit to bear the designation of cinnamon in the market, are passed off as Cassia.

XIX.—*On the discovery of Fossil Teeth of a Leopard, Bear, and other animals in a Crag Pit at Newbourn in Suffolk.*

By Charles Lyell, Esq., F.R.S., V.P.G.S., &c.

During a late tour in Suffolk (June 1839,) Mr. Wm. Colchester of Ipswich pointed out to me in his collection of fossil teeth from the Red Crag of Newbourn near Woodbridge, one tooth which differed greatly from the rest, and which we, both of us, suspected to belong to a carnivorous mammifer.

On submitting the tooth to the inspection of Mr. Owen of the College of Surgeons, he found on comparison that it agreed precisely in size and shape with the posterior grinder of lower jaw (left side) of the Leopard, *Felis leopardus*, Linn. "This tooth," says Mr. Owen, "is so exactly similar in size and shape to the corresponding tooth in the Leopard, that even its specific identity could not be denied. At the same time the dental formula of the genus *Felis* maintains so close a correspondence in everything but size throughout the known species, that the identity of the fossil with any existing species could not be affirmed on the evidence of a tooth alone. The characteristic fragment from Newbourn affords however decisive evidence that a feline animal as large as a Leopard existed at the geological epoch indicated by the formation in which it was found."

The molar in question is imperfect; the crown and upper portion, so far as the enamel extends, is well preserved, but the base has lost the fangs, and has the appearance of having been worn and polished after the fangs had been broken short off. The two cusps on the crown still retain their points. (See fig. 1.)

Fig. 1.

Posterior molar (left side) of Leopard.
a. View of tooth from the inside.
b. View of the same from the outside.

This fossil resembles in colour that of many of the accompanying teeth of fishes, most of which belong to different species of the shark family, with which the palatal bones of the *Myliobates*, a kind of Skate, are intermixed. It is deserving of remark that in a great portion of the shark's teeth the softer or bony portion at the base has been worn away more or less

entirely as if by attrition, while the upper part, or that covered by enamel, has suffered but slightly. In a word they seem to have been subjected to the same mechanical action as the tooth of the Leopard.

Newbourn is a village on the west side of the estuary of the Deben, and about six miles S.W. from Woodbridge. In the large pit of red crag at the northern extremity of the village (Mr. Wolton's pit) the crag presents its ordinary character of a purely marine deposit, containing the usual shells, in great part comminuted. But the horizontal strata are traversed to the depth of about thirty feet by numerous fissures, which are from a few inches to a foot or more in width, and are filled principally with the detritus of red crag in which numerous fragments of shells are still preserved. Some of these rents terminate downwards, coming to a point, with no signs of fracture below. As at present our information simply extends to the fact that the Leopard's tooth was picked up together with those of fishes in this pit, it might be suggested that the mammalian relic was possibly derived from the contents of one of the fissures, the filling of which was an event certainly posterior and perhaps long subsequent to the æra of the deposition of the crag.

It is well known that teeth of the cave hyæna were found near Maidstone, in Kent, in a rent traversing the limestone called Kentish Rag, and it was not till many years afterwards that any other teeth or bones of quadrupeds were discovered in the superficial deposits of the same district.

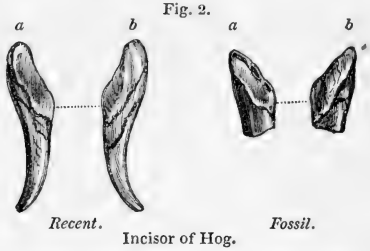
Mr. Searles Wood, to whom I communicated the result of Mr. Owen's examination of the Newbourn fossil, lost no time in carefully examining a large collection of fossil teeth from Newbourn, belonging to the Rev. Edward Moore, of Bealings, near Woodbridge. They belong chiefly to the fishes usually found in the Red Crag, but Mr. Wood selected from among them some which he supposed to be mammalian. Mr. Owen, after an attentive comparison of these, has been able to refer them to a Bear, Hog, and a large Ruminant of the size of the red deer.

The following are the notes on these specimens with which I have been favoured by Mr. Owen :—

"1. *Bear.*—The crown of the tooth of a species of *Ursus*. It is the antepenultimate molar, right side, upper jaw. The fossil indicates a species about the size of the common European bear, but not identical with that or any other existing species. It is smaller than the two large species of bear from the German bone caverns. I have not the means of comparing it with the smaller extinct species described by Goldfuss.

"2. *Hog.*—The external incisor of a young Hog: the tooth

Fig. 2.



Incisor of Hog.

a a. View of tooth from the inside. *b b.* View of tooth from the outside.

belongs to the lower jaw, right side, and very closely resembles the corresponding tooth of a young wild boar. (See fig. 2.)

"3. *Ruminant.*—Fragments of a fractured molar of a Ruminant as large as the red-deer."

The fossil teeth above described, like the tooth of the leopard, are all of them more or less broken and worn. We know not whether they were procured from the fissures or the regular strata of the large Newbourn pit, but I confess that, judging from their appearance, I incline to the opinion that they are all of the age of the red crag. They seem to have undergone precisely the same process of trituration, and to have been impregnated with the same colouring matter, as some of the associated bones and teeth of fishes which we know to have been derived from the regular strata of red crag. Had these mammalian remains been simply washed into fissures formed subsequently, we might have expected them to be in a different state from the crag fossils. It is true that in the formation last mentioned, throughout its range in the counties of Suffolk and Essex, no vestige of a terrestrial quadruped had previously been met with; but I may remind the reader that Mr. Wood found in the red crag of Butley, about seven miles north-east of Newbourn, a single specimen of a freshwater

shell, a variety of the *Planorbis marginatus*, and in the red crag of other places three individuals of an estuary species, *Auricula myosotis*. The same river which conveyed these shells, but especially the *Planorbis*, into the open sea, may also have carried down the carcasses or bones of land animals.

XX.—*On the occurrence of Fossil Quadrumanous, Marsupial, and other Mammalia in the London Clay, near Woodbridge, in Suffolk.* By Charles Lyell, Esq., F.R.S., V.P.G.S., &c.

In the summer of 1838 I was informed by Mr. Wm. Colchester of Ipswich, that he had obtained in the spring of the preceding year, from Kyson (or Kingston), near Woodbridge, in Suffolk, a tooth which he supposed to belong to a mammiferous quadruped, and that it was derived from a bed of sand which he conceived to belong to the London clay formation. In the following year, after having seen the tooth in question and recognized it as decidedly mammiferous, I requested him to take me to the spot, which is situated near the village of Martlesham, on the borders of the estuary of the Deben, about $1\frac{1}{2}$ mile from Woodbridge, and at the distance of about 6 miles from the village of Newbourn mentioned in the preceding notice. I found the deposit at Kyson to consist of brown clay laid open to the depth of 12 feet, and below this sand in layers, yellow and white, which has been pierced to the depth of 12 feet without reaching the bottom. The clay and sand here are dug for making bricks; in the uppermost bed of this sand, precisely at the point where it is in contact with the overlying clay, I found numerous teeth of fishes of the Shark family, similar to others which Mr. Colchester had previously met with associated with the mammalian tooth.

As the clay at Kyson is covered by red crag at a short distance from the pits, and as I had seen clay of the same colour beneath the crag in the neighbouring cliffs of Bawdsey, and also at Felixstow and Harwich, containing Septaria, and as at Harwich the imbedded shells, fruits, and bones of Turtle, are such as characterize the London clay, I entertained no doubt that the Kyson formation belonged to the Eocene period.

On showing the fossil tooth to Mr. Owen, he at once affirmed that it was the grinder of some one of the mixed feeders, rather than either a purely carnivorous or herbivorous quadruped. His first comparison led him to suppose that it was one of the molars of the lower jaw of an Opossum, about the size of the *Didelphys virginiana* of North America, to which it in fact bears so great an affinity that it is only distinguishable when we observe with care the more quadrangular form of the molars of the quadrumanes as contrasted with those of the Opossums, in which the anterior and external angle of the grinder is cut off as it were vertically.

When subsequently Mr. Owen instituted a more minute and extensive comparison, with a view of giving an anatomical description of the tooth above-mentioned, he discovered clearly that it was not a *Didelphys*, but the molar of a Monkey of the genus *Macacus*, thus constituting at once the first terrestrial mammifer which had been found in the London clay, and the first quadrumanous animal hitherto discovered in any country in tertiary strata as old as the Eocene period.

Soon after my visit to Kyson, Mr. Searles Wood, having learnt from me that Mr. Owen had determined the tooth above-mentioned to be mammiferous, visited the spot, and prevailed on Mr. Colchester to search in the sand previously thrown aside from the bed containing the numerous teeth of fish. The result of his examination was the discovery of a lower jaw, referred by Mr. Owen to the genus *Macacus*, containing one molar tooth and the alveolus of another*.

Pursuing his researches Mr. Colchester afterwards met with another jaw, which is figured in the subjoined notice (see figs. 2 *a*, 2 *b*, 2 *c*, pp. 192, 193), which Mr. Charlesworth has since described as the jaw of an Opossum†, a genus to which it will be seen that Mr. Owen also considers it to be in all probability allied. Lastly, in September, 1839, two grinders referred by Mr. Owen to insectivorous bats were also obtained by Mr. Colchester from the same pit at Kyson. (See fig. 3. p. 194.)

* See papers by Messrs. Wood and Owen, Mag. of Nat. Hist., Sept. 1839.
† *Ibid.* p. 450.

XXI.—*Description of the Mammalian Remains found at Kyson in Suffolk, mentioned in the preceding Notice.* By Richard Owen, Esq., F.R.S., &c.

1. Molar of a *Macacus.* (Fig. 1.)

This tooth was one of the first of the mammiferous remains from the London clay formation at Kyson which was submitted to my examination by Mr. Lyell, and the one which after a cursory comparison I observed to present a considerable resemblance with the molar of an opossum. I should not however have presumed to have published a statement of its affinity to, much less its identity with, the genus *Didelphys*, without testing the fossil by a more extended and rigorous comparison.

This I have lately undertaken with a view to the present communication, and the result has been to identify the tooth as a second molar, left side, lower jaw of a *Macacus* (the tooth which corresponds with the second 'bicuspis' in Human Anatomy.) (See fig. 1.) The crown presents four tubercles, arranged in two transverse pairs, the anterior pair being the most distinctly developed, and rising the highest (fig. *a*.); there is also a very small ridge or rudimental talon at the anterior and another at the posterior side of the crown; the latter is placed between and connects together the two posterior tubercles. The fangs are two, strong and divergent; the anterior one has been broken off. The grinding surface of the tooth presents two depressions, a small one in front of the anterior pair of tubercles, and a larger one between the two pairs of tubercles. (Fig. 1, *b*.) The tooth has evidently belonged to an old individual, for the tubercles are worn and the posterior concavity is smoothed and deepened by attrition. It differs from the corresponding tooth of a recent *Macacus* of the same size in having a slight ridge along the base of the anterior part of the crown, and in being a little narrower from side to side, and the same characters distinguish the posterior molar of the fossil *Macacus* described by me in the September number of the 'Magazine of Natural History' (1839). As, moreover, the present fossil

Fig. 1.

a *b*

molar bears exactly the same proportion to the above-mentioned fossil posterior molar, which obtains in the corresponding teeth of the recent *Macaci*, I have no doubt that the two fossil teeth belong to the same extinct species of *Macacus*.

The inferior molars in the genus *Didelphys* differ from the tooth in question in having the anterior and external angle cut off as it were vertically.

2. *A portion of Jaw with one of the False Molars of a Mammiferous Species, probably allied to the Genus* Didelphys. (Fig. 2.)

There is no tooth so little characteristic, or upon which a determination of the genus could be less safely founded, than one of the false molars of the smaller carnivorous and omnivorous *Feræ* and *Marsupialia*. A large, laterally compressed, sharp-pointed middle cone or cusp, with a small posterior, and sometimes also a small anterior talon, more or less distinctly developed, is the form common to these teeth in many genera of the above orders. It is on this account, and because the tooth of the fossil in question (fig. 2 *a*.) differs in the shape of the middle and size of the accessory cusps from that of any known species of *Didelphys*, that I regard its reference to that genus as premature, and the affinities of the species to which it belongs as awaiting further evidence before they can be determined beyond the reach of doubt. Mr. Charlesworth, by whom the present fossil was first described and figured*, has accurately specified the differences above alluded to in the shape of the crown of the tooth as compared with the false molars of the true Opossums: they are seen in the more equilateral or symmetrical shape of the middle cusp, the greater development of the posterior talon, and the presence of the anterior talon at the base of the middle cusp: the grounds on which his determination of the fossil was founded are not stated.

Fig. 2 *a*.

Outside, nat. size.

I agree, however, with Mr. Charlesworth, so far as to consider the fossil in question as bearing so close a resemblance

* Mag. of Nat. Hist., September 1839.

to the corresponding part of the Opossums as to warrant the expectation that subsequent discoveries may prove the differences above-mentioned to be merely specific. The crown of the spurious molars of the placental Feræ which present the same general form as the fossil, are thicker from side to side in proportion to their breadth; the spurious molars of the *Dasyurus Thylacinus* and *Phascogale* differ in like manner from the fossil. It is in the marsupial genera *Didelphys* and *Perameles* that the false molars present the same laterally compressed shape as in the fossil. Now besides the perfect tooth, the fossil includes the empty sockets of two other teeth (fig. 2, *b*); and the relative position of these sockets places the *Perameles* out of the pale of comparison. On the hypothesis that the present fossil represents a species of *Didelphys*, the tooth *in situ* unquestionably corresponds with the second or middle false molar, right side, lower jaw. This is proved by the size and position of the anterior alveolus. Had the tooth *in situ* been the one immediately preceding the true molars, the socket anterior to it should have been at least of equal size, and in juxta-position with the one containing the tooth. The anterior socket, however, is little more than half the size of the one in which the tooth is lodged: it is also separated from that socket by an interspace equal to that which separates the first from the second false molar in the *Didelphys Virginiana*. This is well shown in the inside view (fig. 2, *c*.). In the placental mammalia, in which the first small false molar is similarly separated by a *diastema* from the second, the first false molar has only a single fang. In the present fossil the empty socket of the first false molar proves that that tooth had two fangs as in the marsupial *Feræ* and *Insectivora*. There is nothing in the size or form of the socket posterior to the implanted tooth of the fossil to forbid the supposition that it contained a spurious molar resembling the one in place; had it been the socket of a true molar, as Mr. Charlesworth conjectures, then the fossil could not have belonged to *Didelphys* or to any other known marsupial genus, because no known marsupial animal which presents the

Fig. 2, *b*.

Nat. size.

Fig. 2, *c*.

Inside. Nat. size.

posterior false molar of a similar form and in like juxta-position with the true molars, as the tooth in the present fossil, (on the supposition that it immediately preceded the true molars) has the next false molar so small as it must have been in the fossil on that supposition.

3. *Two molars of a small Mammal most nearly resembling those of the Insectivorous Bats.* (Fig. 3.)

One of these small grinders (fig. 3, *a*) has its crown composed of four triangular prisms, placed in two transverse rows, with an angle turned outwards and a side or flat surface inwards, the summits being sharp-pointed. The exterior prisms are the largest. The crown swells out abruptly above the fangs, defending them, as it were, by an overhanging ridge. There is a small transverse eminence or talon at the anterior part of the crown; and a very small tubercle is placed between the bases of the two external prisms.

a. Fig. 3. *b.*

Twice nat. size.

The second molar (fig. 3, *b*) differs from the preceding in having the two posterior prisms suppressed, and replaced by a flattened triangular surface. The anterior prisms are present, and their apices project far beyond the level of the posterior surface. There is a small ridge at the anterior part of the tooth.

These teeth agree more nearly with the antepenultimate and last molars of the larger Insectivorous Bats than with any other teeth with which I have as yet compared them: they differ chiefly in the presence of the small tubercle at the basal interspace of the exterior prisms.

XXII.—*Information respecting Botanical Travellers.*

Mr. Schomburgk's recent Expedition in Guiana.

In our first volume, p. 68, we communicated the accounts which we had received from Mr. Schomburgk up to the autumn of 1837, informing us of his intention to prosecute his researches to the eastward and towards the sources of the Orinoko. We shall now have the satisfaction, from his arrival in this country, to present our readers, in the present and subsequent Numbers, with the narrative of his proceedings up to the time of his return to Georgetown, the capital of British Guiana.

The great object of the expedition determined upon during the favourable season of 1838–39 was to connect my researches with those of the celebrated Humboldt at Esmeralda, on the Upper Orinoco. This was a task not without its dangers, but such that, should I be able to reach my aim, the success would prove its own reward, and another chasm in the geography of South America would be filled up. I succeeded, and reached Esmeralda from the east on February 22d, 1839, after a period of nearly five months from the time of our departure from the Brazilian boundary Fort San Joaquim, and after enduring the greatest hardships and deprivations. But while the details and geographical discoveries made during this expedition, will doubtless appear in the Journal of the Royal Geographical Society, under whose auspices I travelled, I may here give a general view of the natural productions which distinguished the regions over which our steps, and canoes carried us.

San Joaquim do Rio Branco is situated at the junction of the river Takutu with the river Parima of the natives, or Branco of the Portuguese. We may almost consider it, as being situated in the middle of those extensive savannahs, bounded by the Carawaimi, Canucu, Pacaraima, and Parima mountains, no doubt once the basin, and the origin of the tradition of that mysterious lake which figured for centuries on our maps, and which even the extensive geographical researches of a Humboldt, and his proofs of its present non-existence, have not been able to erase entirely from some recent maps.

These savannahs are covered with *Gramineæ*, and *Cyperaceæ*, chiefly of the tribes *Paniseæ*, *Chlorideæ*, *Agrostideæ*, interspersed with the genera *Cyperus*, *Carex*, *Scirpus*, &c. And while the former afford food to numerous herds of cattle, the sedges give the appearance of herbage to regions which otherwise would appear waste, and barren. The savannahs consist of undulating ground; this is just as we might expect, admitting the opinion, that they formed once the bed of a vast inland lake. Many parts are marshy; even the lower declivities of those gradually rising hills, exhibit frequently a greater moisture than the parched appearance of the environs would warrant, and to the explanation of which the severe dews, the characteristic meteorological phænomenon under the tropics, and the mechanical process of percolation, give a clue. These moist places are distinguished by a livelier vegetation, consisting chiefly of species of the genera *Utricularia*, *Eriocaulon*, *Xyris*, *Pontederia*, *Drosera*, *Marica*, &c., high above which the majestic *Mauritia flexuosa* towers its fan-shaped leaves, and gives that peculiar aspect to the landscape, which stamps it at once with undeniable features as tropical. Accord-

ing as the moisture is more or less prevailing, or the thin stratum of mould is mixed with sand, we may trace individuals of the genera *Crotolaria**, *Lisianthus*, *Coutoubea*, *Hibiscus*, *Shultesia*, *Zornia*, *Stylosanthes*, *Elephantopus*, *Mimosa*, *Eupatorium*, *Latreillea*, *Unxia*, *Wulffia*, *Centrosema*, *Phaseolus*, *Indigofera*, *Tephrosia*, *Porophyllum*, *Hyptis*, *Gerardia*, *Lippia*, *Cryptocalyx*†, *Camara*, *Aegiphila*, *Amasonia*, *Irlbachia*, *Bacopa*, *Buchnera*, *Beyrichia*, &c. A few stunted trees of the *Curatella americana*, the rough leaves of which are so useful to the Indian for polishing his arrows and war clubs; some *Malpighiæ*, the bark of which the Brazilians use for tanning, are dispersed over the savannahs, and in consequence of their almost equal size, do not contribute to lessen the monotonous aspect of these plains —nor do they afford shade to the weary traveller, as their inconsiderable size and thinly scattered foliage, does not lessen the effects of the solar rays upon him, who should seek shelter under their branches. Coppices of wood rise sometimes like oases out of these savannahs, and are marked by trees of considerable size. On approaching such a desirable refuge from the heat of the sun, the transition from the vegetation of the savannah to that of the forest, is highly remarkable. The solitary trees of the *Curatella* become more numerous; they are interspersed with arborescent shrubs, chiefly belonging to the natural orders of *Rubiaceæ* and *Compositæ*, and it appears still undecided, whether forest or savannah is to have the predominance. We approach the wood, girt by species of the genera *Helicteris*, *Mimosa*, *Bauhinia*, *Apeiba*, *Solanum*, &c., satisfied with but little nourishment, and inured to the full action of the sun. In their vicinity we may observe the *Agave*, and several erect and angular *Cacti*, some of the latter in form of huge Candelabras, or overtopping in height the surrounding trees‡, perhaps adorned with flowers remarkable for their beauty,—alas! of short duration—or inviting by their purple-coloured fruits. Divers species of Inga, several *Cassieæ*, *Combretaceæ*, *Lecythideæ*, and *Myrtaceæ*, distinguish the interior of the small forest, which is seldom more than two miles in circumference. Occasionally tracts of huge blocks of syenite traverse the savannahs, or shelves of granite just rise above the earth, and extend to a considerable

* For a detailed account of the plants collected during my expeditions in the interior of Guiana, see Enumeration of plants collected by Mr. Schomburgk in British Guiana, by George Bentham, Esq., Annals of Natural History, Numbers VIII. XII. XIX. and XX. Mr. Bentham's kind intentions are to continue their systematic description in future numbers, while divers sets of these plants, of about 900 species each, remain to be disposed of.

† Annals of Natural History, No. XII. p. 446.

‡ I have observed in the vicinity of Pirara in one of these coppices a *Cereus*, the height of which I estimated at from 50 to 60 feet.

breadth and length. They possess their own Flora; *Rhexiæ* and *Melastomæ*, form perhaps the striking feature, as their large and purple flowers are discerned at a great distance amid these verdant isles; but on approaching many plants of that interesting tribe the *Orchideæ* may be discovered, where one would have thought it impossible that they could derive nourishment. The most common on these piles of syenite, or on the less elevated rocky shelves, are *Cyrtopodium* (*Andersonii*), two new species of *Epidendrum*, *Schomburgkia marginata* and *crispa*, chiefly the former species. It was in a similar situation, where I found a *Melocactus*, the first which I discovered in Guiana; *Euphorbiæ*, *Peperomiæ*; and if water gush from these rocks, *Gesneriæ*, *Tillandsiæ*, *Bromeliæ*, &c. are very common. Many of these plains are bathed by rills of limpid water, lined by Mauritia palms, and their banks adorned by *Rhexiæ* *Hibiscus*, *Oenotheræ*, *Jussieæ* and a *Phaseolus* with large yellow flowers. *Heliconiæ*, several individuals of *Canneæ*, and among them a gigantic *Thalia*, are to be found at the decided marshy situations. Before we leave however, the vegetable productions of the savannahs, I have yet to mention three species of *Cyrtopodium*, which appear to be undescribed. They are terrestrial, and the most common among them recommends itself by its fragrance, and the long period which it remains in flower. The second species has a panicled scape with numerous yellow flowers, spotted with brown, and the third appears merely a variety of the former, from which it differs only in the darker colouring of its flowers. The Indians when travelling over the savannahs are in the practice of setting the grass on fire, and if the weather has been dry, the conflagration spreads to a great extent, and not only the grass, but likewise the foliage of the trees which cover the savannahs, is destroyed by the fiery element; our *Cyrtopodia* survive however the ordeal, and it appears as if they wanted an impetus to call forth their florescence. If rain follows the conflagration, the raceme soon after makes its appearance from below the pseudo-bulb, and is in full blossom before the plant pushes forth a leaf. The pseudo-bulbs, having been injured by the fire, perish; and if I except a few instances, I have not seen during my repeated travels over the savannahs many bulbs which bore leaves on their apex, or plants which possessed leaves, and blossoms at the same time. The fragrance of the *Cyrtopodium*, or *Paulista*, as it is called by the Brazilians, reminds me of another plant, which with regard to its odour might vie with the former. It is a Neurocarpum, and its beautiful cœrulean flowers, with yellowish disc, sometimes an inch and a half to two inches long, and which appear generally in pairs, diffuse a fragrance which resembles that of our carnati

I have already alluded to the circumstance that wild cattle are dispersed over those savannahs with a general outline of the vegetable production of which, we have just become acquainted. Two private individuals, towards the end of the last century, founded cattle-farms in the vicinity of Fort San Joaquim; and having involved themselves, the Government made pecuniary advances which they could not return, and their property fell ultimately in the hands of Government. Many of the cattle have since strayed, and have been reclaimed by nature, roaming in their wild state over the savannahs, and would no doubt rapidly increase if their number were not materially thinned by the attacks of man and tigers. The Brazilian government order annually an expedition against them, the object of which is to capture such as may become reconciled to the domestic state, and to kill the untractable for the sake of their hides and flesh, the latter of which is slightly salted and dried in the sun on the spot, and sent to Manaos, at the mouth of the Rio Negro. As an account of the manner of attack and capture may prove of interest, I relate what I have seen during my presence at one of these expeditions, coupled with the information which I received from the administrator of these farms.

A place having been selected in the vicinity of water, the huts of the party are soon erected and the necessary preparations concluded. The men go out in pairs on horseback, each being provided with the lasso, a rope plaited of narrow thongs, and about twelve fathoms long. One end of it is firmly fixed to the girth of the saddle, generally on the right side, and at the other end is a running noose. As soon as a herd of cattle is observed, the horsemen approach gently, but their object of remaining unobserved is generally frustrated, as the cattle begin to run as soon as the horsemen come near them. The animal which is to be chased having been meanwhile selected, and pointed out, the horsemen follow, and as the horses are the swifter, they manage in a short time to get nearly in a parallel line with the animal. The well-taught steed, as if aware which had been selected for the chase, takes care to keep up with it, until its rider finds opportunity to prepare for the cast of the lasso. This is taken in the right hand, so that the noose may be opposite that part of the circle which he keeps firm in his hand, the other parts of the lasso hanging loosely in coils on the fingers of the left hand. Rising in his stirrups, he gives the noose an impetus by swinging it several times round his head, and discharges it, when he thinks he is most sure in his aim: it carries off the remainder of the string from his left, and, circling in the air, it descends over the horns of the animal, and drawing close around the crown of its head, its swift course is stayed. This is the

moment, when the well-trained horse, although in full speed, stops still, and turning round, uses all its power to pull against the enraged animal. We have supposed that the animal was secured while trying to escape by flight, but sometimes the cattle stand and furiously attack the horsemen, and then great coolness and address are necessary, to avoid their ferocious efforts to gore the horse and its rider. If the horses be lively and well-trained, a great deal of the danger is avoided, as the wary steed watches the motions of the animal, and dexterously avoids its attack, when it suddenly darts upon it. The herd meanwhile pursue their flight, leaving the bulls to guard their retreat, and as it is not usual that they wheel to repeat their attack, if they have once missed their aim, the danger is much lessened, and the horsemen soon succeed in riding off one of the bulls from the rest of the herd and pursue until he stands at bay. The horsemen now keep going round and round the animal, the one endeavouring to engage his attention by making nearer approaches, while the other draws sufficiently near from the opposite side to warrant success, if he should throw his lasso. If the bull make a dart upon either of them, they turn sharp off to the right or left, and the animal passes on straight forward, and makes soon after another stand, until one or the other of the horsemen succeeds in entangling him with the running noose. The ensnared animal makes ferocious efforts to gore the horse, but the latter, aware of the danger by which it is threatened, keeps the rope always on a stretch. If the captured animal pursues too swiftly or makes an unexpected attack, the horseman turns suddenly, stretching by this manœuvre the line at full speed, and counteracting forcibly the animal's advance forwards; it seldom fails of throwing it down, and sometimes with such force as to break its neck or limbs. Convinced at last, that its efforts to gore its capturer are fruitless, it becomes sullen, and allows itself to be dragged forward to the temporary pen which has been erected at the camp. Here they are kept without food or water for three days; they are then turned out, and allowed to graze and drink water, flanked on all sides by horsemen with lances, who manœuvre round the herd to drive back any which might venture to escape; and in the evening they are driven back to the pen. If any should succeed in making their escape the horsemen are ready to pursue them, and to bring back the fugitives in a similar manner as related; but it happens frequently that they become so stubborn as to defy every attempt to induce them to move forward, and such as are so refractory are therefore butchered with the knife.

[To be continued.]

BIBLIOGRAPHICAL NOTICES.

Pracht-Flora Europaeischer Schimmelbildungen. A. C. J. Corda. Leipzic and Dresden, 1839. Folio.

It may seem quite ridiculous to publish a Sertum Mucedinum in the same magnificent style as the Sertum Orchideum of Professor Lindley, but if any be inclined to think so, we have only to refer them to the present most splendid and interesting work. The forms illustrated therein are so beautiful and extraordinary, that at first sight one would be almost inclined to think them recollections of dreams rather than representations of realities and those the offspring of corruption. Twenty-six species, selected for singularity or elegance, are figured, not, as in the generality of works on mycology, by mere scraps, but in all their beauty. Of these nine only have been figured before, and on most of these new light is thrown. Nothing can well be more perfect than the figure of *Syzigytes megalocarpus*, which is one of the most wonderful of vegetable productions, not yielding in interest to *Zygnema* or *Closteria* ; and notwithstanding the admirable memoir of Ehrenberg, under the auspices of the author it presents new attractions. Some of the new forms represented are most wonderful; amongst them is a new *Echinobotryum*, which we have ourselves lately detected of dead stems of *Dahlia*. It appears that the species of the genus are parasites on the stems of other moulds.

We cannot always agree with the author in his systematic views, but with so much novelty before us we may be content to pardon one or two errors. The plant for instance figured under the name of *Dactylium* belongs clearly to quite another series, and is in fact closely allied to *Helminthosporium*. We strongly recommend the work not only to the mycologist but to the lover of nature, to whom the wonders displayed by these lowly productions must prove a rich repast. In conclusion we cannot refrain from quoting the motto prefixed to the work : " Quelle admirable structure, quelle sagesse, quelle Tout-puissance dans le moindre objet sorti des mains du Créateur !"

In the press.

Dr. Johnston is preparing for the press a ' History of the British Sponges and Corallines,' to be printed and illustrated in the same style as his History of the British Zoophytes, to which this new work may be considered as a Supplement, and as completing his ori-

ginal design. It will contain a very full account of all that has been hitherto written on the subject; and an original figure of every species and remarkable variety will be given. Dr. Johnston intends at the same time to avail himself of this opportunity of adding many new figures of zoophytes contributed by his friends, and acquired by himself, since the volume on British Zoophytes was published.

Corpus Florarum Provincialium Sueciæ.—I. *Floram Scanicam scripsit* E. Fries, Upsaliæ, 1835. 8vo.

This is the first of a series of Floras of the different parts of Sweden, comprising that of Schonen. Our object in noticing it here is to give a sketch of the learned Professor's latest views on the arrangement of Fungi, which we are enabled to do not only by the help of the work itself, but from a letter from the Professor himself, dated October 4th, 1838. As the work (though, like the 'Novitiæ Floræ Suecicæ' lately noticed, it is of great utility) is not probably in many hands, we think it cannot fail to be acceptable.

1. Hymenomycetes. { *a.* Agaricinei. *b.* Polyporei. *c.* Hydnei. *d.* Auricularinei. *e.* Clavariei. *f.* Tremellinei.

2. Discomycetes. { *a.* Helvellei (Morchella, Helvella, Rhizina, Peziza, &c.) = Pez. ceraceæ.

Discus excipulo saturatior. { *b.* Bulgariei (Leotia, Bulgaria, &c.) = Pez. gelatinosæ.
c. Dermei (Vibrissea, Ditiola, Dermea, &c.)=Pez. tuberosæ.

Discus ut in sequentibus excipulo dilutior. { *d.* Patellariei (Sarea, Patellaria, Cenangium, &c.)
e. Phacidiacei (Glonium, Actidium, Hysterium, Phacidium, Rhytisma, Leptostroma, &c.)
f. Stictidei.

3. Pyrenomycetes. { Genera e prorsus novo principio ultra 50, naturalissima.

{ *a.* Sphæciei. Ostiolo prominulo, sive eustomi, quale etiam Sp. fuscæ, &c.
b. Dothiorei. Ostiolo impresso, sive cryptostomi.
c. Dichænei. Ostiolo rimoso, sive rhegmostomi.

{ *d.* Perisporiei. Ostiolo poroso, sive porostomi. Analogicum Gasteromycetibus.
e. Apiosporei. Astomi nec sponte dehiscentes (h. l. Antennaria, Myxothecium, Vermicularia.)
f. Cytisporei. Coniomycetes in nucleum redacti, tangunt stilbosporeos.

4. Gasteromycetes. *Sporidia fixa.*
- *a.* Phallodei. Analogi cum Hymenomycetibus.
- *b.* Tuberacei. Analogi cum Discomycetibus.
- *c.* Nidularacei. Analogi cum Pyrenomycetibus.

Sporidia pulveracea laxa.
- *d.* Lycoperdinei.
- *e.* Trichodermacei. Hyphomycetes perfectius evoluti.
- *f.* Myxogastres. Hypodermiis eximie analogi v. c. Perichæna strobilina = Peridermium, Lk.

5. Hyphomycetes.
- (Obs. nunc limites non e substantia floccosa, sed in morphosi pono.)
- *a.* Isariei sive Hymenomycetes elementares.
- *b.* Stilbini sive Discomycetes elementares.
- *c.* Mucorini sive Pyrenomycetes.
- *d.* Mucedines sive Gasteromycetes elementares cum Trichodermaceis confluentes.
- *e.* Dematiei.
- *f.* Sporodermei sive Coniomycetes in floccos concatenati.

6. Coniomycetes.
- *a.* Sclerotiacei sive Hymenomycetes elementares.
- *b.* Tuberculares sive Discomycetes elementares.
- *c.* Stilbosporei sive Pyrenomycetes elementares.
- *d.* Illosporei sive Gasteromycetes elementares.
- *e.* Sepedoniei sive Hyphomycetes elementares.
- *f.* Hypodermiei.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

February 12, 1839.—Thomas Bell, Esq., V.P., in the Chair.

A paper from Mr. Schomburgk, entitled "Remarks on the Greater Ant-bear (*Myrmecophaga jubata*)," was read. This paper commences with some general observations on the *Edentata* and *Monotremata*: the author then proceeds to give a detailed description of the animal under consideration. The following is an abstract of the remaining portion of the paper, or that which relates to the habits of the animal.

Mr. Schomburgk observes, that at a distance the Ant-bear appears to be a much taller animal than it really is, owing to the elongated and nearly erect hair of the mane, and also the erect manner in which it carries its large bushy tail. When walking, the outer portion of the fore foot is applied to the ground, and the long claws are then doubled inwards. It runs with a peculiar trot, and is not, as has been represented, slow in its movements and easily overtaken; for when chased it will keep a horse in canter, and does not tire readily.

White Ants or Termites constitute its chief food. When the Ant-bear meets with one of the tumuli constructed by the White Ants, it immediately pulls the fabric down by means of its large strong claws, and when the Ants are thus exposed its long slender tongue is thrust out to collect them. The movements of the tongue, alternately protruded and retracted, are so rapid, says Dr. Schomburgk, that it is no longer surprising how so large an animal can satiate its appetite with such minute insects. With the Termites he swallows a considerable quantity of the material of which the Ants' nest is constructed. Of this fact Mr. Schomburgk assured himself by dissection, and he is of opinion that the substance of the nest serves as a corrector.

"It has been generally thought," says Mr. Schomburgk, "that the Ant bear lives exclusively on Ants; this, however, is not the case. In one which I dissected a year ago, a species of *Julus* was found; and an adult one now in my possession swallows with avidity fresh meat hashed up for it.

"The Ant-bear makes neither nest nor burrow, its ample tail serving it as sole protection against the inclemency of the weather. One of its favourite positions when at rest, is to tuck up its feet under its belly, and to unite the two extremities almost close together; in which position the tail covers the whole animal: at other times it cowers itself up like a dog when asleep, and the tail covers only the snout and part of the body. The female Ant-bear possesses two pectoral teats, and produces only one young at a time; and as soon as this has received sufficient strength the mother carries it with her on her back, where it keeps itself firmly attached. The young animal remains with its mother for the space of a year, and as this is the period when she brings forth again, it is then obliged to shift for itself.

"If the mother be attacked, she defends herself valiantly: raising herself upon her haunches, she strikes with her sharp claws at the enemy; this is chiefly done with the right foot, while the left rests on the ground; but she quickly changes their respective positions when the attack is carried to the other side: the young one remains all the while clinging to her. If the danger increase, she throws herself upon her back, and strikes with both claws at her enemy.

"I have been assured by a highly-credible person, that the Jaguar finds it difficult to conquer the Ant-bear, and the fight which ensues was described to me as characteristic. It happens frequently that both combatants remain dead upon the spot, or that one does not survive the other many hours. The force which the Ant-bear possesses in its fore feet is astonishing, and I have no doubt that it

is well able to rip open the belly of its assailant; nevertheless, I should scarcely have supposed that the Ant-bear proved formidable to the fiercest of American animals.

"A young one, estimated about four weeks old, was presented to me by Dom Pedro Ayres. While riding on horseback over the savannahs, he discovered the parent with the young, and immediately gave chase. After she had kept the horse in full canter for half an hour, she found herself so closely pressed that she put herself in defence: my friend was ready with the lasso, and having thrown it dexterously over her, she was secured. To the last moment the young one had clung to the mother.

"The young one measured over the forehead along the back, from the tip of the nose to the insertion of the tail, twenty-two and a half inches; the tail was twelve and a half inches, and it stood nine and three quarter inches high. In lieu of the yellowish white of the legs, and the bands of the same colour, which give such a remarkable appearance to the adult, there were in the young animal gray hairs, tinged with white: in all other respects it resembled its mother in colouring.

"The young Ant-bear was quite wild at first, and sought for some dark corner in the room in which it was confined, in order to hide itself. When we approached it, it put itself immediately in defence like the adult ones, and struck out with its right paw, uttering at the same time a growl like that of an incensed puppy. After a few days, however, it became accustomed to its situation, and an Indian woman took upon her to feed it with milk and Cassada, and sometimes with White Ants. It soon showed great attachment to her, and followed her like a dog.

"It appeared to be of a very cold nature; not only the extremities, but the whole body felt cold to the touch, although we kept it wrapped up in a blanket. It preferred, however, to be nestled, and to be taken up, and on putting it down it uttered a whining but not unpleasant sound; when it did not succeed in attracting attention, and was not taken up again, the whining sound was raised to a harsh and grating noise. In following a person, it directed its course more by the smell than by sight, and carried its snout close to the ground. If it found itself at fault, it wheeled round at right angles upon the hind legs, and snuffed the air in all directions, until it found the right scent again. Of the dimness of its sight we had various proofs; it hurt itself frequently against objects that stood in its way, not observing them until it came in contact with them. Its power of smelling was exquisite, and it could

discover its nurse, or any person to whom it had taken a liking, at a considerable distance. Upon these occasions it would immediately commence the whining sound so peculiar to this animal. It was an expert climber; it happened that I was one of its favourites, and whilst writing on my table it used to come softly behind me, and as soon as it was sure it had found me out, it climbed up my legs with great dexterity. It showed its attachment by licking, and was very gentle and even sportive; we all prized it highly. It slept a great deal. We had it for nearly two months, and as it began to feed itself we had great hopes of rearing it; unfortunately we were unable to procure milk, and whether in consequence of the change of food, or some other cause, it gradually declined. I found it sometimes as cold as ice, and stiff, and although I recovered it repeatedly, it died one day during my absence.

"Its place had been meanwhile supplied by an adult specimen, likewise a female. I shall never forget the interesting sight which this individual presented. Some of the Indians belonging to my party, whom I had despatched in quest of game, met it on the savannahs, and wisely attempted to drive it towards San Joaquim without wounding it. My attention was first attracted by an immense hue and cry from the persons about the fort, and upon stepping out the first object which struck me was the Ant-bear, running in a kind of dog gallop towards the houses, and flanked on both sides by the red-skinned Indians, who were furnished with bows and arrows, which they were ready to discharge, should the animal break through their lines. Having arrived at the walls of the fort, it retreated into one of the corners which a bastion formed, and attempted to climb up by thrusting its nails into some of the larger interstices between the freestone of which the walls are built; it did not, however, succeed, and we managed to throw a lasso over it. The animal defended itself valiantly, and as the surrounding persons appeared to be afraid of it, it ran a fair chance of slipping the noose; some of the men more courageous than the rest threw it, however, on the ground, and another noose being fixed to one of its legs, it was secured, and safely lodged in the yard attached to our quarters. In its endeavours to get rid of the rope, which passed round the rump, it chafed itself considerably, and we found it necessary to make a roomy pen, to which it was conveyed. It began to feed on the third day: we gave it Ants and farina; the latter, a preparation of Cassada root, it never refused. The Ants' nests in the neighbourhood of the fort were soon exhausted, and more in way of experiment than out of persuasion that the animal

would eat it, some small pieces of fresh beef were placed before it; to our greatest astonishment it ate the meat with avidity, and has since been chiefly fed on fresh beef and fish.

"By kind treatment it soon became domesticated, and fed out of our hands. When not asleep, (in which state it used the same position as already related,) it rested entirely on its haunches, and stretching its long snout through the palings of its pen, it surveyed the surrounding objects, and snuffed the air.

"It even raised itself frequently, and without difficulty, to nearly an erect posture, and remained thus for some minutes; sometimes it sat with its fore feet crossed. In feeding, it kneeled as sheep and goats do. It attempted frequently to take up objects with its paws; in this manœuvre its long claws assisted wonderfully. In rising from its resting posture it used first to get upon its knees.

"When some meat was thrown before it, it expanded the lateral apertures of the nostrils, and seemed, by moving its flexible upper lip, as if it intended to seek out the most delicate morsels.

"I have already remarked how fond the young one was of climbing, and have no doubt that, if circumstances should require it, they climb trees in their wild state with the same agility.

"It secretes a liquid substance, transparent like water, which drops down almost constantly out of its nostrils and mouth; this is the more remarkable, as it used very little water. The Llama, without using much water, possesses likewise a superabundant quantity of saliva. I recollect, before the pen was finished, when lying in the sun, it perspired so profusely that its hair could not have been more wet had the animal been in the water. It is remarkable that the four individuals, and the young one which we secured at Fort San Joaquim, were all females; in no instance have we observed a male. What, then, is the natural question, becomes of the males? I can give no other answer than that the males are unproportioned to the number of females, and are, no doubt, much more shy. Those which we secured were caught during day; it issues, perhaps, from the dense forests only by night. A similar instance offers itself in the genus *Auchenia*, of which the males do not quit their pastures in quest of the females, and herds exclusively of females and males are met with; it is only during the rutting season that they mix, when the males combat for the females.

"If it could be substantiated that the number of males is considerably smaller than that of the females, in that circumstance would rest an additional ground for supposing that the extinction of its species, like those of the *Edentata* in general, is determined upon.

"The flesh of the Ant-bear is eaten by many of the native tribes, and also by the negroes, who consider its skin a great delicacy."

February 26, 1839.—The Rev. F. W. Hope in the chair.

A communication from the Bishop of Down and Connor was read. In this communication (which was forwarded to the Society through W. Thomson, Esq., Vice-President of the Belfast Natural History Society) his Lordship gives an interesting account of a Philantomba Antelope *(Antilope Philantomba,* Ogilby) which his Lordship had had in his possession for a considerable time. The animal was brought from Sierra Leone by Frederick Wood Mant, Esq., who has lately presented it to the Society. It is said to be a native of a part of the country one or two hundred miles further inland. He is considered to be very rare even in that part of the world, so that little could be learned about him from the inhabitants, by whom, however, he appears to be known by the name of *Phillantombo* or Phillytombo.

"He was landed in England in May 1837, and was thence brought to Down and Connor House, Belfast, Ireland, where he has lived till this present November 1838. The chief change noticed in him has been the loss of his teeth, which took place about Midsummer 1837, and again in 1838, somewhat later in the season; but neither time did he seem to suffer any inconvenience, except for about a fortnight, when he appeared to require softer food than beans and biscuit. He also lost the rough sheath which covered his horns, by rubbing them against trees and posts, of which exercise he is very fond; as he is also of rubbing his cheeks against anything that will assist in removing the glutinous substance which exudes from the orifices under his eyes: for this purpose he is pleased with having his face rubbed by the hand, and he also seems to be gratified by a similar application between his horns. It should be added, that the points of his horns are extremely sharp, as has been experienced by those who have been standing near him when he has been in a playful mood, or who have had occasion to catch him in order to remove him to his night quarters; for although extremely gentle, and free from vice, he is at times too frolicksome to submit willingly to confinement, and is impatient of being taken up in the arms, when he utters a cry like a petted child. It has been remarked, in the case of any wound being inflicted by his horns, that it has never been followed by inflammation, and has soon healed.

"His food has been various; slices of raw potatoes at first, when he came, was his favourite food; but since he has been tried with

wheat, and *rick* beans, and with green branches of any tree, or withered leaves of any kind, he has not eaten of the potatoes at all. Every fruit he readily devours as well as flowers, such as china roses and tulips, or any other gay ornament of the parterre. He has been sometimes observed to dibble in the earth with his sharp hoof, and eat voraciously of the mould; and once, having got access to a plum tree, he swallowed so much of the fruit, stones and all, as to occasion considerable alarm for his safety. He is very fond of hard biscuit, and drinks often of fresh water."

An account of the habits of the Chimpanzee was communicated by Lieut. Henry K. Sayers. "Bamboo, the Chimpanzee, now in the Zoological Society's Gardens, Regent's Park, and the subject of this sketch," says Lieut. Sayers, "was purchased, about eight months since, from a Mandingo, at Sierra Leone, who related that he had captured him in the Bullom country, having first shot the mother, on which occasions the young ones never fail to remain by their wounded parents. On becoming mine, he was delivered over to a black boy, my servant, and in a few days became so attached to him as to be exceedingly troublesome, screaming and throwing himself into the most violent passion if he attempted to leave him for a moment. He evinced also a most strange affection for clothes, never omitting an opportunity of possessing himself of the first garment he came across, whenever he had the means of entering my apartment, which he carried immediately to the Piazza, where invariably he seated himself on it with a self-satisfied grunt, nor would he resign it without a hard fight, and, on being worsted, exhibited every symptom of the greatest anger. Observing this strange fancy I procured him a piece of cotton cloth, which, much to the amusement of all who saw him, he was never without, carrying it with him wherever he went, nor could any temptation induce him to resign it even for a moment. Totally unacquainted with their mode of living in the wild state, I adopted the following method of feeding him, which has appeared to succeed admirably. — In the morning, at eight o'clock, he received a piece of bread about the size of a halfpenny loaf, steeped in water or milk and water; about two, a couple of bananas or plantains; and before he retired for the night, a banana, orange, or slice of pine apple. The banana appeared to be his favourite fruit; for it he would forsake all other viands, and if not gratified, would exhibit the utmost petulance. On one occasion I deemed it necessary to refuse him one, considering that he had already eaten a sufficiency, upon which he threw himself into the most violent passion, and uttering a piercing cry, knocked his head with

such violence against the wall as to throw him on his back, then ascending a chest which was near, wildly threw his arms into the air and precipitated himself from it. These actions so alarmed me for his safety that I gave up the contest, and on doing so he evinced the greatest satisfaction at his victory, uttering, for several minutes, the most expressive grunts and cries; in short, he exhibited on all occasions where his will was opposed, the impatient temper of a spoilt child; but even in the height of passion I never observed any disposition to bite or otherwise ill treat his keeper or myself.

"Although he would never object to be caressed or nursed by even a stranger, yet I never saw him evince the slightest disposition to make the acquaintance of any other animal. At the time he came into my possession I had two Patas Monkeys, and thinking they might become acquainted, I placed Mr. Bamboo in the same apartment, where he resided for five months, yet I never saw the least desire on his part to become even friendly; on the contrary, he showed evident anger and dislike at their approach. This strange attachment to the human race and manifest dislike to all others, I have always considered one of the most extraordinary features of this genus. His cunning was also remarkable. On all occasions where he thought he was unobserved, he would not fail to steal everything within his reach, for no other apparent purpose than to gratify a propensity for thieving: did he, however, even think you were looking at him, he would wait his opportunity with the greatest patience before he commenced depredations. In his habits, unlike the monkey tribe, he was exceedingly cleanly, never soiling his bed or any place near it; and even on board ship (during the warm weather) he never failed to seek the deck, unassisted, whenever the calls of nature required it. On being left by himself in his piazza he would invariably seat himself on the window-sill, which was the highest point he could attain, and commanded a view of the barrack yard as well as the interior of my bed-room; but at sun-set he would descend, enter a washing-tub, which he had of his own accord chosen as a sleeping-place, and remain there all night: as soon, however, as the sun rose, he would never fail to occupy his favourite position on the window-ledge. From this I should say, that trees are ascended by the Chimpanzees merely for observation or food, and that they live principally on the ground. Bamboo, at the time of purchase, appeared to be about fourteen months old, and from what I could learn from the natives, they do not reach their full growth till between nine and ten years of age, which, if true, brings them extremely near the human species, as the boy or girl of West Africa,

at thirteen or fourteen years old, is quite as much a man or woman as those of nineteen or twenty in our more northern clime. Their height, when full-grown, is said to be between four and five feet: indeed I was credibly informed, that a male Chimpanzee, which had been shot in the neighbourhood and brought into Free Town, measured four feet five inches in length, and was so heavy as to form a very fair load for two men, who carried him on a pole between them. The natives say that in their wild state their strength is enormous, and that they have seen them snap boughs off the trees with the greatest apparent ease, which the united strength of two men could scarcely bend. The Chimpanzee is, without doubt, to be found in all the countries from the banks of the Gambia in the north, to the kingdom of Congo in the south, as the natives of all the intermediate parts seem to be perfectly acquainted with them. From my own experience I can state that the low shores of the Bullom country, situated on the northern shores of the river Sierra Leone, are infested by them in numbers quite equal to the commonest species of monkey. I consider these animals to be gregarious, for when visiting the rice farms of the Chief Dalla Mohammadoo, on the Bullom shore, their cries plainly indicated the vicinity of a *troop*, as the noise heard could not have been produced by less than eight or ten of them. The *natives* also affirmed, that they always travel in strong bodies, armed with sticks, which they use with much dexterity. They are exceedingly watchful, and the first one who discovers the approach of a stranger utters a protracted cry, much resembling that of a human being in the greatest distress. The difficulty of procuring live specimens of this genus arises principally, I should say, from the superstitions of the natives concerning them, who believe they possess the power of 'witching.'

"There are authors who have, I believe, affirmed that some of the natives on the western coast term these animals in their language 'Pongos;' but I observed that all the natives in the neighbourhood of Sierra Leone, when speaking of this animal, invariably called him 'Baboo,' a corruption, I should suppose, of our term Baboon."

At the request of the Chairman, Mr. Ogilby proceeded to make some observations upon a new species of Monkey, now living at the Society's Menagerie, which he characterized as follows:—

Papio Melanotus. *P. cinereo-brunneus; capite, dorso, lumbisque sub-nigris; caudâ brevissimâ, nudâ; facie, auriculisque pallidis.*

The specimen from which this description is taken is a young male, said to have been brought from Madras. It has at first sight a

considerable resemblance to the common Barbary species (*Papio sylvanus*) both in general colour and in physiognomy, but differs materially in the blackish brown shade which covers all the upper parts of the head, neck, shoulders, and back. The face and ears are of a pale flesh colour, not unlike the shade which distinguishes extreme age in the human species; the naked part of the paws is dirty brown, and the temples are slightly tinged with a shade of scarlet, which the keeper informs me spreads and deepens when the animal is feeding. The tail is about an inch long, very slender, and perfectly *naked*; but whether the last circumstance be not accidental I shall not take on me to say; it *appears*, however, to be the natural condition of the organ. The general colour of the sides, under parts of the body, and extremities, is that pale olive brown so common among other species of this genus, such as the Bhunder (*P. Rhesus*), the Maimon (*P. Nemestrinus*), &c., and the hairs are equally without annulations. The individual has all the liveliness, good-nature, and grimace of the young Magot (*P. Inuus* and *Sylvanus*); but, like that species, it will probably become morose and saturnine as it advances in age and physical development; qualities which, indeed, are common to all the Papios, and pre-eminently distinguish them from the Cercopithecs, Colobs, and Semnopithecs.

BOTANICAL SOCIETY OF LONDON.

February 15, 1839.—Dr. D. C. Macreight, V.P., F.L.S., in the Chair.

Dr. W. H. Willshire read a paper "On the structure of the Woody Fibre in the tribe *Gymnospermiæ*."

March 1, 1839.—John Reynolds, Esq., Treasurer, in the Chair.

A paper was read from Mr. Robert M. Stark "On the Muscology of Cirencester, Gloucestershire," (communicated by the Curator,) in which he stated that he had observed the following Mosses in that district.

Phascum subulatum.
cuspidatum.
Gymnostomum ovatum.
truncatulum.
conicum.
Encalypta vulgaris.
Weissia curvirostra.
Grimmia apocarpa.
Grimmia pulvinata.
Dicranum bryoides.
adiantoides.
laxifolium.
scoparium.
Tortula enervis.
muralis.
ruralis.

Tortula unguiculata.
fallax.
Polytrichum undulatum.
Funaria hygrometrica.
Orthotrichum anomalum.
affine.
diaphanum.
striatum.
crispum.
Bryum argenteum.
cæspititium.
ligulatum.
rostratum.
Neckera pumila.
Anomodon viticulosum.
Daltonia heteromalla.
Hypnum trichomanoides.
complanatum.
serpens.
populeum.
purum.
sericeum.
albicans.
dendroides.
curvatum.
proliferum.
rutabulum.
velutinum.
cordifolium.
triquetrum.
cupressiforme.
molluscum.

Mr. Daniel Cooper read a paper "On a new Structure in Roots or Stems of Dicotyledonous Plants, in which a Deviation from the Concentric circles of Wood to the Spiral had occurred." He also exhibited specimens of the Spiral Arrangement which he had been given to understand were procured from the Burdock.

Mr. J. T. Cooper, Jun., exhibited numerous figures of Mosses and Ferns produced by the Photogenic process of Mr. Talbot.

March 15, 1839.—John Edward Gray, Esq., F.R.S., President, in the Chair.

A paper was read from Edwin Lees, Esq., F.L.S., being "Observations on the species of *Tilia* natives of England, with Notices of some individual remarkable and aged Trees." The author stated that he considered the Lime indigenous to Worcestershire, the borders of Herefordshire, Gloucestershire, Monmouthshire and South Wales. At Hainford, four miles north of Worcester, on the banks of the Severn; about the western base of the Berrow Hill, near Martley; on Ankerdine Hill, near Knightsford Bridge; on the Teme; as well as amongst the rocky glens about Pont Nedd Vechan, Glamorganshire; many very remarkable old Limes occur in spots evidently under the wild keeping of nature. Mr. Lees had also observed the Lime growing profusely on a steep precipice overhanging the Teme, called Rosebury Rock, and forming woods on the old Red Sandstone banks above Knightsford Bridge, as well as covering in particular nearly the whole of a large natural wood of 500 acres in extent at Shrawley, eight miles north of Worcester, where for many years it has regularly been cut down at intervals as underwood, and the pollarded stumps are moss-covered and evidently of great age. It is also apparently wild near Ledbury, Herefordshire, at Broomsberrow in

Gloucestershire, and in Monmouthshire. Near Broomsberrow, where some very curious old Limes of the broad-leaved kind present themselves, is a place called *Linteredge*, no doubt from the Linden trees there, which is in fact the more common and proper appellation; and a parish called Linwood in Lincolnshire, where the small-leaved Linden is said to grow, is very likely derived from a similar fact. The paper was accompanied by six splendid drawings of old Limes observed in different places (from the pencil of Mr. Lees) who also sent the Society numerous species of the *Tilia*.

MISCELLANEOUS.

GEOGRAPHICAL DISTRIBUTION OF BRITISH BIRDS.

Mr. Fellows, who has recently published a very interesting Journal of a tour he made last year in Asia Minor*, has communicated to us a list of the birds which he observed and shot during his tour, and a short notice of those which occur in the British Islands may not be unacceptable as an addition to our information regarding their geographical range.

Neophron percnopterus, Sw. *Falco rufipes*, Bechst. The most common Hawk in Asia Minor, building its nest under the roofs and sometimes even in the interior of houses.—*Accipiter fringillarius*, Will. Killed on the Highlands near Altius Tash.—*Noctua passerina*, Selby†. Shot at Ephesus in the Theatre, found commonly through Asia Minor and Greece.—*Lanius rufus*, *L. Collurio*, *Saxicola Œnanthe*, *Sturnus vulgaris*, *Upupa Epops*,—*Sitta europea*. The name in Turkish signifies "Nut-Borer."—*Cuculus canorus*. Seen on the mountains during the month of April and at no other time.—*Coracias garrula*. Common throughout the south and west parts of the country wherever the Magpie was not found, and never seen in the same district with that bird: falls through the air like a Tumbler Pigeon.—*Merops Apiaster*. Found in the south and west parts of the county; they utter a rich warbling "Chirp" when on the wing and generally fly rapidly and high in the air; they are often found among the turpentine firs, from which bees collect much honey, and are sometimes attracted to the valleys by the numerous apiaries of the peasantry.—

* This work has excited considerable attention from the discovery by Mr. Fellows of the extensive remains of many Greek towns, highly interesting to the antiquarian and the scholar.

† *N. passerina* of Selby, and most modern ornithologists, is *Ot. nudipes*, Nilsson, easily distinguished from the only British bird with which it can be confounded, the *Noctua Tengmalmi*, Selby, by its *bare* or thinly plumed toes. The true *N. passerina* has not yet been added to the British list.—Ed.

Columba Turtur, *Charadrius Hiaticula*, *Totanus hypoleucos*, *Glareola pratincola*, shot at Xanthus, the "Partridge Snipe" of the Turks. —*Larus argentatus*, *Tadorna rutila*. These specimens are placed in the Museum of the Natural History Society at Nottingham.

ON THE GENERA *ÆGILOPS* AND *TRITICUM*.

From the extreme resemblance of the fruit of *Ægilops* with the grains of cultivated wheat, some botanists have supposed that the latter was merely an *Ægilops* modified by cultivation. M. Esprit Fabre having found some plants of *Ægilops triticoides* last year, in the environs of Agde, sowed the fruits of them in his garden, and obtained a plant in which the characters of *Ægilops* almost entirely disappeared to give place to those of *Triticum*. It is not yet quite a *Triticum*, nor is it an *Ægilops*. Next year M. Fabre intends to sow the grains he gathered this year, and to continue the observations he has begun.—*Comptes Rendus*, August 1839. No. 7.

ON THE ANIMAL NATURE OF THE *OSCILLATORIA*.

In a late Number of the 'Annals,' p. 70, we drew the attention of our readers to the problematical nature of the *Oscillatoria*; since then we have received the April number of the 'Annales des Sciences Naturelles,' in which Dr. Unger, in communicating the description of a new *Spirillum*, makes the following observation on the nature of these curious and interesting forms. I did not propose, says the learned Doctor, in making this communication to enter into a comparative examination of the *Oscillatoria*, but to combat a system, according to which the forms at present known ought to be necessarily referred to some vegetable genus, composed of elements certainly very heterogeneous. When Agardh, speaking of some *Oscillatoria** which move with the greatest ease, states that they have an articulated head which they move after the manner of a beak, he certainly by this points to an animal nature. The characters assigned by Agardh to the *Oscillatoria animalis* of Karlsbad are far more striking: according to his expressions, it does not oscillate; it has not the pendulum-like movement; but it crawls like a worm, and turns itself in every direction. It is also able to move itself freely in the water, differing thus from the others, which are only able to do this when they rest on the common substratum. *It moves the head, which is linguiform, as the mollusca move their tentacula*; in a word, animal movement cannot be denied them. Moreover, if we

* Ueber die gegen meine Ansichten in der Physiologie der Algen gemachten Einwürfe.—Nova Acta Nat. Curios. vol. xiv. part II. p. 756.

refer to his own opinion (l. c. p. 8.) which he expresses when describing the *Oscillatoria* of Karlsbad, that their characters depend chiefly on their mode of life, we shall be so much the more induced to consider these productions rather as animal than vegetable. It is only to be regretted that we know so little of the history of the life and development of these beings, for we refuse to characterize some forms as animal on the sole ground that we do not find in them that movement which is the property of animal nature.

NEW SPECIES OF FROG FOUND IN AMBER.

The 'Annales des Sciences Naturelles' for June mentions, as a palæontological curiosity, a Frog contained in a fragment of yellow amber, and preserving all its external characters, in the possession of the Baron Bulow Rieth, of Stettin; and certainly not inclosed by artificial means, as it differs specifically from all frogs now existing. M. Schmidt thinks it nearest to *Rana temporaria* in the colour of the skin and spots on the legs.

METEOROLOGICAL OBSERVATIONS FOR SEPT., 1839.

Chiswick.—Sept. 1. Cloudy: boisterous. 2. Showery. 3. Fine: rain: fine at night, with splendid Aurora borealis. 4. Very fine: rain. 5. Rain. 6. Very fine: rain. 7. Fine: cloudy: very boisterous: almost a hurricane at night. 8. Fine. 9. Hazy: very fine. 10. Foggy: fine. 11, 12. Overcast. 13. Clear and fine. 14. Heavy rain. 15. Showery. 16. Rain. 17. Very heavy rain. 18. Showery. 19. Overcast: clear. 20. Very fine. 21. Rain: cloudy: rain at night. 23. Foggy. 24. Cloudy. 25. Showery. 26. Very fine. 27. Cloudy and fine: slight rain. 28. Drizzly. 29. Heavy dew: fine. 30. Fine.

The quantity of rain which fell in this month, amounting to little short of 4 inches, may be reckoned as double an average quantity.

Boston.—Sept. 1. Stormy: rain A.M. 2. Fine: rain A.M. 3. Cloudy: rain A.M. and P.M. 4. Fine. 5. Cloudy: rain early A.M.: rain P.M. 6. Fine. 7. Stormy: rain P.M. 8. Stormy: rain early A.M. 9. Cloudy. 10. Fine. 11. Cloudy: rain early A.M. 12. Cloudy: rain A.M. 13. Fine: rain P.M. 14. Cloudy: rain early A.M. 15, 16. Cloudy: rain early A.M.: rain P.M. 17, 18. Fine: rain early A.M. 19. Fine: rain early P.M. 20. Fine. 21—23. Misty. 24, 25. Cloudy. 26, 27. Fine. 28. Cloudy: rain early A.M.: rain P.M. 29, 30. Fine.

Applegarth Manse, Dumfries-shire.—Sept. 1. Heavy showers all day. 2. Occasional showers. 3. Warm and close. 4. Occasional showers, with gleams of sunshine. 5. Unceasing rain. 6. Dull but fair: shower in evening. 7. Almost constant rain: flood. 8. Rain began at noon: all day. 9. Rain greater part of the day. 10. Very fine day: pleasant breeze. 11. Fine day, but cloudy. 12. Fair till noon, when it rained. 13. Showery. 14. Stormy: wind and rain all day. 15. Moderate, with frequent showers. 16. Fair till afternoon, when it rained. 17. Showery, with intervals fair. 18. Showery all day. 19. 20. Fine A.M.: showery P.M. 21. Fair and calm: distant thunder. 22. Fine harvest day: slight shower P.M. 23. The same: no rain. 24. Fine A.M.: rain P.M. 25. Heavy rain morning: cleared up. 26. Frequent showers. 27, 28. Continued succession of heavy showers. 29. Fine harvest day: one slight shower. 30. Calm: dry and sunny.

Sun 25 days. Rain 24 days. Thunder 1 day.

Wind south 11 days. South-east 5 days. South-west 3½ days. West 5 days. West north-west 1 day. East 3 days. North ½ day. Variable 1 day.

Calm 8 days. Moderate 11 days. Brisk 3 days. Variable 1 day Strong breeze 5 days. Boisterous 2 days.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. ROBERTON; *by* Mr. THOMPSON *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. VEALL *at Boston, and by* Mr. DUNBAR *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1839. Sept.	Barometer.						Thermometer.									Wind.				Rain.				Dew point.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc.			Chiswick.		Boston. 8½ a.m.	Dumfries-shire.			London: Roy. Soc. 9 a.m.	Chiswick 1 p.m.	Bost.	Dumfries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	8½ p.m.	Fahr. 9 a.m.	Self-register. Max.	Min.	Max.	Min.		Max.	Min.										
1.	29·072	29·185	29·061	28·49	28·68	28·70	62·0	63·5	56·6	68	50	61	59½	51	sw.var.	sw.	w.	s.	·180	·01	·42	...	60
2.	29·220	29·314	29·194	28·66	28·83	28·95	59·8	64·8	53.0	66	50	57	61	48	wsw.	sw.	w.	se.	·008	·11	·12	...	53
3.	29·450	29·634	29·440	28·85	29·14	29·30	57·7	63·5	52·0	67	46	58	59½	43½	sw.var.	sw.	w.	s.	·122	·01	·16	...	55
4.	29·764	29·962	29·745	29·18	29·54	29·69	57·5	61·0	50·0	71	53	60	61	45½	w.	w.	w.	sw.	·041	·19	·15	...	54
5.	29·918	29·910	29·885	29·33	29·55	29·55	62·4	66·0	57·0	70	53	58	59	48½	w.	sw.	w.	s.	·133	·06	·06	...	58
6.	30·032	30·067	29·998	29·40	29·67	29·67	61·8	67·0	56·0	74	46	60	62	52	w.	w.	w.	s.	·061	·04	·02	1·85	58
● 7.	29·916	29·918	29·785	29·32	29·46	29·27	62·5	68·0	55·0	66	55	60·5	57	52½	s.	sw.	sw.	s.	·011	...	...	...	57
8.	29·978	30·006	29·936	29·33	29·60	29·55	60·8	65·7	56·2	71	61	60	58½	49	sw.var.	sw.	w.	s.	·030	...	·11	...	56
9.	30·046	30·026	29·971	29·38	29·53	29·60	65·0	68·0	61·0	75	51	65	59	55½	sw.	sw.	sw.	w.	...	...	...	...	60
10.	30·030	30·131	29·999	29·40	29·79	29·95	62·4	69·5	57·0	78	59	60·5	60	49	w.	sw.	w.	w.	...	...	...	...	60
11.	30·048	30·047	29·878	29·47	29·89	29·72	62·2	70·0	60·5	69	58	60	58	46	se.	s.	calm	sse.	...	·04	·04	...	62
12.	29·804	29·804	29·726	29·22	29·65	29·50	61·0	69·8	60·0	63	41	58	59½	42	nw.	w.	calm	w.	·019	...	·05	...	59
13.	29·672	29·669	29·429	29·11	29·38	29·30	57·5	63·0	49·0	65	50	54	56	44	sw.	s.	nw.	w.	...	·09	·03	...	54
14.	29·166	29·165	29·120	28·75	29·14	29·10	58·6	63·5	53·5	66	50	56	55	41½	se.	se.	s.	e.	·013	·84	·14	2·68	59
15.	29·148	29·288	29·134	28·72	29·07	29·07	58·5	60·9	55·0	68	50	59	62	52	s.	s.	se.	e.	·205	·20	·10	...	58
☽ 16.	29·368	29·382	29·356	28·89	29·10	29·14	58·5	62·5	53·5	65	51	58	59½	47	s.	s.	s.	e.	·105	·21	·26	...	55
17.	29·554	29·536	29·467	28·98	29·12	29·19	58·2	62·5	53·6	62	46	58	57½	51	sw.	s.	w.	sw.	·102	·90	·10	...	55
18.	29·530	29·556	29·511	28·98	29·16	29·20	58·0	60·8	49·0	67	46	54	57	48½	sw.	sw.	w.	s.	·691	·52	·15	...	55
19.	29·518	29·494	29·465	29·03	29·25	29·30	58·5	60·0	51·0	64	48	53	55½	47½	ssw.	s.	calm	s.	·672	·08	·11	...	53
20.	29·626	29·621	29·611	29·13	29·34	29·41	58·3	60·9	51·0	67	49	54	56	44½	ssw.	sw.	s.	sse.	·036	·04	·01	...	53
21.	29·528	29·631	29·548	29·10	29·44	29·41	51·7	61·7	51·9	63	42	51	59	45½	nw.	n.	calm	ssw.	·102	·30	...	1·81	52
22.	29·628	29·773	29·620	29·16	29·48	29·55	55·4	58·7	50·0	64	41	50	58	36	sse.	s.	calm	s.	·336	·17	...	...	52
○ 23.	29·784	29·877	29·765	29·30	29·62	29·65	52·5	60·3	46·0	67	38	47·5	57	35	sw.	sw.	calm	sw&n	·044	...	...	...	50
24.	29·894	29·885	29·798	29·40	29·60	29·47	54·6	59·2	49·0	66	54	52	60½	42	s.	s.	calm	s.	...	·06	...	...	50
25.	29·768	29·841	29·749	29·16	29·32	29·44	60·3	60·0	54·0	71	48	59	58½	43½	ssw.	s.	s.	s.	·055	·03	...	...	57
26.	29·856	29·886	29·839	29·30	29·48	29·58	59·0	64·5	55·0	66	42	55	58	44	wsw.	s.	w.	w.	·016	...	...	...	55
27.	29·930	29·917	29·693	29·32	29·58	29·34	55·0	63·0	48·5	64	49	54	53½	46	ssw.	sw.	w.	sse.	...	·01	...	...	52
28.	29·498	29·528	29·474	29·03	29·27	29·29	56·0	60·5	54·0	65	36	57	55	49	s.	s.	s.	se.	...	·01	·02	1·30	55
☾ 29.	29·642	29·980	29·625	29·16	29·38	29·55	52·6	60·4	48·0	66	36	51	56½	46	wsw.	sw.	calm	wnw.	...	...	·11	...	50
30.	29·856	29·979	29·832	29·40	29·75	29·85	51·5	60·0	45·0	67	41	51	56½	38	e.	e.	calm	Var.	...	...	...	...	49
Mean.	29·675	29·733	29·621	29·13	29·392	29·409	58·3	63·5	53·0	67·36	48·06	56·3	58·1	46·1					Sum. 2·982	3·92	2·16	7·64	Mean. 55·2

XXIII.—*On a Shell-bank in the Irish Sea, considered Zoologically and Geologically.* By EDWARD FORBES, Esq.

FOR the last seven years I have been in the habit of dredging on a scallop bank which lies about five miles off the coast of Ballaugh on the north-western side of the Isle of Man. My observations have generally been made in autumn, and have been regularly recorded as soon as the contents of the dredge had undergone examination. The number of species and the number of specimens, dead and living, were duly noted down; always of the mollusca, and generally of the zoophytes and radiata. The want of a sufficient acquaintance with the crustacea and annelides has prevented my keeping any memorial of the numbers caught: the specimens were however generally preserved. From this bank I have obtained many new and rare animals, descriptions of some of which have been published. The observing of such, however, was not the only object in view, but also the observing the manner in which the various species there living are associated together, and the changes which their habitat undergoes from time to time,—points in zoology especially useful to the geologist. The results, so far, of my researches in this interesting locality, I propose in this paper briefly to communicate.

The bank, properly so called, is about twenty fathoms below the surface of the sea, and is thickly covered with scallops (*Pecten opercularis*), among which the common Oyster, the *Pecten maximus* and *P. varius*, and many other shells are found in smaller numbers. The ground at the edge of the bank is gravelly, with few scallops, but many univalve shells, such as *Murex erinaceus*, *Trochus zizyphinus*, and *Natica Alderi*. Between the bank and the shore, but nearer the latter, is a great tract of fifteen fathoms and under in depth, where great quantities of *Laminaria* and other marine plants grow, and which is covered with stones of considerable size, similar

to those which lie at low water on the shore, rolled masses of porphyry, syenite, granite, slate, and limestone. The neighbouring coast is sandy and marly, being in fact the edge, seawards, of a great tract of Pleistocene strata, forming the northern part of the island. The testaceous mollusca always abundant on the bank and on its edge are the following:

Pecten opercularis.	Buccinum undatum.
—— distortus.	Trochus zizyphinus.
Modiola vulgaris.	—— tumidus.
Hiatella rugosa.	Nassa macula.
Chiton cinereus.	Emarginula fissura.

Lottia pulchella.

All the above are constantly taken alive in great numbers, and dead specimens of them are also plentiful. The *Buccinum undatum* is generally of a large size, and almost always the variety called *striatum* by Pennant. Almost equally common now with *Emarginula fissura* is *Fissurella græca*, but this was not the case five years ago. They appeared suddenly on the bank in considerable numbers and of a good size. I have never taken but one young specimen (in which state it is *Patella apertura* of Montagu) though continually on the look out for them.

On the neighbouring shore I have observed a similar case of a species appearing, which was not found there formerly. Four years ago I picked up two specimens, very much seaworn, of *Lottia testudinalis*, on the shore at Ballaugh. At that time no living specimens of the species were to be found on our coast. Last year, however, to my surprise I found great numbers of very young *Lottiæ* under stones at low water. The year before I had taken a single full-grown example at a low spring tide, the first Manx living specimen I had ever found. This year (1839) the species is abundant; three or four under every stone at low water mark, well-grown, but not so large as the specimens common in Arran and the Hebrides. What is the cause of this sudden appearance of a species? Are the tides, or storms, or the locomotive powers of the molluscs themselves the means of transportation? Mollusca are much more active animals than is commonly supposed; and the smallest testacea, both bivalve and univalve,

delight in swimming. The naked mollusca of the genus *Eolida* swim with considerable rapidity, and are continually moving about when in their native element. Those who judge of these animals from seeing them on or under a stone at low water can form but a slight idea either of their beauty or habits. There is another instance of the variable appearance of a mollusc which I would mention. The spines of *Spatangus purpureus* (abundant on the bank) are some years covered with the parasitic *Montacuta substriata,* and at other seasons quite clear.

The following species are always found on the bank, and occasionally in considerable numbers :

Fusus antiquus.	Venus cassina.
—— corneus.	—— fasciata.
—— Bamfius.	—— virginea.
Nucula margaritacea.	Kellia suborbicularis.
Pectunculus pilosus.	Velutina lævigata.

The *Fusus antiquus* is the small form of that shell called *Fusus norvegicus* by some authors. It seems confined to certain spots on the bank. Most univalve shells of the siphonostomatous tribes are gregarious and plentiful in confined localities. Most of the above-mentioned species are gregarious, both univalve and bivalve. It is remarkable that young specimens of *Venus cassina* and *fasciata* rarely occur, and when found are almost always dead shells, whilst of *Venus virginea* the only living specimens taken are young ones. In the latter case it may be accounted for by supposing that *Venus virginea,* being a borer in mud, buries itself deeper when full-grown than when young. *Kellia suborbicularis* lives in little families of all ages in the mud-filled cavities of dead *Venus virginea.* Along with it is occasionally associated *Amphidesma tenue.*

Always found on the bank, though never in great numbers, are the following :

Ostræa edulis.	Murex erinaceus.
Pecten maximus.	Capulus hungaricus.
Lima fragilis.	Natica Alderi.
Pecten obsoletus.	Venus exoleta.
Cardium lævigatum.	—— ovata,
Psammobia tellinella.	Mya truncata.

The oysters are few, very large, muscular, and thick-shelled. I have rarely seen a half-grown oyster on this bank, and never a very young one. They seem to be the aged survivors of some former colony. Many of the shells are dead. Those of the living are generally perforated by that singular zoophyte the *Cliona*. Oyster shells, when they die, do not generally separate valve from valve: Venuses also remain in general with the hinge perfect: but Tellinæ and Psammobiæ, as well as Pectens, go to pieces. *Cardium lævigatum* is often found double, fresh-looking, of a large size, but always dead. The one or two young specimens (*Cardium serratum* of British authors) I have taken have been alive. *Cardium elongatum* and *nodosum* occasionally occur, but also dead, and these two species rarely remain double after death. *Venus exoleta* is rarely taken alive here, but the specimens are fine, large, and double. Young shells very rarely occur. *Venus lineata* is occasionally found: on the opposite coast of the island it abounds. *Venus ovata* is generally living. *Mya truncata* is found only dead and old; the valves generally separate. I feel sure the *Mya Swainsoni* is only the young of this species, and not of *Mya arenaria* as some have supposed. Wherever *Mya truncata* is found, there *Mya Swainsoni* is found; and all gradations of form may be observed from *Mya Swainsoni* to *Mya truncata*, passing through the *Mya ovata* of Turton, which is the half-grown shell. Look on the beak of a *Mya truncata*, and you will find a little *Mya Swainsoni* included. The beak of bivalves tells many tales against supposititious species, and is not yet attended to as it ought to be.

Occasionally taken, and on the whole not uncommon, are

Fusus muricatus.	Chiton lævis.
Trochus Montacuti.	Pecten varius.
Mactra elliptica.	Solen ensis.
Tellina crassa.	Amphidesma tenue.

Lucina undata and Radula.

Mactra elliptica is generally dead, double and perforated: *Tellina crassa* and *Solen ensis* always dead; the former never double. *Pecten varius* occurs in considerable plenty some years, and at other times I do not find a single specimen.

The Chitons are never taken dead, probably falling to pieces after the animal's death. The Lucinæ are always dead.

Rare, but taken oftener than once, are

Trochus tenuis.	Chiton fuscatus.
Fusus linearis.	Lima inflata.
Natica Montagui.	—— tenera.
Rissoa reticulata.	Modiola marmorata.
Dentalium entalis.	Astarte scotica.
Chiton fascicularis.	—— danmoniensis.

Modiola discors.

All these species are taken alive. The *Lima inflata* is always found in a very singular situation, imbedded in a mass of coralline fibres, broken shells and fragments of millepora. On breaking open the mass we find the Lima alive in the centre, in a neatly constructed nest, the sides regularly smoothed, somewhat resembling the bed of the *Modiola impacta* of the South seas. I am not aware that this very remarkable habit has ever been noticed. Neither *Lima fragilis* nor *Lima tenera* are found in similar nests. The two species of *Astarte* are found of nearly equal size, the characters of the margin distinct in each. I regard the thickening of the margin in many species of this genus as specific in the full-grown shell.

The following species have occurred only once. In the case of the three first, two specimens were taken of each, of the others one only.

Eulima Donovani.	Pecten lævis.
Pleurotoma purpurea.	Criopus anomalus.
Arca tetragona.	Psammobia strigillata.

The two *Arcæ* were taken together, imbedded in the mud filling the cavity of a large dead *Modiola*. They were alive. The *Pecten* was attached to the stalk of a coralline. The *Psammobia* was a dead valve.

Naked mollusca are not uncommon on the bank, as might be expected, seeing that it is very fertile in specimens of *Antennularia antennina*, the favourite habitat of the smaller deep-water Nudibranchia. The most common is *Melibœa fragilis*. Formerly *Tritonia Hombergi* abounded of a very large size,

but during the last three years I have only taken as many specimens.

Animals of the class Echinodermata are abundant. Star-fish of the family Asteriæ abound on the bank, those of the family Ophiuræ on its edge. Among gravel *Echinus subangularis* is common: among the scallops *Echinus esculentus*. *Spatangus cordatus* is very rare, while *Sp. purpureus* is very common, as also *Echinocyamus pusillus*. *Holothuriæ* are extremely scarce, two species only having been found, and but one specimen of each.

Among the zoophytes, of late *Plumularia myriophyllum* has become common; and this year I have taken twenty specimens of the rare *Thuiaria articulata*, which I never observed in our sea before. Every dredging excursion I make I add to our local list of zoophytes and naked mollusca, but seldom now find a testaceous mollusk new to the district. The inhabitants of this bank belonging to the classes Mollusca, Echinodermata and Zoophytes, may be summed up as follows:

Mollusca	Univalve Testacea	27	
	Bivalve Testacea	44	
	Nudibranchia	9	
	Naked Acephala	4	
			84
Echinodermata	Asteriadæ	14	
	Echinidæ	5	
	Holothuriadæ	2	
			21
Zoophytes	Hydroiada	11	
	Asteroida	1	
	Helianthoida	2	
	Ascidioida	14	
			28

I shall now, before concluding, notice a few points wherein this review of the Ballaugh scallop-bank may be made to bear on Geology.

Supposing the bank converted into a fossil bed similar to the shell-marls of the Pleistocene or newer Pliocene æra, let us see what effect such change would have on the Fauna.

1. We should be able to form a pretty accurate idea of the testaceous mollusca inhabiting it, but not of the naked mollusca, as the latter would wholly disappear.

2. The relative proportions of univalve and bivalve testacea met with would depend on the part of the bed examined, whether its centre or its edge.

3. The Chitons would scarcely be met with in consequence of their fragility and disorganization after death, though abundant on the bed in a living state.

4. It is probable that a greater number of species would be met with in the fossil than in the recent bed, since the rarity of certain species would seem rather to depend on the paucity of individuals than on other causes; and as the probability of meeting such would depend on the extent of surface examined, the inspection of a bed of shells high and dry would be more likely to reward our researches than an examination conducted in the deep sea by means of the dredge, which must always be partial.

5. Of the Echinodermata we should probably find the remains of sea urchins only; and as they generally fall in pieces like the Chitons, we should be obliged to determine the species from fragments. I may mention that I find good specific characters in the *spines alone* of our native living species, and no doubt such is also the case with the fossil.

6. Of Zoophytes we should find only the remains of a few species (having calcareous polypidoms) belonging to the order *Ascidioidea*. The greater number would probably altogether disappear.

7. The larger Crustacea being very few, and the smaller very small and fragile, or else unpreservable in such circumstances, though very numerous living, we should find but few traces of the presence of the tribe.

8. The testaceous Annelides would remain, the soft tribes altogether disappearing.

I have drawn up these observations chiefly in the hope of inducing others to present us with similar reviews of the shell-banks of our coast. Geology and zoology will gain as much by inquiring how our marine animals are associated together as by investigating genera and species, though the former subject has as yet been but little attended to in comparison with the latter.

XXIV.—*Miscellanea Zoologica.* By George Johnston, M.D., Fellow of the Royal College of Surgeons of Edinburgh. With Plates VI. and VII.

The British Nereides.

[Continued from vol. iii. p. 295.]

2. Phyllodoce*, *Savigny.*

Char. *Body* linear-elongate, with numerous segments: *head* distinct: *proboscis* thick, clavate, the orifice encircled with papillary tentacula: no *jaws*: *antennæ* frontal, small, four or rarely five: *eyes* two: *tentacular cirri* four on each side, unequal, setaceous: *feet* uniramous, overlapped with a leaf-like veined cirrus: *bristles* setaceous, slender, jointed: no *branchiæ*: posterior extremity terminated with a pair of short fleshy *styles*.

Observations. The Phyllodoces are the most beautiful worms† among the Nereides, and are readily distinguished by the series of compressed foliaceous lamellæ, originating immediately above the insertions of the feet, which garnish the sides of the body. The peculiar office of these organs is conjectured to be respiratory ‡, but they also aid the animal in its progress through the water, for, following the motions of the feet and capable of being partially altered from a horizontal to a perpendicular position, they act as a bank of oars, and must be especially useful when the worm glides from a solid surface, and finds itself unsupported in the water. Hence the species are quick and lively, and swim with considerable ease §. We have found them buried occasionally in light sand between tide marks; but they principally reside in deeper

* The name of a sea-nymph, of the train of Cyrene.—Virg. Georg. iv. 336. It is synonymous with the *Nereiphylle* of Blainville, but not with the *Phyllodoce* of Ranzani. A genus of plants has been named *Philodice*, and to those who think it against the canon to give the same name to any subjects of Fauna and Flora, this might be a reason to prefer the nomenclature of Blainville.

† "Virgines pulcherrimæ inter Nereides."—*Otho Fabricius.*

‡ Cuv. Reg. Anim. iii. p. 202. It would be wrong to overlook their resemblance to the branchiæ in the larvæ of the Ephemerides: see Reaumur, Hist. des Insect. vi. p. 468, pl. 45, fig. 2.

§ "Currit egregie; natare etiam valet lamellis suis retroversis oblique sursum erectis."—Fabr. Faun. Grœnl. p. 298.

water amid the roots of corallines and the shells of mollusca and sedentary annelidans *. The body is much elongated and proportionably slender, composed of a numerous succession of similar segments, narrowed gradually towards each extremity, more especially towards the posterior, which is terminated by two short fleshy styles. From the mouth is protruded at will a large proboscis, divided into two rings by a fold sometimes scarcely visible (Plate VI. fig. 3.); the under half on the whole roughened with fleshy papillæ arranged in rows, while a series of larger papillæ encircles the orifice. There seem to be two eyes only†, occipital in position and larger than in the allied genera. The front of the head is armed with four small simple antennæ; and on each side of the post-occipital ring there are two pairs of unequal tentacular cirri, jointed at the base, and usually kept retroverted when the creature is at rest. The feet are rather small, uniramous, furnished with a single spine and a brush of very elegant, slender bristles, divided by a joint near the middle into two portions, of which the terminal one is as sharp as the finest needle. (Plate VI. fig. 6.)

In the Phyllodoces the blood is not red as in the great majority of the Annelides, but yellowish or colourless ‡.

1. *Ph. lamelligera*, of a dusky-olive or sometimes oil-green; the colour often confined to the margins of the segments. (Plate VI. fig. 1—6.)

Nereis lamelligera, *Turt. Gmel.* iv. p. 90. *Turt. Brit. Faun.* p. 135. *Penn. Brit. Zool.* iv. p. 96. *Bosc, Vers,* i. p. 173. *Jameson in Wern. Mem.* i. p. 557.—Phyllodoce gigantea, *Johnston in Zool. Journ.* iv. p. 53.

Hab. Sometimes found at low-water mark, but more common among the refuse brought up on the lines of the fishermen. Deep water in the Frith of Forth, brought up by the oyster-dredges, *Dr. Neill.* Common in Berwick Bay.

Desc. *Body* 14 inches long, linear-elongate, somewhat compressed, tapered at the tail, smooth, dusky with blueish and greenish shades reflecting a metallic lustre, the branchial leaf-

* Audouin and M. Edwards, Litt. de la France, i. p. 237.

† According to Lamarck four, "mais les postérieurs sont peu apparens."—Anim. s. Vert. 2de édit. v. p. 556.

‡ Lam. Anim. s. Vert. 2de édit. v. p. 556. Ann. des Sc. Nat. n. s. x. p. 197.

lets generally clouded in the centre with a dark undefined spot. *Head* quadrangular; the *proboscis* covered, on its lower half, with fleshy papillæ arranged in about twelve rows; *eyes* black; *antennæ* very short, conical. *Segments* very numerous, the post-occipital not larger than the following, bearing on each side four rather short setaceous *tentacular cirri*, of which the two anterior are shorter than the posterior pairs, and under these there is a concealed rudimentary cirrus: *feet* all alike, the *superior cirrus* forming an obliquely heart-shaped shortly stalked leaflet, veined, entire, smooth; the *inferior cirrus* is similar in structure and nearly so in figure, but it is about two-thirds less: between them is the proper *foot*, not very protuberant, armed with a brush of bristles disposed in a somewhat semicircular manner, having a single straw-coloured spine in their middle: the *bristles* are slender, pellucid, jointed, the joint being cleft for the reception of the needle-like point: posterior extremity terminated with two very short fleshy *styles*.

This species is said to attain sometimes a size considerably greater than that of the specimen just described, but on this part of the coast one of 14 inches length is rare, while examples varying from 4 to 8 inches are not uncommon. It is liable to much difference in the tints of its colour, and the green often predominates, while in young individuals the colour is not diffused over the segments, but confined to their margins, which are dusky, while the centre may be a pale yellow. In these also the spots in the centre of the branchial leaflets are usually well-marked. These are liable to be slightly affected in their form by the motion and contractions of the worm; and near the tail they always incline more to the oval than the heart-shape. The proboscis is either clavate or cylindrical, according to its degree of protrusion. The worm tints the spirits in which it is preserved with a greenish colour: the body becomes blueish- or greenish-grey, and the lamellæ a uniform olive.

Plate VI. fig. 1. *Phyllodoce lamelligera*, of the natural size. Fig. 2. The head and proboscis, as this appears when half extruded, magnified. Fig. 3. The proboscis fully protruded. Fig. 4. Two segments magnified. Fig. 5. A lateral view of the foot reversed. Fig. 6. The setigerous papilla with its bristles and spine.

2. *Ph. maculata*, the body marked with dark-brown spots in three rows; branchial leaflets somewhat heart-shaped. Plate VII.* fig. 1—3.

Nereis maculata, *Linn. Syst.* 1086. *Mull. Zool. Dan. prod.* p. 217. *Bosc, Vers*, i. p. 171.—Phyllodoce pulchra, *Johnston in Zool. Journ.* iv. p. 54. —The figure of *Baster* (*Opusc. Subs.* i. p. 14. tab. iv. fig. 1.) may possibly be intended for a representation of this species.

Hab. The shore at and within tide marks. Frequent on the coast of Berwickshire.

Desc. Worm sometimes 4 inches long, slender, depressed, tapered a little towards each extremity, yellowish, with a row of dark-brown spots along the back, and the sides spotted with the same colour; ventral surface paler, with a median row of small rather distant spots, and a series of larger ones on each side at the base of the feet. *Head* bluntly pointed, armed in front with four white conical *antennæ*; *eyes* black. *Post-occipital segment* with four pairs of setaceous *tentacular cirri*, of which the two anterior are the shortest: on each side of the other segments there is an oval or somewhat heart-shaped *branchial lamella*, with a brown spot in its centre, and supported on a very short spotted stalk: beneath them are the feet, each *foot* consisting of two papillary processes, the superior furnished with a brush of retractile *bristles* of the usual character. Anal segment terminated with two short conical *styles*.

3. *Ph. bilineata*, slender, pale greenish-yellow, with a continuous dark line drawn down each side at the insertions of the feet. Plate VI. fig. 7—10.

Nereis maculata? *Fabr. Faun. Grœnl.* p. 298. *Turt. Gmel.* iv. p. 88.

Hab. On oysters from Preston-pans in the Firth of Forth. Berwick Bay, rare.

Desc. From 2 to 3 inches long, very slender, serpentine, somewhat narrowed in front, more so towards the tail, of a pale greenish-yellow colour, with a dark continuous line along each side, rendered sinuous by the emarginations at the junction of the segments, which are numerous and quadrangular. *Head* ovoid; *eyes* two, placed backwards; *antennæ* four, unequal, placed in a stellate fashion round the orifice of the mouth: *tentacular cirri* rather short, unequal: *branchial la-*

* Pl. VII. will be given in the Supplement to the present volume.

mellæ ovate or elliptical, smooth, veined; the *inferior cirrus* short and papillary, not extending beyond the apex of the *foot*, which is slightly emarginate and armed as usual with a brush of slender jointed *bristles* and a single *spine*.

Plate VI. fig. 7. *Ph. bilineata*, natural size. Fig. 8. The head. Fig. 9. The middle segments; and Fig. 10. The caudal extremity:—magnified.

4. *Ph. viridis*, body roundish, of a uniform grass-green colour; branchial leaflets lanceolate; antennæ five. Plate VI. fig. 11—15.

Nereis viridis, *Linn. Syst.* 1086. *Mull. Zool. Dan. prod.* 217, *no.* 2636. *Fabric. Faun. Grœnl.* 297. *Turt. Gmel.* iv. 88. *Turt. Brit. Faun.* 135. *Adams in Linn. Trans.* v. 8. *Bosc, Vers*, i. 171. *Pen. Brit. Zool. edit.* 1812, iv. 94.—Phyllodoce clavigera, *Aud. et Edw. Hist. Nat. du Litt. de la France*, ii. 226. *pl.* 5 *a. fig.* 9—13.

Hab. Found on *Fucus pinnatifidus*, near Tenby (Pembrokeshire), *Adams*. Berwick Bay abundantly, and I believe it to be common on most parts of the British coast.

Desc. Worm from 2 to 3 inches long, elongate and narrow, slightly tapered towards the head, more so at the tail, of a uniform duck-green colour, paler on the ventral aspect. *Head* small, narrowest in front, but not pointed, the apex armed with four short conical *antennæ*, and a smaller *antenna* is less perceptible on the vertex: *eyes* two*, occipital, dark brown: *mouth* with a large clavate *proboscis*, greenish, rough under the magnifier, with minute papillæ, edentulous: post-occipital segment with four *tentacular cirri* on each side, twice the length of the branchiæ, the anterior pair one half shorter than the others, conical, simple: *segments* very numerous, often defined by a line of deeper green, shorter than their breadth, smooth, convex dorsally: *branchial leaflets* (or superior cirri) lanceolate, slightly compressed, retroflexed, longer than the foot, which is furnished with a bundle of very slender retractile acicular bristles and with a single spine: *tail* terminated with two fleshy *styles*, similar to the leaflets, but rather larger.

P. viridis lives under stones, or in the crevices of slaty rocks, between tide marks; but it abounds most near low-water mark, nor is it uncommon among the corallines and shells that are never left uncovered by the tide. It is an active spe-

* Audouin and Edwards say four, disposed in a transverse line, and very small, but their figure shows two only.

cies in water, moving forwards principally by the oared leaflets that extend from the sides; but on dry ground its movement is slow, and the leaflets are kept applied to the sides and brought somewhat under the body. When kept in a vessel of sea-water, deprived of food, the green colour becomes less intense, and allows us to trace a darker intestine down the centre of the body. When specimens are put into spirits they give out a copious green liquor and tinge the spirit deeply. Immersed in fresh water the worm is evidently pained, but is not killed so instantaneously as some other marine worms are, and in dying does not separate and break in pieces.

I have not hesitated to refer this species to the *Phy. clavigera* of Audouin and Edwards, although some slight differences may be traced in our figures; for some experience has brought me to believe that, in comparing figures which have been made under the magnifier, we are not to look for an exact resemblance between them. I have seen figures drawn by the same individual and from the same objects at somewhat distant periods, but with every desire to be accurate, between which the discrepancy was greater than could have been at first imagined. So also I have not expressed any doubt of their species being identical with the *Nereis viridis* of Otho Fabricius, for the only distinction pointed out by Audouin and Edwards between them is the absence of the odd antenna in the latter, and this is only inferred to be the case from the silence of the Greenland naturalist. But it is no imputation on the acknowledged accuracy of Fabricius to believe that this organ may have escaped his notice; for, even after having been made aware of its existence, I have sometimes found that it was no easy matter to bring it into view and make it perceptible to others.

Plate VI. fig. 11. *P. viridis*, of the natural size. Fig. 12. The head and anterior segments, magnified. Fig. 13. The head and proboscis extruded. Fig. 14. The middle segments seen from below. Fig. 15. The caudal extremity.

3. Psamathe, *Johnston.*

Char. *Body* scolopendriform: *head* small: *eyes* four, in pairs: *antennæ* four, short, unequal, biarticulate: *proboscis* thick and cylindrical, its aperture encircled with a series of

papillary tentacula, edentulous: *tentacular cirri* four on each side, unequal: *feet* uniramous, bifid at the apex; the dorsal *cirrus* elongate, filiform, jointed; the ventral one short: tail with two filiform *styles*.

Obs. This genus, which I have named in honour of the daughter of Nereus and Doris, will take rank, as it appears to me, between *Scyllis* and *Hesione*. It differs from the first in the number and structure of the antennæ, in the form of the head, and in the arrangement of the eyes; and from the latter in the form of the body (which in this family is an important character), and in the structure of the proboscis, which in *Hesione* is very long and destitute of oral tentacula.

1. *Ps. fusca.* Plate VII. fig. 4.

Psamathe fusca, *Johnston in Mag. Nat. Hist.* ix. 15. *fig.* 1.

Hab. The sea-shore within and between tide-marks. Berwick Bay occasionally.

Desc. Worm scolopendriform, about an inch in length, slightly narrowed in front, tapered towards the tail, of a yellowish-brown or fuscous colour, and in the paler specimens a series of obscure spots may be observed down each side above the feet. *Head* small, square, entire in front: *eyes* four*, very distinct, occipital, placed in pairs: *antennæ* four, short, biarticulate, frontal, the superior pair thicker and shorter than the inferior: *mouth* furnished with a thick cylindrical *proboscis*, whose aperture is encircled with a close fringe of papulous tentacula: *tentacular cirri* four on each side, the inferior pairs shortest, filiform, jointed, and issuing from a bulged base: *segments* numerous, the anterior shorter and smaller than the others, which are nearly of the same length and breadth: *feet* much developed and prominent, all alike, conic, the apex emarginate or divided into two obtuse lobes, between which the bristles are protruded: superior *cirrus* elongate, filiform, jointed like a *Conferva*, scarcely moniliform, and arising from a swollen basilar joint: ventral *cirrus* short, not extending beyond the foot, neither is it jointed: *bristles* retractile, strong, jointed near the top, the apical piece fixed on in a bayonet fashion; they are collected into two small but unequal fasci-

* I have seen specimens in which there were only two eyes: from their size a pair seemed to have coalesced.

cles, having a rather small *spine* in the middle of each: anal segment truncate and terminated with two long *styles* similar to the tentacular cirri.

This little worm is occasionally met with in Berwick Bay, lurking amid the roots of *Confervæ*, corallines, and sponges. It advances through the water with considerable velocity and in a wriggling manner, pushing out and alternately withdrawing the bristles of its feet, and moving its long cirri in every direction. When the creature is active and first taken, the cirri have a somewhat moniliform appearance under the microscope, but as its energy declines this appearance becomes fainter; they then appear jointed like a common *Conferva*, and after death even these joints fade away and the whole organ assumes a homogeneous structure.

Plate VII. fig. 4. *Ps. fusca*, magnified. The line expresses the length of the specimen.

4. Ioida*, *Johnston.*

Char. *Body* linear-elongate: *head* small: *eyes* two, large: *antennæ* three, cranial, filiform, submoniliform: *tentacular cirri* none: *proboscis* ————? *segments* numerous: *feet* undivided, each with a dorsal moniliform *cirrus* and two bundles of bristles, one of which is very long: *branchiæ* none: *styles* ———?

Obs. This new genus is allied to *Scyllis*, from which it differs in the number of eyes, in the absence of tentacular cirri, and in the appendages to the feet,—the *Scyllis* having two cirri to each and a single bundle of bristles,—while the *Ioida* has one cirrus and two bundles of bristles.

1. *I. macrophthalma.* Plate VII. fig. 5.

Hab. Amongst corallines in deep water. Coast of Berwickshire.

Desc. Worm about an inch long and a line in breadth, of a dark blue or purple colour, unspotted, linear-elongate, depressed, smooth. *Head* small but very distinct, pale, rounded in front, entire: *eyes* two, very large, lateral and nearly mar-

* From Ἰοειδής, blue or violet-coloured. The name is given by Drayton to one of his Naiades:—

"Ioida, which preserves the azure violets."

Polyolbion, song 20.

ginal, prominent, dark brown : *antennæ* three, frontal, filiform, rather short, equal in size and equally distanced, porrect, faintly annular. *Segments* twenty-five in the specimen examined, distinct, broader than long, the post-occipital and anal considerably less than the others and with proportionably small appendages : *feet* papillary, uniramous, each armed with a dorsal *cirrus* twice as long as the foot, obscurely moniliform, colourless, and with two bundles of bristles, the superior bundles consisting of short stout retractile bristles, jointed near the top, and with a *spine* in their middle ; the inferior bundles of very long setaceous unjointed *hairs*, which the worm has no power of withdrawing. The first pair of feet is destitute of this inferior bundle. The anal extremity was wanting in the only specimen I have yet met with, but from the reparation which had begun I believe it to be terminated by two styles similar to the dorsal cirrus.

[To be continued.]

XXV.—*Descriptions of British* Chalcidites. By Francis Walker, F.L.S.

[Concluded from p. 32.]

Genus Pteromalus, *Swederus*.

Fem. P. disco proximus : corpus breve, convexum, parum nitens, scitissime squameum, parce hirtum : caput transversum, breve, thorace latius ; vertex latus ; frons abrupte declivis : oculi mediocres, non extantes : antennæ subclavatæ, thorace longiores ; articulus 1^{us} gracilis, sublinearis ; 2^{us} longus, basi ad apicem latescens ; 3^{us} et 4^{us} minimi ; 5^{us} et sequentes breves, approximati, usque ad 10^{um} curtantes ; clava longiovata, articulo 10^{o} duplo longior : thorax ovatus : prothorax transversus, brevissimus : mesothoracis scutum longitudine paullo latius ; parapsidum suturæ vix conspicuæ ; scutellum conicum : metathorax transversus, mediocris, declivis, postice angustior : petiolus brevissimus : abdomen nitens, læve, latitudine paullo longius, supra planum, subtus carinatum, thorace multo brevius paullo latius : pedes simplices, subæquales : alæ angustæ ; nervus humeralis ulnari fere duplo longior, radialis ulnari paullo brevior cubitali longior ; stigma minutum.

Sp. 1. Pter. Promulus, Fem. *Viridi-cyaneus, abdomen purpureo-cupreum, antennæ fuscæ, pedes flavo-fulvi, femora viridi-picea, alæ fuscæ.*

Viridi-cyaneus : oculi et ocelli rufi : antennæ fuscæ ; articulus 1^{us} et 2^{us}

fulvi: abdomen viride; discus purpureo-cupreus: pedes fulvi; coxæ cyaneo-virides; femora viridi-picea; genua flava; meso- et metatarsi flavi, apice fusci: alæ fuscæ; squamulæ piceæ; nervi proalis fusci, metalis flavi. (Corp. long. lin. 1; alar. lin. $1\frac{2}{3}$.)

Found near Edinburgh, by Dr. Greville.

Mas. P. Favorino proximus: corpus longum, sublineare, convexum, parum nitens, scitissime squameum, parce hirtum: caput transversum, breve, thorace paullo latius; vertex latus; frons abrupte declivis, vix impressa: oculi mediocres, non extantes: antennæ graciles, filiformes, thorace multo longiores; articulus 1us gracilis, sublinearis; 2us subrotundus; 3us et 4us minimi; 5us et sequentes longi, lineares, usque ad 10um curtantes; clava longifusiformis, articulo 10° plus duplo longior: thorax longiovatus: prothorax transversus, brevissimus: mesothoracis scutum longitudine vix latius; parapsidum suturæ vix conspicuæ; scutellum prominens, fere conicum: metathorax transversus, sat magnus, declivis, postice angustior: petiolus brevissimus: abdomen depressum, læve, nitens, basi ad apicem latescens, thorace paullo longius et angustius: pedes graciles, simplices, subæquales: alæ mediocres; nervus humeralis ulnari fere duplo longior, radialis ulnari multo longior, cubitalis radiali multo brevior; stigma minutum.

Sp. 2. Pter. Varro, Mas. *Cyaneo-viridis, abdomen cupreo-purpureum fulvo-maculatum, antennæ nigræ, pedes lutei fusco-cincti, alæ limpidæ.*

Cyaneo-viridis: oculi et ocelli rufi: antennæ nigræ; articuli 1us et 2us virides: abdomen cupreo-purpureum, ante medium fulvo obsolete maculatum: pedes lutei; coxæ virides; femora fusca, apice flava; tarsi apice fusci; mesotibiæ fusco cinctæ; metatibiæ fuscæ; protarsi fulvi: alæ limpidæ; squamulæ piceæ; nervi proalis fusci, metalis flavi. (Corp. long. lin. $1\frac{1}{2}$; alar. lin. $2\frac{1}{3}$.)

Found near Edinburgh, by Dr. Greville.

Genus Encyrtus, *Dalman.*

Mas. E. clavicorni proximus: corpus breve, crassum, latum, convexum, scitissime squameum, rude punctatum, parum nitens, parce pubescens: caput transversum, breve, thorace non latius; vertex latus; frons abrupte declivis, non impressa: oculi mediocres, non extantes: antennæ clavatæ, crassæ, ad os insertæ, thorace longiores; articulus 1us basi ad apicem latescens; 2us longicyathiformis; 3us et sequentes breves, usque ad 8um latescentes; clava longiconica, articulo 8° multo latior et triplo longior: thorax sublinearis, latitudine duplo longior: prothorax transversus, brevissimus: mesothoracis scutum longitudine multo latius; parapsides scuto in unum confusæ; paraptera fere inter scutum et scutellum convenientia; scutellum magnum, longiobconicum: metathorax transversus, parvus: abdomen obconicum, planum, nitens, læve, fere glabrum, quasi sessile, thorace multo brevius vix angustius; segmentum 1um maximum, 2um et sequentia brevissima: pedes validi; mesopedum tibiæ longæ apice crassæ et spinigeræ, tarsi lati: alæ mediocres; nervus humeralis costæ dimidio brevior, cubitalis sat longus, ulnaris et radialis nulli.

Sp. 1. Enc. Nicippe, Mas. *Viridi-æneus cyaneo-varius, abdomen cupreum, antennæ nigræ, pedes fulvi, alæ limpidæ.*

Viridi-æneus: oculi et ocelli rufi: antennæ nigræ; articulus 1us fulvus, 2us fuscus: mesothoracis scutum cyaneo-viride: abdomen cupreum: pedes fulvi; coxæ æneæ; ungues et pulvilli fusci: alæ limpidæ; squamulæ piceæ; nervi fulvi. (Corp. long. lin. 1; alar. lin. $1\frac{3}{4}$.)

September, Northumberland, found by Dr. Greville.

Genus Thysanus, *Walker*.

"Corpus elongatum. Antennæ quasi 3-articulatæ articulo 3 lineari-elongato. Alæ longe ciliatæ. Nervus subcostalis abrupte terminatus apice non deflexus. Tarsi medii longissimi.

"Corpus lineare subdepressum. Caput oblatum. Antennæ prope os insertæ (6 articulatæ?) (9 articulatæ?) articulus 1us linearis radicula gracili; 2us brevior, obconicus, sequentes tres brevissime annuliformes vix conspicui; 3us (ex analogia trium locum implens) præcedentibus conjunctim longior, mari duplo longior, linearis compressus subnudus. Collare antrorsum attenuatum. Suturæ parapsidum inconspicuæ. Scutellum obtusum. Abdomen subsessile oblongum dorso deplanatum (plica elevata acuminata per basin protracta); segmentis subæqualibus; *fem.* longius, apice acuminatum; subtus carinatum, rima infera ad $\frac{1}{3}$ longitudinis protracta. Terebra recondita. Alæ plumato-ciliatæ, ulna crassiuscula costæ medium superante et abrupta. Pedes tarsis longis tenuibus, mediis longissimis.

"Sp. 1. Th. ater.

"Niger nitidus verticis margine, fronteq. media rufis; verticis macula albicante prope utrumque oculum. Antennæ ochraceæ articulus 1° 2° obscurioribus. Pedes ochreo-fusci, geniculis tarsisque pallidioribus. Alæ hyalinæ nervo fusco, fascia media effusa infumata. (Corp. long. lin. $\frac{1}{2}$; alar. lin. $\frac{3}{4}$.)"—*Haliday.*

Genus Eulophus, *Geoffroy.*

"*Eulophus alce*, Mas. Obscure viridi-æneus, scutello cupreo, abdomine nigro-viridi basi ænescente. Antennæ fuscæ, scapo nigro-viridi, articulis 3° 4° 5° basi ramum validum pectinatum emittentibus: ramus interior illis articulis conjunctim æqualis: articuli sequentes coarctati clavam lanceolatam, articulos 4um et 5um conjunctim longitudine æquiparantem, sed multo crassiorem, fingentes; 6us hujus clavæ dimidium occupat, 8us apice spinula parva. Metathorax longitudine et latitudine subæqualibus, apice parum attenuatus; reticulato-rugulosus, carinula media levi, lateralibus nullis. Petiolus brevis validus, obscure æneus, sublævis, $\frac{1}{2}$ coxarum posticarum æquiparans. Pedes validi: antici flavi tarsis subfuscis: posteriores flavi, tibiarum et tarsorum apice late, femoribus mediis medio, posticis basi demta fuscis. Coxæ nigro-virides. Tarsi breves. Tibiæ posteriores subsinuatæ. Alæ obscure hyalinæ, nervis dilute fuscis; radio pallidiore, breviusculo, subarcuato, angulum acutissimum fingente. Long. vix 1 lin.

"Clifden, July, 1839."—*Haliday.*

Genus Entedon, *Dalman.*

Mas. E. Cydoni proximus: corpus convexum, nitens, scitissime squameum, parce hirtum: caput transversum, brevissimum, vix thoracis latitudine; vertex latus; frons impressa, abrupte declivis: oculi mediocres, non extantes: ocellus medius perparum antepositus: antennæ filiformes, graciles, thorace longiores; articulus 1us longifusiformis; 2us cyathiformis; 3us, 4us, et 5us lineares, discreti; clava gracilis, attenuata, acuminata, articulo 5° longior et angustior: thorax ovatus: prothorax brevissimus, supra vix conspicuus, antice angustus: mesothoracis scutum longitudine multo latius; parapsidum suturæ bene determinatæ; scutellum subovatum: metathorax mediocris, transversus: petiolus brevissimus: abdomen sublineare, planum, læve, thorace multo brevius et angustius; segmentum 1um maximum; 2um et sequentia brevissima: pedes graciles, simplices, subæquales: alæ latæ; nervus ulnaris humerali multo longior, radialis brevis, cubitalis adhuc brevior.

Sp. 1. Ent. Hersilia, Mas. *Viridis cyaneo-cupreo et purpureo varius, antennæ nigræ, pedes fulvo-flavi, femora viridia, alæ limpidæ.*

Viridis: caput aureo-viride: oculi et ocelli rufi: antennæ nigræ; articuli 1us et 2us virides: abdomen cupreum, basi aureo-viride: pedes flavi; coxæ virides; trochanteres fusci; femora viridia, apice flava; tarsi fulvi; protarsi fusci; alæ limpidæ; squamulæ piceæ; nervi proalis picei, metalis fusci. (Corp. long. lin. $\frac{3}{4}$—$\frac{4}{5}$; alar. lin. $1\frac{1}{3}$—$1\frac{1}{2}$.)

Var. β.—Thorax cyaneo-viridis: mesothoracis scutellum cupreum: tibiæ fulvæ; tarsi obscuriores.

Var. γ.—Mesothoracis scutellum purpureo-cupreum: abdomen basi cyaneum: tibiæ fulvæ.

Found by Dr. Greville near Edinburgh, and during September in Northumberland.

" *Entedon rutilans*, Mas. Rubro-aureus. Abdomen convexius, dimidio anteriore albida, basi summa fusco-æneo. Antennæ 8-art. moniliformes, articulis 1°, 2° fuscis, reliquis fusco ferrugineis pilosis; 2us major 3°. Stemmaticum valde elevatum. Genæ pone oculos villosæ latæ. Metathorax apice, pone carinam transversam bis-arcuatam producto-attenuatus, petioli insertionem amplectens. Pedes flavidi, coxis cyaneo-viridibus, unguibus fuscis.

" *Entedon gemmeus*, Mas. Purpurascenti-ruber. Abdominis segmentum 2um macula media albida. Antennæ 7-articulatæ fuscæ, 2° et 3° subæqualibus, annello interjecto: 6° et 7° subconnatis. Genæ angustiores. Metathorax apice, sub carina transversa gibbula, breviter deflexus in petioli insertionem. Pedes albidi, coxis fusco-æneis, tarsis posterioribus apice fuscis.

" *Variat*, femoribus posticis basi fusco-lineatis."—*Haliday.*

Genus Cirrospilus, *Westwood.*

Fem. C. Verieni proximus: corpus sublineare, convexum, nitens, læve, fere glabrum: caput transversum, brevissimum, thorace angustius; vertex latus; frons impressa, abrupte declivis: oculi mediocres, extantes: antennæ subclavatæ, graciles, medio frontis insertæ; articulus 1us gracilis, subline-

aris ; 2us basi ad apicem latescens ; 3us et sequentes lineares ; 4us 3° brevior, 5° longior ; clava fusiformis, articulo 5° paullo latior et duplo longior : thorax ovatus : prothorax transversus, brevissimus : mesothoracis scutum unisulcatum, fere planum, longitudine paullo latius ; parapsidum suturæ remotæ, optime determinatæ ; scutellum subrotundum, bisulcatum : metathorax transversus, brevis : petiolus brevissimus : abdomen ovatum, supra planum, subtus carinatum, apice acuminatum, thorace paullo longius et latius : pedes graciles, simplices, subæquales : alæ latæ ; nervus ulnaris humerali duplo longior, radialis nullus, cubitalis sat longus ; stigma minutum.

Sp. 1. Cirr. Teridæ, Fem. *Nigro-cupreus, antennæ piceæ, pedes fusco-fulvi, femora nigro-cuprea, alæ limpidæ.*

Nigro-cupreus : oculi et ocelli rufi : antennæ piceæ ; articuli 1us et 2us nigri ; pedes nigro-cuprei ; trochanteres picei ; genua flava ; metatibiæ apice fulvæ ; mesotibiæ fulvæ, fusco cinctæ ; propedum tibiæ fulvæ, tarsi fusci ; meso- et metatarsi fusci, basi fulvi : alæ limpidæ ; squamulæ piceæ ; nervi proalis fulvi, metalis flavi. (Corp. long. lin. 1 ; alar. lin. $2\frac{1}{3}$.)

Found by Dr. Greville, near Edinburgh.

Fem. C. Sotadi affinis? corpus angustum, convexum, obscurum, scitissime squameum parce hirtum : caput transversum, breve, thorace paullo latius ; vertex latus; frons abrupte declivis : antennæ graciles, extrorsum crassiores, thorace paullo longiores ; articulus 1us sublinearis ; 2us longicyathiformis ; 3us, 4us, et 5us lineares, subæquales ; clava longifusiformis, acuminata, articulo 5° plus duplo longior : thorax ovatus : prothorax transversus, brevis : mesothoracis scutum longitudine paullo latius ; parapsidum suturæ optime determinatæ ; scutellum subrotundum : metathorax transversus, mediocris : petiolus brevissimus : abdomen fusiforme, læve, nitens, supra depressum, subtus carinatum, apice attenuatum et acuminatum, thorace angustius et multo longius ; latera subcompressa : pedes simplices, subæquales : alæ mediocres ; nervus ulnaris humerali multo longior, radialis nullus, cubitalis brevis.

Sp. 2. Cirr. Brunchus, Fem. *Ater, abdomen nigro-cupreum, antennæ piceæ, pedes flavi, femora nigra, alæ limpidæ.*

Ater : oculi et ocelli rufi : antennæ piceæ, basi nigræ : abdomen nigro-cupreum : pedes flavi ; coxæ nigræ ; trochanteres picei ; femora nigra ; tarsi apice fusci : alæ limpidæ ; squamulæ piceæ ; nervi proalis fusci, metalis flavi. (Corp. long. lin. $\frac{3}{4}$; alar. lin. $1\frac{1}{3}$.)

Found by Dr. Greville, near Edinburgh.

XXVI.—*Hints on the Anatomico-Physiological Differences in the Organization of Stems.* By Dr. M. J. Schleiden.*

I have been constantly surprised in reading the numerous controversies on the differences between monocotyledonous and dicotyledonous stems, to find that, in general, they con-

* Translated from Wiegmann's Archiv, part 3, 1839.

tain only comparisons between the so-called woody trunks of palms, and those of the dicotyledonous forest trees of our zone, the consideration being for the most part overlooked, that things wholly dissimilar, and which will not admit of comparison, are thus compared. The palm-stems, for example, originate from the undeveloped interfoliar parts, but our dicotyledonous woody stems from the developed parts; and this distinction is so very essential for plants with numerous series of woody bundles, that the stalk of a pink, and a culm of grass, do not differ so much as the latter and the stalk of a bulb. It appears to me, that even if the most correct, certainly not the shortest expression, has yet been found for the distinction between the two great divisions of the Phanerogamia, with reference to the structure of their stems, notwithstanding all the researches of the most eminent naturalists. In stems in general the following differences occur, which rest on the development, number and arrangement, direction and structure of the vascular (woody) bundles.

1. The vascular bundles, whose development always proceeds from the interior to the exterior, are either limited or unlimited in their growth. Commonly every vascular bundle consists of three different physiological parts, namely of an extremely delicate, rapidly developing tissue, of most tender texture, in which new cells are continually generated; these are deposited in various configurations, in two different directions, viz. towards the exterior, in the shape of a peculiar, very thick-walled cellular, more or less elongated tissue (*liber*); and to the interior, in gradual succession (subjected to the gradual expansion in length of the part), in the form of annular, spiral, reticulate, and porous vessels; and of ligneous cells, the latter either uniform, or differing from each other, forming the wood, properly so called. Up to a certain period the development of the vascular system in the Monocotyledons and Dicotyledons proceeds uniformly; but then, in Monocotyledons the active formative cellular tissue, with delicate walls, suddenly changes; the partitions of the cells become thicker, their generating power ceases, and, when all the surrounding cells are fully developed, they also assume a form entirely peculiar, and cease to convey gum, mu-

cus, &c., in short all thick formative saps. At the period when the development of these cells ceases, they are called by Mohl *vasa propria*. From this cause all further development of these vascular bundles is rendered impossible, and therefore I call them *terminated*, or "limited." In Dicotyledons, on the contrary, this tissue, which is then termed *cambium*, Auct., *couche régénératrice*, Mirb., retains, during the whole lifetime of the parts of the plant, its vital formative power; it continues to develope new cells, and by means of them increases the mass, as they go on adding partly to the exterior portion (*liber*), and partly to the interior (wood), to infinity. This happens according to the climate and nature of the plant, either pretty continuously, as for instance in the *Cacteæ**, or by strong periodical advances alternating with almost entire cessations, as in our forest trees. In the latter, one may be convinced by perseverance and delicate manipulation, that the stem forms a continuous tissue, from the pith to the bark, in all periods of its life, and that the bark is never separated from the stem; what has been so considered is only a rent produced by manipulation of the delicate formative tissue, which is in a great measure present, even during the winter, constituting the foundation of the new annual zones, although compressed, and filled with gum, starch, &c. In the spring, being expanded and swollen by the new current of sap, it is deprived of its contents by their solution. In all cases we may convince ourselves that the new cellular tissue is always formed within that already existing, and, in fact, in primitive cells, by means of cytoblasts, in the same manner as I have already previously demonstrated with regard to other cells. Indeed, the young cells are constantly formed on the upper *or* lower (I regret that I have not yet paid sufficient attention to this point,) end of the elongated primitive cells, and by means of their expansion lengthwise grow through them, and their contact with the other end of the cell appears to call into existence a new cell

* For this reason the observation of the whole process is most easy in the Cactuses. In general they have also remissions of growth, which do not altogether correspond with the annual impulses, although they produce similar appearances. The cause is yet wholly unknown.

at the corresponding place in the next succeeding cell. It is only since the autumn of 1837 that I have submitted this process to a proper radical research, and must beg to correct everything that I formerly said in 'Müller's Archiv, 1838*' (Contributions to Phytogenesis,) in accordance with my views at that time respecting the *origin* of cambium, although in the explanation I have there given of the *function* of woody stems no essential alteration is requisite.

This difference between limited and unlimited vascular bundles affords the *only universal* distinction between Monocotyledons and Dicotyledons. In the annual Dicotyledons the vascular bundle, checked in its further development by the death of the plant, has, it is true, in so far some similarity to the Monocotyledons; yet, with close research, the difference is distinctly apparent, for the formative layer constantly retains to the last moment its generating power; and upon this, in fact, is founded the lignification of annual plants, arising from a consequent prevention of the flowering, *e. g.*, in *Reseda odorata* and *Cheiranthus annuus*. For those who find an advancement of science solely and wholly in the employment of new terms, and who are tired of the good old division into *Monocotyledons* and *Dicotyledons*†, I propose, instead of the nonsensical division into *Endogens* and *Exogens*, the denomination of *Teleophytes* for *Monocotyledons*, and *Synechophytes* for *Dicotyledons*, founded on the preceding observations.

2. The second distinction among the various organizations of stems, is founded on the number and arrangement of the vascular bundles, namely, whether only one simple circle, or several concentric circles, are present. In the first case they generally approach sooner or later close to each other, and thus form a hollow closed cylinder, which is only traversed by greater or smaller bands of the compressed parenchyma, from within outwards: these bands are called

* A translation of this Memoir appeared in the 6th Part of Taylor's Scientific Memoirs, selected from foreign transactions, &c. Edit.

† This division, nevertheless, remains the only correct one, because it depends on the development; and its value is not even lessened by some of the *Coniferæ*, since the essential character consists not in the number, but in the verticillation of the *cotyledons*.

medullary rays. This closing together does not always take place in annual stems, and consequently there exists no difference except the nature of the vessels between the woody framework, for example, of *Tropæolum majus* (unlimited vascular bundles), and the creeping stem of *Polypodium ramosum*, (limited vascular bundles). Only where a defined boundary is produced by *a single* circle of nearly approximating bundles, can there be any question of bark and pith. There is, originally, present everywhere only a uniform parenchyma, and it is only after the development of a part of this into vascular bundles, that the diversity arises, of inclosed substance (pith), and external substance (bark); while the medullary rays, which may be traced through all gradations, from narrow laminæ to a continuous communicating parenchymatous mass, traversed merely by some threads of vascular bundles, still preserve the connexion. The dispute about bark, or no bark, in Monocotyledons, is therefore quite foolish, either an empty contention about words, or grounded on the assertion of something decidedly false. Meanwhile, that which has by many people been called the bark of the Monocotyledons, is very different in its origin, structure, and physiological importance, from the bark of the Dicotyledons.

The case of a simple circle of closed vascular bundles only occurs, so far as I know, in the stems of Dicotyledons. In Monocotyledons, on the contrary, it is, I believe, the regular structure of the roots.

The other case, of several concentric circles of vascular bundles, exists throughout the Monocotyledons, and is to be found among the Dicotyledons in the *Piperaceæ*, *Nyctagineæ*, *Amaranthaceæ*, *Chenopodeæ*, and perhaps in many others, the structure and formation of whose stems are not at present well known. Meanwhile the chief distinction between Monocotyledons, namely that of the closed or unclosed vascular bundles, comes here into action, and gives rise to an entirely peculiar woody structure in the before-named Dicotyledons. Dr. Robert Brown first drew my attention to this in the stem of a *Pisonia*, (*unknown Burmese tree*, in Lindley's 'Introduction to Botany', p. 80, fig. 40.). Now, as all these vascular bundles, arranged in various circles, continue to be

developed until at last they almost form a continuous mass, the parenchyma which previously separated them is thereby compressed into some small insulated patches, that appear scattered through the completely formed wood in little narrow vertical bands, which, in regard to their origin, may rightly be termed vertical medullary rays. On the outside of these cords are found in the wood very frequently *spiroidæ* still unaltered, forming the commencements of the outer vascular bundles. I have pursued the entire development of this peculiar structure in two species of *Pisonia*, in *Amaranthus viridis*, *Beta Cicla*, *Atriplex hortensis*, *Chenopodium Quinoa*, &c. Many other plants of the families mentioned, such as the *Piperaceæ*, which I could only examine under certain circumstances, prove, by their structure, that this peculiarity is quite general in those families.

A curious form of wood probably belongs here, (and perhaps the whole family of the *Crassulaceæ*), but I had no opportunity of following up the history of their development*. In the old stem of an undetermined *Echeveria* I found, for instance, an entire uniform mass of wood, formed of prosenchymatous cells without vessels, and scattered therein small vertical cords of a very delicate-walled parenchyma, in the midst of which ran spiral vessels, most of which might still be unrolled.

3. A third point of importance, arising from the essential differences of stems, is the relation of the axis to the parts given off from its periphery, the leaves and buds. Hereto belong a multiplicity of phenomena.

A. A phænomenon common to all Dicotyledons, is the formation of nodes. A lateral organ in fact originates universally among Dicotyledons only from the nodes; the part so called in botanical descriptions is not here intended (for that is mostly a crude conception of a somewhat isolated form of

* I beg here expressly to observe that the earlier stages were not at my disposal, and protest solemnly against the reproach of having overlooked anything, if the development should give any other result. I should not notice this if Meyen (in his Annual Report for 1838, p. 44) had not so groundlessly charged me with error, though I had explicitly declared that I had been unable to examine the earlier stages, and where, moreover, the history of the development shows that my supposition on the signification of the questionable formation was correct.

appearance), but a peculiar arrangement of the vascular system which may always be demonstrated by anatomy. For there is formed from two or more vascular bundles by simple superposition on one another, or by anastomotic ramifications, a loop, *ansa*, and only from this *plexus* do the peripherical organs receive their vascular bundles. From this relation, then, in connexion with the formation of the horizontal medullary rays, results infinite variety in the woody body. This *ansa* is, at the same time, especially destined to place the parenchyma of the lateral organs in connexion with the pith (or, rather, the living parenchyma) of the axis. The size of the noose is therefore essentially dependent on the thickness of the base of the leaves or lateral buds, (or, rather, the reverse).

In the Monocotyledons this formation of true nodes is probably far more rare, if indeed it occurs at all; for I am yet in doubt whether a real anastomosis of the vascular system takes place in the so-called nodes of the grasses, for the purpose of giving off bundles to the lateral parts. Thus much at least is certain, that in Monocotyledons the anastomosis of the vascular system decidedly takes place more rarely than in Dicotyledons. If it could be ascertained that the above characteristic formation of nodes nowhere occurred amongst the Monocotyledons, this would certainly afford a primary and general distinction between them.

In Acotyledons the decided dicotyledonous formation again occurs; and many unnecessary words would have been spared on the pretended difference in the stems of Ferns if the formation from which it is said to deviate (viz. the dicotyledonous stem) had been studied, not in a limited consideration of the Oak or the Lime, but in the various types of the different families. I believe it would not be very difficult for me to demonstrate all the modifications of the woody tissue of ferns, which do not depend on the closing up of the vascular bundles, but only on number, situation and mutual combination, as occurring in all essential points in the *Euphorbiaceæ* or the *Cacteæ*.

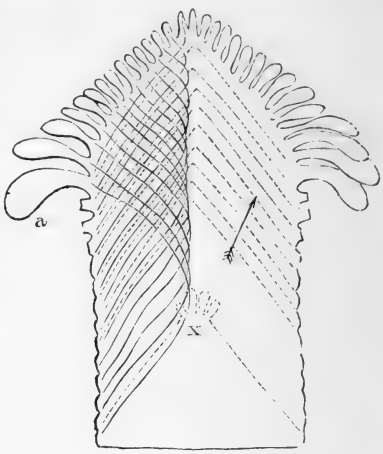
B. In every case where vascular bundles go off to a peripherical organ, they must decussate with the subsequently

originated parts, which are formed exteriorly to the point of departure. This is already evident without any examination, and is so far from being a peculiarity of growth of the Monocotyledons, that from this alone one might already have ventured with security to conclude the non-existence of the pretended Endogeneity. But it is most strikingly to be observed in the separated closed vascular bundles of the Monocotyledons; although exceedingly well also in other cases, as for instance in old *Melocacti*, *Echinocacti*, and *Mammillariæ*.

C. But here the most important circumstance is whether the interfoliar parts are longitudinally developed or not. In the first case all the new parts originating on the surface (whether it be new vascular bundles or the continued development of old ones) serve naturally to add to the thickness of the whole stem, without its length being in any way increased by *these* new parts. It is otherwise when the interfoliar parts remain undeveloped. Here, as far as I have hitherto been able to observe, this circumstance constantly occurs, that from the germinating plant, or the node in the act of formation, the impulse of growth, being unable to extend lengthwise, expands every following internode more and more in breadth until a certain period, so that every subsequent one projects somewhat beyond the earlier one, and thus converts the original lateral surface into an under surface. As the best example, I may here mention the development of bulbs, and of the *Melocacti*. This augmentation of the internodes continues only to a certain period, namely, till the plant has in this manner formed for itself a sufficiently broad basis. From this time the new internode no longer expands itself beyond the old; and a stem gradually increasing in height, but usually not increasing any further in thickness, originates through the continued deposition of the interfoliar parts, resembling hollow cones, on one another. A repetition of the gradual expansion of the internodes just described occurs as an exception in the tumid forms of the palm stems. For the study of this form of stem in the Monocotyledons, I would recommend to those who have not palms at hand the *Allium strictum* and *senescens*, &c, as they are in reality palm stems in miniature.

From this mode of formation there naturally follows in those

plants with closed vascular bundles the arch-formed course peculiar to the vascular bundles of the peripherical parts, which is easily made evident by a diagram of the construction of such a stem, as in the annexed Figure, where the dotted lines represent the limits of the mass (the hollow cone) belonging to each interfolial part, and the arrow denotes the direction which does not exactly correspond to the direction from within outwards in a developed stem, but combines this and the other direction from above downwards, each cone being at the same time a newly deposited part directed outwardly and a new internode added superiorly. Now every leaf (*a*) has originally its position on the apex (*x*) of the hollow cone, which originated contemporaneously with it, and in which those vascular bundles belonging to the leaves naturally proceed obliquely from the periphery inwards and upwards to the leaf, and consequently to the axis of the stem (*x*). From this position the leaf is now in consequence of the continued formation gradually pushed towards the periphery, which course its vascular bundles must follow, as they perforate all the succeeding cones just as a branch of one of our forest trees breaks through the subsequent annual zones; whence it results that the second portion of the arc is formed from within obliquely outwards and upwards. Now whether the arc is longer or shorter, or what is the same thing, more or less curved, depends principally on the shape of the recently superposed cone, i. e. on the terminal shoot. The more acute the terminal bud the longer the curve, as in most of the Palms; and the flatter it is the shorter and more curved is the arc, as in most Monocotyledonous Rhizomes.



It is, however, evident that we dare not make use of the

curved course of the vascular bundles as a primary distinction between the Monocotyledons and Dicotyledons, for this is dependent on two other relations, that of the closed vascular bundles and the undeveloped internodes; consequently it would on the one hand be present in the Dicotyledons if they had closed vascular bundles, and on the other would not belong generally to the monocotyledonous stem, but only to that with undeveloped internodes.

D. Now from a combination of the circumstances related under *A.* and *C.* there originates in the *simple* closed circle of vascular bundles and proportionally large leaf-bases, for the closed vascular bundles, the form of the Fern-stem, and for the unclosed that of the Cactean stem: the latter repeats nearly all the relations of the Fern-stem, only always above the earth.

4. In the dicotyledonous structure of stems many diversities still result from the hypertrophy of the pith, the bark, or both, as for instance in the *Euphorbiæ*, *Cacteæ*, many tubers, *e. g. Solanum tuberosum*, and particularly also the *Cycadeæ*, the structure of whose stem has only the most superficial resemblance to that of the Palms, and is certainly more nearly allied to that of the Fern stems, but differs essentially from them by the unlimited vascular bundles, and approaches far more to the *Cacteæ*.

5. Lastly, the modification of the cells composing the woody bundles, whether originally or at a subsequent stage of development, differs extremely, much more indeed than hitherto believed. The light wood of the *Avicenniæ* consists almost wholly of porous vessels; the equally light and soft wood of *Bombax pentandra* consists almost entirely of parenchyma, spiral, circular and reticulate vessels, and rarely of prosenchyma occurring in the exterior part of the annual rings. The wood of the *Melocacti*, *Mammillariæ* and *Echinocacti* consists entirely of peculiar short broad thin-walled cells, terminating above and below in an obtuse conical form, with very thick annular or spiral fibrous cells (deposited on their narrow margin), like those which Meyen has represented in his 'Phytotomie' of *Opuntia cylindrica*, where they occur, as in most of the *Opuntiæ*, though in less abundance, at the coarctations of the joints. It is well known that in the *Coniferæ*

and *Cycadeæ* the cells which form the wood develope uniformly, and not as in many other kinds of wood separating into prosenchyma and vessels. In many plants the earliest spiral vessels of the medullary sheath, in consequence of the great longitudinal expansion of the cells, become changed into annular vessels, in which form they remain ; in other plants the spiral vessels do not show this tendency, notwithstanding the great extension they have to undergo ; they are then frequently elongated with their cell to such a degree that they appear only like a thread lying in an intercellular passage, and they are very frequently entirely reabsorbed. This may be beautifully observed in *Opuntia monacantha*, *cylindrica*, *Mammillaria simplex*, *Helleborus fœtidus*, &c. May not this be the reason why we in many cases no longer find genuine *spiroides* in the developed stem, even in the *corona medullaris*?

The study of the organization of stems is still a boundless field for careful research; so far as I know no one has yet given a true explanation of that frequent formation in the family of the *Sapindaceæ*, where in one stem we meet with several centra for the formation of wood, only one of which occupies the axis of the stem. Likewise very little that is satisfactory is known of the peculiar structure of the stem of the *Phytocrene* (Wall.), or of the analogous forms frequently occurring in the family of the *Bignoniaceæ*,—forms which cannot be described by words, for which reason I cursorily refer to Lindley, 'Introduction to Botany,' p. 79, fig. 36, where a similar structure, stated to be from a *Passiflora*, is represented.

XXVII.—*On the Mycology of the neighbourhood of Bristol.* By Mr. Henry Oxley Stephens.

To the Editors of the Annals of Natural History.

Gentlemen,

I do not know whether you will consider the following Mycological Notices of sufficient importance as to give them a

place in your Journal; but as the difficulties of this branch of botanical science are acknowledged by all, and the labourers are comparatively few, the smallest contributions may not be without value. I am not aware that any botanist has described the mycology of the neighbourhood of Bristol: at least Mr. Berkeley appears to have received no communications from this quarter, as no mention is made of any in his portion of the 'English Flora.' I have only mentioned species which appear to be most interesting, and some which I consider undescribed; although in the latter particular I may be mistaken, as I have never seen the Systema Mycologica of Fries.

Agaricus phalloides, vaginatus, rubescens. Common in all the woods about Bristol.

Ag. Cossus, Sow. Stapleton Grove, most abundant; growing in dense masses. The larger plants are four to six inches across. The odour is always strong.

Ag. fulvus, Retz. Under birch trees, Leigh Wood, Sept. 1839.

Ag. torminosus, Schaffn. Pileus of a beautiful strawberry colour, Leigh Wood.

Ag. acris, Bolton. Leigh Wood, Sept. 1837.

Ag. uvidus, Fries. Stapleton Grove. *Ag. Lysginus,* Fr. Ditto.

Ag. blennius, Fr. Woods; not uncommon.

Ag. rufus, Scop. Leigh Wood, under birch trees. My specimens agree with the descriptions of Withering and Persoon in having a zoned pileus.

Ag. flexuosus, Pers. Amongst bushes, Stapleton.

Ag. infundibuliformis, Bull. *β. major.* Stapleton Woods, &c. One of the latest autumnal Fungi, continuing to spring up until cut off by the frosts.

Ag. giganteus, Sow. Not nearly so common as the preceding, and growing in more open situations, Leigh Wood.

Ag. nebularis, Batsch. I am surprised at the confusion which existed with regard to this most distinct plant. Withering described it with sufficient exactness, and Bolton's figure and account are distinct enough, although I have never seen the colour so pale as he has represented it. Grows on commons among furze-bushes.

Ag. odorus, Bull. Leigh Wood, amongst moss in Sept. and Oct. The pileus is often of a whitish colour, the pale specimens fully as fragrant as the green ones.

Ag. grammopodius, Bull. Grows in pastures in large rings. It is

one of the earliest Fungi, appearing in June. Felton and Clifton Down.

Ag. pelianthenus, Fr. Stapleton Grove, June 1838. My plant is exactly represented by Bolton, tab. 4. fig. 1. with the exception of the processes on the gills, which are like those of *Ag. balaninus*, Berkeley, in Mag. of Zool. and Botany.

Ag. fusco-purpureus, Pers. In ditches, among fallen beech leaves, Stapleton.

Ag. tuberosus, Bull. Amongst moss without the tuber, Leigh Wood.

Ag. Clavus, Bull. On dead grass stems, Stapleton.

Ag. parasiticus. On the pileus of decaying Agarics, Leigh Wood.

Ag. caulicinalis. On the roots of grass; not uncommon.

Ag. rondas, Fr. On dead bramble sticks. Stapleton Wood.

Ag. Campanella, Batsch. *β. badipus*. On the ground under fir trees, Durdham Down. Found during the whole year from spring to Christmas.

Ag. fragrans, Sow. Amongst moss in most of the woods about Bristol. One of the latest of the autumnal Fungi. It is sometimes scentless.

Ag. myxacius species nova? *Pleuropus*. Pileus dimidiate and lobed olive brown, very slimy, paler towards the margin, extreme edge revolute and downy, substance fleshy, flesh white. Gills close, white, rather narrow, decurrent or acute behind, very irregular in length, forked, separating from the substance of the pileus like the tubes of *Boleti*. Stem solid, white, truly lateral. Smell like *Polyp. squamosus*. The pileus varies from one to one and a half inch across. Two specimens grew close together on the turf, Durdham Down, July 1839, after a fortnight of very wet weather.

Ag. rhodopolius. Shady woods, Nightingale Valley.

Ag. repandus, Bull. Durdham Down. The pileus is sometimes of the deepest indigo, the plant differing in nothing else.

Ag. phlebophorus, Ditm. In the hollow of an old hazel tree, Leigh Wood.

Ag. griseo-cyaneus, Fr. Down and upland pastures, very abundant. The stem is frequently eccentric when young, and the odour powerfully aromatic, exactly like *Melissa officinalis*.

Ag. chalybeus and *columbarius*. Abundant on every dry common in the autumn months.—*Ag. pascuus*. Common, but not so plentiful as the foregoing.—*Ag. Sowerbii*. A most abundant species; our downs and dry pastures are completely strewed with it in

the autumn. A most distinct and interesting species: the strong mousy odour and bright verdigris green stripe at once distinguish it.

Ag. torvus. Stapleton Grove; perhaps not uncommon.

Ag. violaceus, Linn. In several places in the parish of Stapleton.

Ag. radicosus, Bull. Leigh Wood. Smell exactly like cherry laurel water.

Ag. adiposus, Batsch. Very rare. On an old ash, Redland.

Ag. squarrosus, Mull. On trunks of various trees. Very common.

Ag. mutabilis. On a bank where a willow tree had been cut down. April.

Ag. fastibilis. In clusters on an old ash tree, *with a distinct veil.* I should not have at first recognised this plant as a variety of *Ag. fastibilis* for the smell resembled *Ag. melleus* and the taste was pleasant; but on keeping the specimens a few days, as the sporules ripened, the characteristic odour of *Ag. fastibilis* appeared; the sporules, too, exactly accorded in colour and figure.

Ag. obscurus, Pers. Synop. p. 347. No. 163. Albertini and Schwein, Consp. p. 174. No. 504. It is singular this Agaric has not been described as British, as it is a very common species with us, growing on the naked soil in all the woods about Bristol. It is in many respects a remarkable plant, the odour is strong but pleasant, and when bruised the stem and pileus instantly turn a bright brick red.

Ag. hirtus, species nova? Inocyba. Pileus white, with a shade of cinnamon towards the centre, about one inch in diameter, covered with hairy scales of a light cinnamon brown. Gills pure white, not numerous, adnexed of different lengths and rather broad. Stem about two inches high, attenuated upwards, tumid downwards, and again contracted towards the base, perfectly solid, striated, crooked, one eighth of an inch thick at the most swollen part, densely covered all over with beautiful cinnamon scales, which stand out in a squarrose manner, giving to the plant a hispid feeling. Flesh of the stem and pileus white, tough and elastic, sporules ——— ? odour none, taste pleasant. Nearly allied to *Ag. plumosus,* Bott., but differs in colour and habit. Grew under oak trees, amongst moss, Leigh Wood, Sept. 6, 1838.

Ag. Loveianus, Berk. Is not this species described by Mr. Knapp Journal of a Naturalist, as *Ag. surrectus,* cum icone lignea?

Ag. medius, Schum.* Meadows in September, always after stormy weather.

Cantharellus tubæformis, Bull. On stumps, Leigh Wood.

Cantharellus? confluens, species nova? Densely crowded, so that the pilei frequently become confluent. Pileus repand and lobed, quarter to half an inch in diameter. Stem half an inch in height, one-eighth in thickness, solid. Hymenium pruinose, with a few obsolete veins. The whole plant of a pale clay-coloured brown, scarcely varying in any part, with the exception of the margin of the pileus, which is paler. Grew in dense clusters under beech trees. Stapleton Grove, Sept. 6, 1839.

Polyporus adustus, Willd. Stapleton Grove. Effused in large masses over fallen leaves as well as on stumps.

Polyp. suaveolens. On willows, in the parish of Stapleton; very abundant. It has a zoneless villous white pileus and brownish pores; smells like aniseeds.

Polyp. dryadeus, Pers. On old oaks, in most woods about Bristol, always growing near the base of the trunks.

Polyp. medulla panis, Jacq. Inside a hollow ash. Precisely like a mass of the crumb of bread.

Boletus luteus. It is singular, that although Mr. Berkeley marks this species as exceedingly common, I have never found it in this neighbourhood; the common species here being *B. Grevellei*.

B. granulatus, Linn. Common, often growing to a great size.

B. subtomentosus. Ditto.

Radulum orbiculare, Fr. On fallen birch sticks, Leigh Wood. Hymenium waxy. My specimens do not exactly accord with Dr. Greville's figure, but they are not very perfect.

Thelephora amorpha, Pers. A. & S. Conspect. p. 329, No. 982. Descriptio bona. On dead bramble or dog-rose sticks. Cook's Folly Woods, June, 1839.

Th. incrustans. Woods: common. *Th. epidermea*. On fallen twigs in woods. *Th. nuda*. Ditto.

Th. corrugata, Fr. On sticks in a wet hedge. Redland, April, 1839. Hymenium much cracked and papillose, with red-brown bristles. A golden yellow-brown woolly parasitic fungus grows upon it.

Th. (*Merisma*) *fastidiosum*. Pers. Mycolog. Europ. vol. i. p. 155.

* *Ag. medius*, Schum., should be *Ag. pusillus*, Pers. The error in English Flora has been corrected in Mr. Berkeley's British Fungi and in our Journal. —Ed.

No. 1. In woods, glueing fallen leaves together in masses. *Stercoris humani olet.*

Clavana pistillaris, Linn. Very rare. Nightingale Valley.

Cl. amethystina, Bull. In a copse opposite the Black Horse on the road to Aust Passage. A very large specimen.

Geoglossum glabrum, Pers. This present autumn. Dardham Down.

Helvella crispa and *lacunosa*. Stapleton Grove.

H. elastica, Bull. Under trees. Stapleton, autumn.

Peziza reticulata, Grev. On the ground in various woods about Bristol; by no means rare with us. It is one of the earliest fungi, appearing in February. The odour resembles that of chlorine. Before Mr. Berkeley's invaluable portion of the 'English Flora' was published I had considered this to be a non-descript species; subsequently I have seen Dr. Greville's figure, than which nothing can be more excellent.

Pez. acetabulum, Linn. On a clay bank, Stapleton, May.

Pez. vesiculosa, Bull. There is what I consider to be a form of this plant grows on the naked soil in woods; it is much smaller, of a more regular figure and less juicy consistency than the dung-hill plants, otherwise I do not know how to distinguish it.

Pez. macropus, Pers. Under beech trees, Stapleton, September. Growing in company with *Helvella elastica*. Mr. Berkeley remarks that some forms of these plants resemble each other, which they do very strongly, and Fries seems to consider them as identical, an opinion which I presume to doubt.

Pez. humosa, Fr. On the naked soil, Leigh Wood, Sept. 4, 1839. Colour deep blood red internally, externally with greenish cast, when wounded bleeding a whey-like juice.

Pez. scutellata, Linn. On clay in wet ditch banks, Stapleton. Densely gregarious, the largest plants were the size of six-pences. The usual habitat for *Pez. scutellata* appears to be rotten wood. Perhaps my plant is *Pez. umbrosa*, as Mr. Berkeley suspects, but the latter plant is not mentioned in the Mycolog. Eur.

Pez. calycina and *Laricis*. Abundant on larch sticks in the spring. Stapleton.

Tremella fimbriata, Pers. On stumps, Redland. It immediately gives a dark tincture to water.

Sphærobolus stellatus, Tode. On sticks, Stapleton Wood.

Sph. entomorrhiza, Dicks. I am aware how unwarrantable it is to alter a well-known specific name, especially when imposed by such a revered botanist as Dickson, but this specific name has

ceased to be distinctive, as other *Sphæriæ* growing from the larvæ of insects have been discovered; indeed I have seen gigantic specimens from New Zealand on caterpillars. There appear to be two very distinct forms, or rather two species, described under *Sph. entomorrhiza*, one with a slender stem and exserted ostiola, and the other with a more robust stem and perithecia entirely immersed.

Mr. Berkeley says, Dickson's plant is evidently altered from the larvæ having been buried in the ground; but there is no evidence of this either from the figure or description, and I humbly conceive the exserted ostiola render it specifically distinct*. I would propose to call the original plant *Sph. Dicksoni*, and the variety described in the 'English Flora' by Mr. Berkeley, *Sph. Berkelæi*, in compliment to that profound mycologist. I possess a single specimen of the last plant or variety gathered at Stockwood, Somerset, April 1836; it precisely accords with Mr. Berkeley's description; the roots embrace as it were the caterpillar, which is hardened, as if filled with the matter of which the fungus is composed.

Sph. lanciformis, Sow. On birch bark. Not uncommon.

Sph. leiphæmia, Fr. On dead oak branches. Very common.

Sph. incana, species nova? Section villose. Perithecia densely crowded, globose, covered with white mealy down. Ostiola papillary, black, shining. Growing on low dung in dense patches. Stapleton Wood, August 24, 1839.

An exceedingly neat *Sphæria*: the ostiola and a little of the upper portion of the perithecia are bare. I can find no description applicable to this plant.

Sph. strobilina, Holl. and Schum. On cones of Scotch fir, Stapleton.

Sph. atrovirens, A. and S. γ Rusci. On dead *Ruscus aculeatus*. Not uncommon.

Sph. setacea, Pers. On dead leaves of the *Pyrus Aria*, Redland.

Sph. vagans lamiocola, Berk. Fung. Exsiccat. On *L. album*, everywhere. This, or a nearly allied species, occurred on the leaves of *Lychnis diurna*.

Geaster rufescens, Pers. In woods on a clay soil; not uncommon with us. There is a nearly allied species, occasionally found on open downs, with the outer peridium rose-coloured.

Diderma cyanescens, Fr. On dead oak leaves, Nightingale Valley.

Didymium hemisphericum, Bull. On twigs, in a ditch, Ashby, April.

Trichia fallax. On rotten wood, Stapleton.

* The degree of exsertion of the spherules in *Sphæria militans* is extremely variable, therefore a safe character can scarcely be drawn from this circumstance.—Ed.

Sepedonium roseum, Fr. Overrunning all the plants of *Ag. rubescens*, Stapleton Wood, July 1839. Sporidia much resembling those of the pedicellate Uredines.

Puccinia tumida. On *Bunium flexuosum*, Brandon Hill, May 1838.

P. Circææ, Pers. On *C. Lutetiana*, Leigh Wood, September, 1839. The handsomest species with which I am acquainted.

P. Ulmaria, Dec. On *Spiræa Ulmaria*, Stockwood. Associated with *Uredo Potentillarum*.

Ocidium Primulæ, Dec. On primrose, Nightingale Valley. Sporidia yellow orange.

O. Ari, Berk. On *A. maculatum*, Leigh Wood, May.

O. leucospermum, Dec. On *Anemone nemorosa*, Redland, May.

Uredo Scillarum, Grev. The sporidia grow from a thickened kind of sabiculum, which is very apparent in the dried specimens. Leigh Wood, May.

U. Primulæ, Dec. On *P. vulgaris*, Nightingale Valley. Sori sometimes in rings.

U. crustacea, Berk. On *Campanula rotundifolia*, Wick Rocks, Gloucestershire, August.

U. Petroselini. On *Smyrnium Olusatrum*, St. Vincent's Rocks.

U. pompholygodes, Berk. Fung. Exsiccat. On *Anemone nemorosa*, Redland.

U. Umbellatarum, Johnst. On *Conium maculatum* and *Athusa Cynapium*.

U. Hypericorum, Dec. On *Hyp. Androsæmum*, Leigh Wood, June.

U. confluens, Dec. On *Mercurialis perennis*, Clifton. Sporidia dull yellow.

U. Lini. On *L. catharticum*. Common.

Henry Oxley Stephens.

North Street, Bristol, Sept. 21, 1839.

XXVIII.—*On the* Arctium Lappa *and* Bardana *of* Sir J. E. Smith. By Charles C. Babington, M.A., F.L.S., F.G.S., &c.

It must have appeared a remarkable circumstance to most practical botanists that the plants described by Sir J. E. Smith under the names of *Arctium Lappa* and *A. Bardana*, should be considered as truly distinct species by many authors of celebrity, and that others whose opinions were deserving of equal attention should as decidedly declare them to be only varieties of one plant: indeed some botanists have gone so

far as to say that they are not even distinguishable as varieties. It appears to me that part of this difference of opinion may be referred to the unsatisfactory manner in which they have been figured in English Botany, neither of the plates numbered respectively 1228 and 2478, representing either of the plants in the state in which I find them in nature. Tab. 1228, which is named *A. Lappa*, has the habit, protruded flowers and small heads of *A. Bardana*, but it wants the woolly involucrum, and has the leaves too much waved at their margins for that plant. Tab. 2478, denominated *A. Bardana*, has the habit and large green heads of *A. Lappa*, but its involucrum is clothed with wool, its flowers are protruded, and its leaves want the wavy margin and numerous prickles of that species. From this confusion of characters I cannot avoid suspecting that some mistake has occurred, and am not surprised that any botanist, on a cursory view of the figures in comparison with specimens, should have believed the plants to be very variable. I had myself come to that conclusion, and should not probably soon have detected my mistake, had not an eminent practical botanist informed me that he had always been accustomed to distinguish two Burdocks in the earlier years of his life (before the publication of those figures), but that latterly he had failed in determining them by their technical characters. I am now become convinced that two plants of different habit, and possessing distinctive characters, which are very permanent, exist in England, and propose describing them as follows :

1. *Arctium Lappa*, Linn. Capitulis subcorymbosis, involucri glabriusculi squamis interioribus concoloribus lineari-lanceolatis in mucronulum sensim attenuatis margine scariosis flosculos superantibus.

A. Lappa, *Linn. Sp. Pl.* ii. 1143. *Sm. Eng. Fl.* iii. 380.

A. majus, *Schkuhr.* iii. 49. *Wim. et Grab. Fl. Silec.* iii. 105. *Ledeb. Fl. Alt.* iv. 37.

Lappa major, *Gaertn.* ii. 379, *t.* 162. *DC. Prod.* vi. 660. *Koch. Syn.* 404. *Peterm. Fl. Lips.* 600.

L. officinalis, "*All.*" *Spenn. Fl. Frib.* 491.

In this plant the involucrum is longer than the florets, the scales are all yellowish-green, rigid, subulate and hooked, with the exception of a very few of the innermost ones, which are linear-lanceolate, contracting gradually into a slightly curved

rigid point; all of them in their lower part and some of the innermost throughout their whole length, are furnished with a very narrow scarious white minutely ciliated not serrulated margin. The leaves are cordate, their margins nearly flat, and fringed with numerous rigid prickles formed by the excurrent points of the nerves.

The most apparent characters of this plant are its large size, large corymbose heads, and glabrous pale green involucrum.

2. *A. Bardana,* Willd. Capitulis racemosis involucri arachnoideo-lanati squamis interioribus coloratis lineari-lanceolatis abrupte mucronatis flosculis brevioribus.

Arctium Bardana, *Willd. Sp. Pl.* iii. 1632. *Sm. Engl. Fl.* iii. 381. A. tomentosum, *Schk.* iii. 49. *Fl. Sil.* iii. 104. *Fl. Alt.* iv. 37. Lappa tomentosa, *Lam., Dict.* i. 377. *DC. Prod.* vi. 660. *Koch,* 405. *Spenn. Fl. Friburg.* 490. *Peterm. Fl. Lips.* 601.

Here the involucrum is shorter than the florets, the scales are often nearly all purple-coloured, and although most of them are rigid, subulate, and hooked, yet the inner ones, which are linear-lanceolate and contract rather suddenly into an almost straight rigid point, are more numerous in proportion than they are in *A. Lappa.* Here the outer scales are fringed as in the former plant, but the inner ones, which are always coloured purple, are minutely serrulated throughout. The leaves are much smaller, less wavy at their margins, and fewer of the nerves appear to be excurrent, although I have seen them quite as numerous as in *A. Lappa.*

This species is distinguished at a glance by its smaller size, small racemed heads, and more or less woolly and coloured involucrum.

I do not pretend to say that these plants are really distinct species, but am certainly inclined to consider them as deserving of that rank:—for although I have looked carefully for them, yet intermediate states have not come under my notice since I have been familiar with the living plants: my wish is to call the attention of English botanists to a neglected genus in our native Flora. It is probable that both plants are common throughout the country, but *A. Bardana* appears to be rather the more frequent.

St. John's Coll. Cambridge, Oct. 12, 1839.

XXIX.—*Floræ Insularum Novæ Zelandiæ Precursor; or a Specimen of the Botany of the Islands of New Zealand.* By Allan Cunningham, Esq.

[Concluded from p. 26.]

FLACOURTIANEÆ, *Rich. in Mém. du Mus. DC.*

Melicytus, *Forst.*

Flores dioici v. polygami. *Mas. Cal.* monosepalus, 5-dentatus, dentibus brevibus persistentibus. *Petala* 5 calyce duplo longiora, discohypogyno basi coalita. *Filamenta* 5 clavata cyathiformia antherifera petalis alterna. *Antheræ* erectæ, adnatæ, quadrato-cordatæ, biloculares introstæ, loculis appositis longitudinaliter dehiscentes. *Fœm. Calyx* et *petala* ut in masc. *Discus* e squamis 5, petalis oppositis glandulosis. *Ovarium* liberum sessile, stigmate depresso, 2—5-lobo, terminatum. *Fructus* baccatus, 1-locularis, indehiscens polyspermus, calyce persistente nec aucto basi cinctus. *Semina* parietalia inæqualia angulata, latere exteriore convexa, testa minutissime scrobiculata.—Arbusculæ *glabræ*. Folia *alterna, petiolata, exstipulata, oblonga, acuminata, calloso-dentata, membranacea, penninervia, venosa.* Flores *parvi albi axillares fasciculati, pedicellati, pedicellis basi bracteolatis.*

623. *M. ramiflorus*, dioicus, foliis obovato-oblongis, fasciculis subsexfloris, petalis ovali-lanceolatis acuminatis, fructu sphæroideo, stigmate 4—5 lobato. *Forst. Prod. n.* 371. *Gen. Char. t.* 62. *DC. Prodr.* i. *p.* 257. *A. Rich. Fl. Nov. Zel. p.* 313.

Mahöé, indigenis. *R. C.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* On the skirts of forests and banks of rivulets, Bay of Islands &c.—1833, *R. Cunningham.* Middle Island.—1773, *G. Forster.*—1827, *D'Urville.*

624. *M. macrophyllus*, polygamus, foliis ovato-oblongis versus petiolum angustatis, fasciculis 8—10-floris, petalis oblongis obtusis, fructu obovato, stigmate 2—3-lobato.

New Zealand (Northern Island). Shady forests in the country between the Bay of Islands and Hokianga river.—1826, *A. Cunningham.*—1833, *R. Cunningham.*

CRUCIFERÆ, *Juss.*

1. Nasturtium, *R. Br. in Hort. Kew.*

625. *N. sylvestre. Br. in Hort. Kew. ed.* 2. *v.* iv. *p.* 110. *DC. Prodr. n.* i. *p.* 137. *A. Rich. Fl. Nov. Zel. p.* 309.—Sisymbrium sylvestre. *L. E. Bot. t.* 2324.

Chiqui ab incolis vulgo dicitur. *D'Urville.*

New Zealand (Middle Island). On barren spots, Cook's Strait.—1827, *D'Urville.*

2. Cardamine, *L.*

626. *C. debilis*, (*Banks and Sol. Ms.*) foliis petiolatis glabris pinnatisectis,

segmentis petiolulatis ovatis subsinuatis subbijugis cum impari reniformi caule debili, siliquis erectis. *DC. Prodr.* i. *p.* 153.—Sisymbrium heterophyllum. *Forst. Prodr. n.* 250. *A. Rich. Fl. Nov. Zel. p.* 310. *Willd. Sp. Pl.* iii. *p.* 505.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* In humid woods among ferns on the Kana-Kana river, Bay of Islands.—1826, *A. Cunningham.*

3. Alyssum, *DC., L.*

627. *A. maritimum*, caulibus basi suffruticosis procumbentibus, foliis lineari-lanceolatis acutis subincanis, siliquis ovalibus glabris stylo brevi apiculatis. *DC. Prodr.* i. *p.* 164. *Willd. Sp. Pl.* iii. *p.* 459.—A. halamifolium. *L. Curtis Mag.* 101.

New Zealand (Northern Island). Sandy shores of the Bay of Islands.—1833, *A. Cunningham.*

An species indigena?

4. Lepidium, *R. Br., DC.*

628. *L. oleraceum*, siliculis ovatis acutiusculis, foliis glabris elliptico-oblongis profunde serratis, superioribus integris apice subserratis. *DC. Prodr.* i. *p.* 207. *Forst. Prodr. n.* 248. *Willd. Sp. Pl.* iii. *p.* 437. *A. Rich. Fl. Nov. Zel. p.* 310. *t.* 35.

Eketara, indig. *D'Urville.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Shores of the Bay of Islands.—1826, *A. Cunningham.* (Middle Island), shores of Queen Charlotte's Sound.—1773, *G. Forster.*

Brassica sativa (rather *oleracea*, L.) and *Raphanus sativus*, L. are enumerated by M. Ach. Richard in his 'Essai d'une Flore de la Nouvelle Zélande,' although he admits them not to be indigenous, but originally introduced by European visitors, and like the potato, had become generally wild on the Northern Island, as well in the drier woods as in the waste grounds in the environs of native villages.

MAGNOLIACEÆ, *DC.*

Drimys, *Forst., D.C.*

629. *D. axillaris*, foliis oblongis utrinque acuminatis, pedicellis unifloris. *DC. Prodr.* i. *p.* 78. *Forst. Gen. Char. t.* 42. *A. Rich. Fl. Nov. Zel. p.* 290.—Wintera axillaris. *Forst. Prodr. n.* 229. *Willd. Sp. Pl.* ii. *p.* 1240.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Damp shady forests on the Kana-Kana and Hokianga Rivers.—1826, *A. Cunningham.*—1833, *R. Cunningham.*

RANUNCULACEÆ, *Juss.*

1. Ranunculus, *L.*

630. *R. rivularis*, foliis glabris longe petiolatis 3-partitis, partitionibus cuneiformibus apice incisis, caule natanti-reptante, pedunculis oppositifoliis unifloris, petalis lanceolatis remotis unguiculatis. *DC. Prodr.* i. *p.* 34. *Banks et Sol. Ms. in Bibl. Banks.*

New Zealand (Middle Island). In the channels of rivulets at Totara-nui near Queen Charlotte's Sound.—1769, *Sir Jos. Banks.* On the Kana-Kana and Hokianga Rivers, Bay of Islands.—1826, *A. Cunningham.*

Herba tenella, glabra; caules graciles, reptantes s. nutantes. *Folia* (fere *Trifolii suffocati*) 3-partita, lobis cuneatis apice in lobulos 2—3 divaricatos incisis. *Flores* parvi, pallido-flavi, petala lanceolata, remota, elongata unguiculata, unguibus limbos petalorum æquantibus. *Stam.* 8—12. *Ovaria* 6—12. *Carpella* totidem obovata, subcompressa, lævia, stylo rectiusculo filiformi aristata, in capitulum sphæroideum basi villis nonnullis cinctum aggregata.

631. *R. acaulis*, foliis glabris, radicalibus longe petiolatis 3-partitis, lobis ovalibus integerrimis, scapo unifloro nudo petiolis breviore, calyce patente, petalis lanceolatis remotis erectis. *DC. Prodr.* i. *p.* 34. *Banks and Sol. Ms.*

New Zealand (Northern Island). In muddy water-courses and wet grounds on the shores of Mercury Bay (Opuragi).—1769, *Sir Jos. Banks.*

Herba glabra, tenella (fere facie *Trifolii uniflori*.). *Folia* omnia radicalia, petioli graciles 2—3 poll. longi, limbi 3-partiti, lobis obtusis integerrimis lateralibus ovalibus, medio obovato paulo majore. *Scapus* vix 2-pollicaris nudus 1-florus. *Petala* longe unguiculata, erecta, angusta, acuta (pallide flava v. alba?) staminibus paucis longiora.

632. *R. acris*, foliis pubescentibus subglabrisve palmato-partitis, lobis inciso-dentatis acutis, summis linearibus, caule erecto multifloro subpubescente pedunculis teretibus, calyce subvilloso, carpellis mucrone subrecto terminatis. *DC. Prodr.* i. *p.* 36. *A. Rich. Fl. Nov. Zel. p.* 289. *E. Bot. t.* 652.

Ponkou-Ponkou, s. *Ponkookoo* incolarum. *D'Urville.*

New Zealand (Northern Island). Shores of the Bay of Islands.—1827, *D'Urville.*

633. *R. plebeius*, caule erectiusculo dichotomo basi petiolisque patentim pilosissimo apice subglabro, foliis trisectis villosis, segmentis petiolulatis ovatis inciso-dentatis, summis linearibus integris, caule subreflexo. *DC. Prodr.* i. *p.* 39. *R. Br. Ms. ined.*

New Zealand (Northern Island). Banks of the Kahio River, Wangaroa, and elsewhere in moist places in the vicinity of that harbour.—1826, *A. Cunningham.*—1833, *R. Cunningham.*

Caulis suberectus, pedalis sesquipedalisve, apice dichotomo-ramosus, valde hispidus, pilis rigidulis patentibus longis, apice pilis raris adpressis pubescens. *Folia radicalia* et *caulina* longe petiolata, trisecta, segmentis petiolulatis ovato-cuneatis, inciso-lobatis utrinque villosis; floralia summa linearia parva, integra, pauca. *Pedunculi* graciles, elongati, uniflori. *Flores* lutei vix magnitudine *R. arvensis*. *Calyx* hirsutus, primum patens dein reflexus, petalis obovatis brevior. *Carpella* compressa lævia, stylo uncinato terminata, in capitulum subrotundum aggregata.

The specimens from the above-mentioned localities accord so perfectly with M. DeCandolle's character of Brown's plant, originally found in New South Wales, as to leave no doubt of the identity of the species. The nearest affinities of our plant appear to be with

R. Cappaceus (Sm.) and *R. pimpinelloides* (Hooker, Journ. Bot. i. p. 243.) : from the former, however, it differs in its smaller solitary flowers, and from the latter in its leaves being uniformly ternate and each segment deeply incised.

634. *R. hirtus*, caule erecto dichotomo petiolis pedunculisque pilosissimis, foliis caulinis petiolatis inferioribus trisectis, segmentis petiolulatis ovatis dentatis, mediis trilobatis, summis ovali-oblongis, calycibus retroflexis. *DC. Prodr.* i. *p.* 39. *Banks and Sol. Ms.*

New Zealand (Northern Island). Shores of Mercury Bay, also at Howa-Howa Bay (Tolaga) in grassy places.—1769, *Sir Jos. Banks.* Near Tauraki on the Hokianga River.—1833, *R. Cunningham.*

Species antecedenti proxima. *Caules* 2—3 erecti ad apicem iisque pilis patentibus rigidis hispidi, dichotomi. *Folia* radicalia et caulina longe petiolata, petiolis hispidis, segmentis grosse dentatis pilosis. *Flores* minimi longe pedunculati, lutei calyces retroflexi, carpella compressa lævia stylo brevissimo recto apiculata, et in capitulum ovatum aggregata.

2. Clematis, *L.*, *DC.*

635. *C. indivisa*, floribus paniculatis, foliis ternatim sectis, segmentis petiolatis ovalibus obtusis integerrimis mucronatis coriaceis adultis utrinque glabris, foliolis perianthii 6—8 elongato-oblongis obtusis utrinque lanuginosis, staminibus duplo longioribus, antheris submuticis ramulis pedunculisque tomentosis. *Willd. Sp. Pl.* ii. *p.* 1291. *DC. Prodr.* i. *p.* 5. *A. Rich. Fl. Nov. Zel. p.* 288.—C. integrifolia. *Forst. Prodr. n.* 231. non *Linn.*

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* Margins of woods on the shores of the Bay of Islands, and on the Hokianga River, where it was detected flowering in September.—1826, *A. Cunningham.*

Scandens, ramis vetustioribus glabris. *Petioli* cirrhiformes. *Foliola* obtusa, cum mucronulo vel emarginata, coriacea integerrima basi rotundata, aut subcordata interdum obliqua. *Paniculæ* axillares, versus extremitatem ramulorum foliis longiores, ramis oppositis unifloris bracteatis, tomentosis. *Foliola perianthii* plerumque sena, oblonga, obtusa, nervosa, lana crispa dense tecta, nervis anastomozantibus. *Filamenta* complanata sepalorum dimidium æquantia. *Ovaria* numerosa in caudas barbato-plumosas abeuntia.

636. *C. parviflora*, floribus racemoso-paniculatis axillaribus hexasepalis, foliis ternatim sectis, segmentis elliptico-cordatis acuminatis membranaceis venosis integerrimis vel grosse serratis lobatisve, subtus pedunculisque ferrugineo-tomentosis, sepalis oblongo-lanceolatis acuminatis, intus glabris extus pilosis, staminibus paulo longioribus, antheris ovatis apiculo brevi obtuso terminatis.

New Zealand (Northern Island). Thickets on the skirts of forests, Wangaroa.—1826, *A. Cunningham.*

Frutex scandens, ramis elongatis striatis glabris, ramulis sulcatis, pilis raris conspersis. *Petioli* cirrhiformes. *Foliola* ovali-cordata integra vel inciso-serrata, petiolo duplo longiora. *Paniculæ* laxæ, axillares, folia æquantia, petiolisque tomentosæ. *Flores* hexasepali, sepalis lanceolatis extus ferru-

gineo-pilosis. *Stamina* numerosa, sepala vix æquantia. *Pericarpia* ovata, compressa, villosa, in caudas pilosas attenuatas desinentia, pilis longis simplicibus patentibus.

Closely allied to the following species, but differs in having leaflets of a much thinner texture and uniformly tomentose on their underside; its flowers also are in loose racemes, much smaller and hermaphrodite.

637. *C. hexasepala*, floribus paniculatis dioicis hexasepalis, foliis ternatim sectis, segmentis ovato-cordatis late crenatis reticulatim venosis glabris coriaceis, sepalis oblongis staminibus triplo longioribus. *DC. Prodr.* i. *p.* 5.—C. hexapetala. *Forst. Prodr. n.* 230. *Ic. in Bibl. Banks, ined. t.* 170.—C. odorata. *Banks et Sol. Mss.*

New Zealand (Northern Island).—1769, *Sir Jos Banks.* (Middle Island.) Queen Charlotte's Sound.—1773, *G. Forster.*

Frutex scandens, ramis teretibus substriatis. *Foliola* ovato-cordata, crenis latis obtusissimis subincisa, petiolata, glaberrima, obsolete trinervia. *Pedunculi* pluries dichotomi, pedicelli elongati foliis triplo longiores v. æquales. *Flores* patentes, 6-sepali sepalis oblongis albido-flavescentibus (in sicco). Stamina sepalis ter breviora. Pericarpia ovalia, compressa, pubescentia, vix apice attenuata, in caudam barbatam producta*.

GENERA INCERTÆ SEDIS,

vel

quoad Ordines dubia.

1. CORYNOCARPUS, *Forst.*

Calyx inferus pentaphyllus, foliolis oblongis concavis deciduis. *Petala* 5, subrotunda. *Nectarium* (stamina sterilia) e foliolis 5 erectis petaliformibus, cum petalis alternantibus, basi glandula globosa. *Stamina* 5 e basi petalorum. *Antheræ* erectæ oblongæ. *Stylus* brevis, stigmate obtuso. *Drupa* (nux) turbinato-clavata oblonga, 1-sperma.

638. *C. lævigata. Forst. Prodr. n.* 114. *Gen. Char. t.* 16. *Willd. Sp.*

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* Nova satis distincta species est:

C. cocculifolia, floribus paniculatis dioicis 4-sepalis, foliis indivisis longe petiolatis orbiculato-ovalibus obtusis membranaceis 5-nerviis integerrimis glabris, basi sæpius cordatis, sepalis oblongis margine lanatis, antheris ovatis obtuse apiculatis. Crescit in locis apricis præsertim in marginibus sylvarum cæduarum Insulæ Norfolk, ubi Augusto Septembrique floret.

Caulis scandens, uti reliquæ partes, glaberrimus, sulcatus. *Petioli* elongati sæpe cirrhiformes. *Folia* opposita, petiolata, orbiculata, obtusa, integerrima, basi simplicia rotundata crebre cordata. *Flores* parvi paniculati dioici. *Perianthium* 4-sepalum, sepalis oblongis ovato-lanceolatisve nervosis intus glabris, extus villosis, marginibusque lanigeris, staminibus paulo longioribus. *Stamina* numerosa, filamentis basi complanatis. *Antheræ* ovatæ (post anthesin lineares) apiculatæ, apiculo obtuso. *Pericarpia* ovalia, compressa, villosa, in caudas barbato-plumosas desinentia, apicibus nudis. *A. Cunningham.*

Pl. i. *p.* 1178. *Rœm. et Sch. Syst. Veg.* v. *p.* 345. *A. Rich. Fl. Nov. Zel. p.* 365.—Merretia lucida. *Sol. Mss. in Bibl. Banks.*

Karaka ab incolis vocatur.

New Zealand (Northern Island).—1769, *Sir Jos. Banks.* In moist shady woods on the shores of the Bay of Islands.—1826, *A. Cunningham.*

Arbor spectabilis (facie *Ardisiæ*) 40-pedalis et altior, ramosa, ramis teretibus patentibus, glabriusculis apice foliosis, cortice cinereo-brunneo vestitis. *Folia* alterna, petiolata, sesquipalmaria (sæpe 3-pollices lata) obovata v. ovato-oblonga, obtusa, integerrima, glaberrima, lævia. *Panicula* terminalis, simplicissima, racemosa. *Flores* parvi albi pedicellati. *Petala* 5 erecta, æqualia, concava, calyce paulo majora, ungue angusto. *Nectarium* (stamina sterilia), foliola 5 adscendentia, oblonga, acuta, petalis paulo minora et cum eis alternantia, et singula aucta corpusculo glanduliformi globoso, fere ovarii magnitudine. *Ovarium* superum globosum. *Stylus* brevis filiformis. *Stigma* obtusum. *Drupa*, ——.

Obs. An *Myrsineis* affine?

This tree, upon which the eye of the traveller rests with pleasure, by reason of its rich dark glossy leaves and highly ornamental growth, furnishes a plum-like fruit, of which the drupaceous coat being when fully ripened of a sweetish taste, is eaten by the natives. The nut or kernel also, upon being deprived (by steaming and maceration in salt water) of the poisonous property which it is said to possess, is held in considerable estimation by the New Zealanders, who collect and store it for food in seasons of dearth. If eaten without this necessary preparation, the body of the person becomes seized with severe spasmodic pains and convulsions, from which the sufferer in some cases does not recover, but has been observed to die in great agony in a few hours. The timber is not used for any other purpose than as fire wood, being of short fibre and very soft.

2. Griselineæ, *Forst., Prodr.*

Flores polygami dioici. *Herm. Calyx* superus 5-dentatus. *Corolla* 5-petala. *Stamina* 5. *Styli* 3, cylindrici brevissimi, stigmatibus simplicibus. *Ovarium* 3-loculare? loculis 1-ovulatis. *Masc. Calyx* 5-dentatus. *Corolla* 5-petala. *Stamina* 5. *Antheræ* subrotundæ.

639. *G. lucida. Forst. Prodr. n.* 401. *Willd. Sp. Pl.* iv. *p.* 1128. *Rœm. et Sch. Syst. Veg.* vi. *p.* 641. *Spreng. Pugil.* i. *p.* 63.—Scopolia lucida. *Forst. Char. Gen. t.* 70.

New Zealand (Northern Island). On the shores of Mercury and Howa-Howa Bays, upon the east coast.—1769, *Sir Jos. Banks.* (Middle Island.) —1773, *G. Forster.*

Arbuscula, ramis erectiusculis, ramulis divaricatis sulcatis, cortice fusco-olivaceo tectis. *Folia* alterna, petiolata, oblonga, coriacea, basi inæqualia, hinc attenuata, inde rotundata, integerrima, obtusa, utrinque glabra, supra nitida, subtus opaca venosa, fere spithamæa, palmam lata. *Panicula* termi-

nalis aphylla: rami divergentes bractea suffulti, pedunculis subtrifidis. *Flores masculi* fœmineis interpositi, illorum calyx pentaphyllus rotatus, stamina calyce parum longiora. *Antheræ* 4-loculares. *Fœmineus*: calyx 5-dentatus, styli 3 lanceolati. *Fructus* trigonus trispermus videtur. Hinc potius ad Cl. xxi. releganda inter *Tricocca*, *Crotonopsin* inter et *Polychroam.—Spr. loc. cit.*.

Forsan ad *Euphorbiaceas* pertinet?

Quid Cliffortioides cordata, *Sol. Mss. ex Forst. p. n.* 660. absq. descr. vel C. oblongata, *Sol. Mss. in Bibl. Banks.*?

Frutices Novæ Zelandiæ: ad sylvas juxta Totara rivi, prope littora Freti Cook, incolunt, 1769. *Illustr. Banks.*

XXX.—*Information respecting Botanical Travellers.*

Mr. Schomburgk's recent Expedition in Guiana.

[Continued from p. 199.]

On our march over the savannahs we discovered them frequently grazing in groups, some of the older bulls keeping the outposts. As soon as danger is approaching they give the signal by loudly bellowing, and the whole herd is immediately on the alert; they stand gazing, and snuff the air as if they intended to ascertain by smell the extent of danger. On nearer approach, the bulls which stood guard are seen to show their dissatisfaction of the interruption; they stamp with their feet and bow to the ground with their head, tossing up the sand and grass high in the air. If the assailants are numerous and continue their approach, the bull retreats for a short distance, but turns and repeats the former manœuvre; and if this does not intimidate the enemy, they then consider it time to follow speedily the retreating herd.

I consider the number of wild cattle scattered over the savannahs at about 4000, but I doubt whether they are on the increase, as man and jaguars commit fearful ravages among them. To judge from what I have seen I should say the number of bulls amounts to about a third. The general colour of the wild cattle is brown or black, and there are very few spotted among them. Their most deadly enemy is the greater jaguar, *Felis onca*, Linn., which hovers in such quantities about Fort San Joaquim, that during the month of June 1838, twelve individuals were killed by the cattle-drivers. They are very daring, and sometimes kill cattle within a few yards of houses that are inhabited. They care very little for the fires which are made to prevent their encroachments. If one or a pair of these animals should take up their quarters in the vicinity of a cattle farm,

scarcely a night passes in which they do not commit ravages. They do not eat much of any they kill, perhaps ten or twelve pounds, and principally of the breast; but they prefer killing fresh every time they are hungry. When out of the reach of cattle farms or the wild herds on the savannahs, they subsist on Peccaris, Capabyras, Tapirs, and Deer*.

Not less destructive is the Turtle-tiger, a species or variety of the former. They are of the same strong build as the greater jaguar, and very much resemble it both in form, colour, and disposition of its spots†, but they are about a third less in size. In the vicinity of human habitations they commit great ravages among domestic animals; Hogs, Sheep, Goats, &c. are alike exposed to their attacks, but I never heard of an authenticated instance of their attacking man, although they will come boldly to his habitation, and even enter the houses and carry away the dogs from the fireside.

I fear much that by relating the following instances of boldness I run the risk of being accused of exaggeration; but as I was not the only witness of the singular feats of one of that species I hesitate the less, as it is characteristic of its mischievousness. At my return, in February 1837, from a pedestrian tour in search of the sources of the Essequibo, two of the gentlemen belonging to the expedition, who had been awaiting me at Curassawaka, a settlement of Caribis at the Rupununi, complained much that they as well as the Indians had been lately much annoyed by a jaguar, or tiger as it is vulgarly called, which prowled almost nightly about the settlement, and had carried away a young puppy from below the Indian hut. They observed, that one of my dogs, which I had lately bought, appeared to be the only one which, although he did not attack the unwelcome guest, at least kept him at bay. My tent was pitched that night several yards distant from the Indian huts, and before I went into my hammock I placed another, which had just been returned to me after

* It has been stated that the larger jaguar does not attack man when unannoyed. I know of several instances contradictory to this belief, and the most striking example is one of the Indians who have accompanied me to London, and who offers the evidence of the attack on his body. When a boy of eight or nine years of age, he was accompanying his grandmother to the provision field, and loitered a short distance behind, when a jaguar rushed from the bush and seized him. His grandmother had however presence of mind enough to attack the jaguar with a cutlass which she had in her hand, and obliged it to drop its prey. Four large scars in the vicinity of the clavicle will attest to his last day the fierceness of the jaguar.

† I have not seen the representation which Major Hamilton Smith has given of the lesser jaguar, but from his description I have little doubt that it is identical with the above.

it had been washed, on a trunk that stood near the place where my hammock was slung. The newly washed one was missed next morning: my suspicion of its having been stolen fell upon some Wapisana Indians, who were to depart next day; and although it was a new feature in the character of the Indian not contaminated by the vices prevailing at the coast regions, I had no other alternative to account for the absence of the hammock, which I was positive of having placed the preceding evening on the trunk in my tent. As to the observation of I-rai-i, the chieftain of the settlement, that the tiger most likely had carried the hammock away, I gave so little credit to it that I insisted now on searching the Indian huts, but without success. The party of Wapisanas departed next day, and supposing they might have hid the hammock at a convenient spot to take in their canoe when passing by, I sent a quick-pulling corial after them to search the canoe once more, when they might have considered themselves secure from further search: but no vestige of the hammock was to be discovered, and they departed, very likely not well satisfied with the mistrust I had shown as to their honesty. The small size of the tent, which did not afford sufficient protection in case of rain, induced me to take possession of an uninhabited hut, at some distance from the other huts. I was equally annoyed with the others at the frequent visits which the tiger continued to pay us during dark nights, and the chase which ensued with my dog, who though not trained for hunting the tiger, was nevertheless able to molest him and to prevent his entering the huts; but the noise of the barking dog and the growls of the incensed tiger, who in spite of his springs could not get at his wary antagonist, was indescribable, and lasted generally for several hours. Our attempts at securing the disturber of our rest had proved hitherto fruitless, and we began to consider it as an unavoidable evil. The other three Europeans who belonged to my party had taken possession of the chieftain's hut, and Mr. Le Breton complained one morning after the departure of the Wapisanas, that having found his blanket too warm for him during the night and put it under his hammock, no trace of it was to be discovered next morning. These strange thefts, for which we could not account, as we put implicit faith in the honesty of I-rai-i's people, became more frequent; saucepans, spoons, a table-cloth, which had been left about the hut, vanished one after the other. It was about this time that after an absence of six months I was anxious to communicate with the colony, and as no time was to be lost and I had a great deal of writing to get through, I was generally sitting up until after midnight. Al-

though my hut, merely an open shed, was at some distance from the settlement, and a servant, besides myself, its only inhabitants, we had been no otherwise disturbed by the jaguar than from the noise of the dog when our unwelcome guest prowled in the neighbourhood of the huts. I was thus one night sitting up at my desk, and had just put my loaded pistols which had been lying on the desk on a box at my left hand, thinking it too late to expect a visit from the tiger. A short while after my eyes were directed to the outside of the shed, when I discovered an object, the real nature of which I could not make out from my hammock being in the way: holding forward the light I discovered to my great astonishment the jaguar standing not four paces from me, and looking steadfastly at my proceedings. How long he had been there I know not, but before I had put down the candle and seized the pistol, he had walked off slowly into the bush, and although I fired after him I naturally missed him. A few nights after I was awakened by something crawling under my hammock, and supposing it to be a dog which had been in quest of some pieces of biscuit which I had left on a plate, I gave the disturber of my rest a slap with the hand, when lo! the animal cleared with one spring the chests and trunks which stood in its way, and rushed in the bush, displaying the spotted skin of the jaguar. I freely confess that at this discovery the blood chilled in my veins. The marks of the jaguar's paws left next morning no doubt as to the visitor, and we began to consider not so improbable, the report of the Indians as to who might have been the purloiner of the things which we had missed. A search was begun in the neighbouring wood: pieces of wool torn from the blanket when dragged through the bush pointed out the probable direction which the jaguar had taken with its booty, and soon after the blanket itself was found, apparently no further injured than the rents which it might have got in being dragged along. The hammock was found in a quite different direction, and also the other missing objects with the exception of the table-cloth. What could now be the object of the animal in carrying them off? Shall we compare it to the thievish magpie? or was it merely playfulness? Sometimes we were astonished by his feats of strength. One evening the Indians who had been out fishing returned with a large Arapaima or Piraruco (*Sudis Gigas*), which they had succeeded in capturing for us, their superstition forbidding them to taste of its flesh. As it was late and the fish weighed not less than two hundred pounds, we deferred conveying it on land until next morning. When morning came no fish was to be found in the canoe, but there were sufficient traces to show that it had been dragged

by the jaguar into the wood, where we found it minus its tail part, which to a third of the fish's length had been eaten off. It may be conceived what strength was necessary to get it out of the canoe, and I am almost inclined to suppose that it had been assisted by another jaguar. Our endeavours to rid ourselves of this unwelcome visitor proved all fruitless, and there were some among us who began to think like the Indians that its life was enchanted.

Mr. Vieth, who formed one of our party during the two last expeditions into the interior, and who during a long stay in Guiana has attentively observed the habits of the native cats, told me that he went to sleep in an Indian hut where there were altogether seven hammocks hanging occupied by Indians, and each having a fire underneath it; nevertheless at about nine o'clock at night, a jaguar of that species entered a hut, and in spite of the screaming of the Indians carried away a dog which was lying near one of the fires.

[To be continued.]

BIBLIOGRAPHICAL NOTICES.

Nouveau Recueil de Planches Coloriées d'Oiseaux, pour servir de suite et de complément aux Planches Enluminées de Buffon. Par C. J. Temminck et Meiffren Laugier Baron de Chartrouse. Livr. 98—102. Paris, 1839.

These "Livraisons" bring a work to a conclusion, which, commencing at a time when there existed few periodicals devoted to ornithology, was hailed with much interest. During nearly twenty years it has been conducted with great regularity, having only when near its conclusion occasionally failed in its monthly appearance, while it has maintained an equality in execution alike creditable to the authors and the artists employed by them. The original design of the work was to continue modern discovery in a series of figures of birds not contained in the 'Planches Enluminées,' and it now extends to a collection of 600 plates, on which are represented about 800 species, delineated in almost every instance with a correctness which will allow of little mistake, and coloured with great clearness; at the same time the plates bear the peculiar character of foreign art, which is not in many instances in accordance with the taste of the British ornithological draftsman. This collection is especially rich in figures of many of the species inhabiting the Dutch possessions in the islands of the East, where the valuable and beautiful productions became first appreciated and in part described in the

works of Raffles and Horsfield, and whose interior recesses have supplied many splendid species to the researches of the naturalists who have been lately employed to explore them. The residence of Sieboldt in Japan has also furnished many subjects which are not to be found elsewhere. The descriptive part is concisely written, but there is little added to our knowledge of habits or affinities, and the greatest blemish to the work is the passing over the discoveries of contemporary writers, with whose works M. Temminck should have been conversant; thus from the commencement of the series many birds are given under new denominations which had previously been described by other naturalists. A difference of opinion may have existed, but prior and contemporary labourers in the same field could scarcely all be unworthy of notice; even in the concluding Livraisons this is apparent.

The parts which we have now received contain some very interesting and remarkable birds which may be worthy of a short notice. *Uria Wumizusume*, Temm., pl. 579, is a remarkable bird from the coasts of Corea and Japan, furnished with a lanceolate frontal crest in the breeding season; it was indicated by Pallas and Latham, and designated under a separate generic title by Brandt. So far as we can judge from the figure now given it will differ in many respects from the true Guillemots, and we do not think that the specific name given by M. Temminck is any improvement upon that of "*antiqua*" given by its first describers.—*Picus Awokera*, Temm., pl. 585, a Japanese bird very closely resembling *P. viridis*, but considered to be distinct, and if so presenting another instance of the close alliance which the members of this genus (*Brachylophus*, Sw.) hold with each other.—*Dacelo Buccoides*, Temm., pl. 586. We question much that this is a distinct species, though we wish to give every deference to the high authority which the author's experience will carry with it.—*Fringilla Kawarahiba*, Temm., pl. 588. (*coccothraustes* or belonging to *Chloris*, Sw.) is a beautiful Japanese species, but *Fringilla rutilans*, Temm. (*Passer*) represented on the same plate, and also found in Japan, seems nearly allied to *P. Indica*, Orn. Illust. pl. 118. The head of the Japanese bird is more chestnut-coloured, and the black patch beneath is confined to the throat only.—*Allotrius flaviscapis*, Temm., pl. 589. is given as the type of a new genus. It is a Japanese and Sumatran bird, and will stand very near if it does not enter *Pteruthius*, Sw. figured in Mr. Gould's Himalayan Century.—*Timalia Trichorrhos*, Temm., pl. 594. This bird will enter the genus *Macronous* of the 'Ornithological Illustrations,' pl. 150, which Mr. Swainson considers an aberrant *Brachypteryx*. It seems closely

allied to the bird alluded to, but will differ slightly in the markings of the cheeks and throat, and seems to have the lengthened plumes springing from the axillæ only, whereas in the other they arise from the whole lower part of the back. If we are right in this bird being distinct, a second species will tend to confirm the separation of the form to a subgenus; for independent of the remarkable development of the dorsal and axillary plumes, there are other differences which would warrant a removal when a few species exhibited similar characters. It is probable also that *Timalia maculata*, Temm., pl. 593, where the plumage exhibits an inclination to lengthen and become disunited, would also range with them.—*Timalia nigricollis*, pl. 594, said to be found in Borneo and not hitherto discovered in Java or Sumatra, we have received from both of the latter islands and also from the Malayan Peninsula.—*Eurylavinus psittacinus*, pl. 598. The only difference which we can perceive in this figure from that of a beautiful species from continental India, is in the tail being more lengthened and coloured entirely of an ultramarine tint. The bird we allude to is that named *E. Dalhousii* in the 'Edinb. New Phil. Journ.' for 1829, figured by Mr. Royle in his Botany, &c. of the Himalayan Mountains, beautifully represented by Mr. Gould in his 'Icones Avium,' under the subgeneric title of *Crossodera*, and lastly indicated by Mr. Swainson in his 'Classification of Birds,' as *psarisomus*. At present we consider the two birds identical, and that reference to the descriptions alluded to if they are not so would have tended to illustrate the subject. The specimens which have reached Britain have we believe been all received from continental India, principally from the Himalayan and Nipal districts, while M. Temminck's birds have been found in the mountain forests of the interior of Sumatra. "La découverte en est due à M. Muller." The concluding Livraison contains a copious "Tableau Méthodique" and the title pages, besides a few supplementary observations upon some of the descriptions published in the course of the work.

Flora Lipsiensis Excursoria, Auctore G. L. Petermann. Lipsiæ, 1838.
J. A. Barth.

This excellent little work has just reached us, and we rejoice in introducing it to the notice of English botanists. The book contains full generic and specific characters of 1316 flowering plants which grow in the neighbourhood of Leipsic, and these not merely compiled from other works, as is unfortunately often the case in local Floras, but drawn up with great care from the examination of the plants themselves. The arrangement is Linnæan, with the omission

of the classes *Dodecandria, Monœcia, Diœcia,* and *Polygamia.* Several new species are given, namely:

1. *Carex Lipsiensis* separated from *C. Oederi* by its ascending, not erect growth, shorter rostrum, narrower leaves, and ovate not ovate-oblong bracteas. We suspect that this cannot be considered as more than a variety, even if *C. Oederi* is distinct from *C. flava.*

2. *Arrhenatherum biaristatum,* distinguished by having both its florets furnished with kneed awns.

3. *Campanula cordata,* differing from *C. Trachelium* by having *all* its leaves cordate and stalked, flowers separate (singuli), calyx hispid, with ovate-suboblong segments.

4. *Stellaria flaccida,* "debilitate insignis, viridis; flores fere *S. glaucæ,* habitus *S. gramineæ*; caulis lævis, glaber, ramosissimus, ramis 9—12 pollicaribus, filiformibus; folia angustissima, glabra, lævia, corymbus axillaris, et sub anthesi caule ipso brevior; pedicelluli elongati, filiformes; bracteolæ scariosæ, herbaceo-uninerviæ, una alterave serratura instructæ, glabræ."

5. *Betonica recurvidens,* separated from *B. officinalis* by its ovate-lanceolate strongly serrated cauline leaves, the serratures patent and "apice subrecurvis."

6. *Hypericum medium.* This plant is an intermediate form between *H. perforatum* and *tetrapterum*; from the latter it is distinguished by its terete scarcely 2-edged stem, and sessile not amplexicaul leaves, of which the lower are without pellucid dots; from the former its differences appear to be very slight, depending upon its shorter leaves, the lower of which are not punctured, smaller corolla, which is but little longer than the calyx, and never "dorso nigro punctata."

7. *Hypericum decumbens.* This appears to be the variety of *H. humifusum* with pointed and glandularly serrated sepals, and we think ought not to be separated from that plant.

8. *Leontodon validus,* said to be a much stronger, taller, and more branched plant than *L. autumnalis,* but we do not see how it is to be distinguished unless it is by its longer style.

We have not space to give any further extracts from this valuable contribution to European descriptive botany, which we trust will soon be in the hands of all working botanists. We must however protest against the extensive introduction of new terms, both names of parts and descriptive, with which the book abounds, even more than most of the modern German Floras. We know of no good attending this practice, and are quite certain that it is a very troublesome and puzzling one, not only to young botanists, but also to those who are much more advanced in the study of the science.

PROCEEDINGS OF LEARNED SOCIETIES.

BOTANICAL SOCIETY OF LONDON.

5th April, 1839.—Dr. D. C. Macreight, V.P. in the Chair.

The continuation of Mr. Edwin Lees's paper "On the species of *Tilia* natives of England," was read.

After noticing where the author considered the *Tilia* indigenous, he mentions that the *Tilia parvifolia* (Ehr.) is undoubtedly the most common in Britain whatever may be the case on the continent. Ray records it as frequent in Essex and Sussex as well as in Lincolnshire. According to Mr. Bicheno, in Smith's 'English Flora,' it grows plentifully in Stokenchurch Woods, Oxfordshire, and the author found it abundantly in the western parts of Worcestershire, forming in some spots the principal part of the coppice wood, as well as about the wild ravines of the vale of Neath, Glamorganshire, beautifully overhanging the waterfalls of that romantic region. The author saw no reason to doubt its indigenousness. Many singularly grotesque old trees of this species occur about the bases of all the Silurian Hills from Malvern to Ludlow, drawings of which were exhibited.

Dr. Bromfield states, in Watson's 'Botanist's Guide,' that he was informed "that there are entire woods of this species" at Buckland near Ashburton, Devonshire. It is singular that Mr. Watson himself considers the fact of there being woods of this species as leading to "the presumption of the trees being planted and *not* indigenous." But surely the converse of this must appear to the majority of reflecting botanists; and strangely enough, on this principle, *Tilia grandifolia*, which is only found in scattered trees or groups, would have a stronger claim than the far more common *Tilia parvifolia*. Besides, we surely consider the occurrence of a wood or coppice of any particular tree, say the hazel, the alder, or the holly, as indicating a greater adaptitude of the soil or locality to the nourishment of that particular species, which has thus established its home or head quarters at the spot; and on this principle botanists find it advantageous to attend to the *habitats* of plants.

19th April.—Dr. William H. Willshire, in the Chair.

A paper was read from Mr. Arthur Wallis "On the *Orchideæ* of Essex." The northern parts of Essex are characterized by chalky deposits, extending from Cambridgeshire and Herts, occasionally interspersed with loamy sand, and on the high ground alluvial clay. Travelling southward the soil still consists of heavy loam, and in

some districts extensive fields of gravel. On reaching the central parts of the county (in which the author included the neighbourhood for several miles round Chelmsford), there is a rich black mould, with here and there spots of clay and gravel, but no chalk. The extreme west consists, in addition to many fertile spots, of gravel as well as alluvial clay, and in those parts bordering on the Thames, as Purfleet, Thurrock, &c., the chalk predominates. Though it is well known that the Orchis tribe more especially delight in a calcareous soil, yet Mr. W. found them in all the varied *habitats* which the county presents, from the light rich soil to the loam and chalk. The author had found the following: *Orchis moris, Orchis mascula, Orchis pyramidalis, Orchis ustulata,* and *Orchis latifolia.*

A paper was read from Mr. W. H. White* "On the genus *Potentilla* and *Tormentilla.*"

ZOOLOGICAL SOCIETY.

February 26, 1839.—The Rev. F. W. Hope in the Chair.

A paper, entitled "Spicilegium Serpentium Indicorum," was communicated by Dr. Theodore Cantor. This paper contains the following descriptions of

A. *Venomous Serpents* †.

Genus Trigonocephalus, Oppel.

Trigonocephalus erythrurus. *Tri. supra lætè viridis, squamis ovatis carinatis subimbricatis, caudá cinnamomeá, squamis lævibus rhomboidalibus tectá; abdomine flavo-viridescenti lineá nigrá serratá utrinque incluso.*

Scuta abdominalia 167.
Scutella subcaudalia 68.

Habitat. Delta Gangeticum.

Bright green above, with ovate keeled slightly imbricate scales; the tail cinnamon-red, with smooth rhomboidal scales; the abdominal surface greenish-yellow, inclosed on both sides by a black serrated line.

Trigonocephalus mucrosquamatus. *Tri. supernè griseo-brunnescens, annulis nigris albo marginatis, squamis ovalibus, semicarinatis mucronatis, imbricatim tectus; subtus albidus, nigro punctatus.*

Scuta abdominalia 218.
Scutella subcaudalia 91.

Habitat. Naga Hills, Assam.

Brownish grey above, with black white-edged rings, covered with oval, half-keeled, pointed, imbricate scales; whitish beneath, dotted with black.

* See in p. 283 of the present Number a Note relative to Mr. W. H. White and Dr. Westendorp.

† Dr. Cantor's original specimens, drawings, and descriptions are in the possession of the Radcliffe Library, Oxford.

Genus Bungarus, Daudin.

Bungarus lividus. *Bung. supernè lividus, subtus albo-flavescens.*
Scuta abdominalia 221.
Scuta subcaudalia 56.

Habitat. Asám.

Blackish-blue above, yellowish-white beneath.

Genus Hamadryas*, Cantor.

Hamadryas ophiophagus. *Ham. supernè olivaceo-viridis, striis sagittalibus nigris cinctus, abdomine glauco nigro marmorato.*
Scuta abdominalia a 215 *ad* 245.
Scuta subcaudalia a 13 *ad* 32.
Scutella subcaudalia a 63 *ad* 71.

Habitat. Bengal.

Hindustanee name: Sunkr-Choar.

Olive-green above, with arrow-shaped black stripes; beneath, glaucous marbled with black.

Genus Naja, Laurenti.

Naja larvata. *Na. supra brunnea, striis subflavis transversalibus variegata; disco annulo albo, larvæ haud impari, ornato, pone quem (a tribus ad quinque) annuli albi;—inferioris superficiei pars anterior annulis albis, nigro-cœrulescentibus alternis circumdata, pars posterior glauco iridescens.*

Habitat. Bombay, Calcutta, Asám.

Bengalee name: Doollah-Kewtiah Nág.

Brownish, with numerous faint yellow transverse stripes; the hood marked with a white ring, not unlike the form of a mask, behind which there are from three to five white rings;—the anterior part of the lower surface with alternate white and bluish-black rings; the posterior part iridescent-glaucous.

A young specimen of this serpent lives at present in the Society's Gardens in Regent's Park. The artificial temperature, 62° Fahr., in which it is kept appears to agree very well with the serpent, which in one respect offers a striking difference from the habits of this genus when kept in captivity in India, for the keeper informs me that it feeds occasionally upon living frogs and earth-worms, and that it drinks milk; while those in Dr. Russell's and in my own possession in India, when deprived of liberty invariably refused to take any kind of food.

Genus Elaps, Schneider.

Elaps bungaroides†. *El. supernè lividus, striis sagittalibus albis cinctus; infra albus alternè lividus.*
Scuta abdominalia 237.
Scutella subcaudalia 46.

Habitat. Chirra Punji.

Black-blue above, with white arrow-shaped stripes; beneath, alternately white and black-blue.

* Vide Proceedings of the Zoological Society, No. lxvi. p. 73.

† From its resemblance to *Bungarus cœruleus*, Daudin.

Elaps flaviceps. *El. capite flavo, dorso nigro vittâ serratâ albâ cæruleo pallide nitente utrinque circumdato, caudâ flavâ lineâ nigrâ mediâ divisâ;—abdomine flavo lineâ nigrâ utrinque incluso.*

Scuta abdominalia 275.
Scutella subcaudalia 45.

Habitat. Malacca.

The head yellow, the back with a serrate band on each side, shining with a pale sky-blue colour; the tail yellow, divided in the middle by a black dorsal line; the abdominal surface yellow, inclosed on each side by a black line.

On my late visit to Copenhagen, Professor Reinhard pointed out an undescribed species of Bungarus from Java, preserved in the Royal Museum of Natural History (MSS. Cat., No. 128), which exhibits the same distribution of colours as the *Elaps flaviceps*, viz. the head and tail of a light yellow, the back bluish-black, the abdominal surface light yellow, the scuta marked with a short black transverse band or check on each side.

Elaps nigromaculatus. *El. supernè pallidè brunneo-rubescens, maculis nigris albo-marginatis, lineis nigris junctis;—caudâ fasciis duabus nigris albo-marginatis cinctâ; abdomine flavo albescenti, alterne livido, lineâ nigrâ serratâ utrinque incluso.*

Scuta abdominalia 238.
Scuta subcaudalia 24.

Habitat. Sincapore.

Pale reddish brown above, with black white-edged spots, united by black lines; on the tail two black bands with white margins;—the abdominal surface whitish yellow, alternately blue-black, inclosed on both sides by a black serrated line.

Elaps furcatus*, Schneider, Var. *El. supernè pallidè brunneo-rubescens, lineâ dorsali subflavâ nigro serratim marginatâ, caudâ fasciis tribus nigris cinctâ, abdomine flavo albescenti, lineâ nigrâ utrinque incluso.*

Scuta abdominalia 238.
Scutella subcaudalia 24.

Habitat. Sincapore.

Pale reddish brown, above with a light yellow dorsal line, with black serrated margins; on the tail three black bands; the abdominal surface whitish yellow, inclosed on each side by a black line.

B. *Innocuous Serpents.*

Genus Calamaria, Linné.

Calamaria sagittaria. *Cal. partim cinerea, partim ferruginea, serie dorsali punctorum nigrorum, nuchâ capiteque albicantibus, imagine sagittæ nigræ ornatis; corpore squamis lævibus imbricatim tecto; abdomine citrino, punctis lateralibus nigris, vittâ lividâ utrinque incluso.*

Scuta abdominalia 224.
Scutella subcaudalia 69.

Habitat. Bengal, Tirhoot.

* Russell, II., No. xix.

Partly ash-coloured, partly rusty-brown, with a series of black dots along the back; the head and neck whitish, with an arrow-shaped black mark; covered with smooth rhomboidal imbricate scales; the stomach of a citrine colour, with lateral black dots, and a blue black band on either side.

Vernacular name, Dóblee.

Calamaria monticola. *Cal. olivacco-fusca, collari lætè flavo, lineâ dorsali albicante, abdomine citrino.*

Scuta abdominalia 125.

Scutella subcaudalia 44.

Habitat. Naga Hills in Asám.

Dark olive-brown, with a bright yellow collar and a whitish dorsal line; beneath of a citrine colour.

Genus Coronella, Boie.

Coronella albocincta. *Cor. viridè-canescens, fasciis transversalibus albis nigro marginatis, quorum intervalla nigro punctata; scutis abdominalibus albo-flavescentibus, alternè fuscis.*

Scuta abdominalia 181.

Scutella subcaudalia 65.

Habitat. Chirra Púnji, Asám.

Greyish-green, with white transverse bands, edged with black, the intervals dotted with black; the abdominal scuta alternately yellowish-white and deep brown.

Asámese name, Patdei-hee.

Coronella violacea. *Cor. violaceo-rubescens, squamis albo-marginatis, subtus margaritaceis.*

Scuta abdominalia 196.

Scutella subcaudalia 38.

Habitat. Rungpore.

Reddish violet; the scales edged with white; beneath pearl-coloured.

Coronella cyclura. *Cor. viridè-canescens striis nigris obliquis interruptis, abdomine margaritaceo, vittâ tristè cinereâ utrinque incluso.*

Scuta abdominalia 179.

Scutella subcaudalia 43.

Greyish-green, with black oblique interrupted stripes; the abdominal surface pearl-coloured, with a deep ashy-grey band on either side.

Vernacular name, Tukkr-Bora.

Genus Lycodon, Boie.

Lycodon atro-purpureus. *Ly. atro-purpureus albo nigroque marmoratus, abdomine margaritaceo.*

Scuta abdominalia 257.

Scutella subcaudalia 91.

Habitat. Mergui, Tenasserim.

Deep purple, marbled with white and black; beneath pearl-coloured.

Lycodon subfuscus. *Ly. subfuscus, abdomine albo flavescenti.*

Scuta abdominalia 245.
Scutella subcaudalia 78.

Habitat. Bengal.

Light brown; yellowish white beneath.

Vernacular name, Chittee.

Genus Coluber, Boie.

Coluber Dhumna. *Col. olivaceo-viridis, squamis nigro-marginatis, abdomine margaritaceo, scutis scutellisque nigro-clavatis.*

Scuta abdominalia 187.
Scutella subcaudalia 119.

Habitat. Carnatic, Orissa, Bengal, Nepal, Asám, Arracan, Tenasserim.

Olive-green; the scales edged with black; the stomach pearl-coloured, edged with black.

Vernacular name, Dhumna or Dhameen.

Coluber porphyraceus. *Col. lætè porphyraceus, lineis nigris transversalibus albo-marginatis, pone quas lineæ duæ nigræ dorsales, æquidistantes; subtus lætè flavus.*

Scuta abdominalia 213.
Scutella subcaudalia 64.

Habitat. Míshmee Hills, Asám.

Bright porphyry-red, with black transverse lines edged with white, the posterior portion of the body with two black parallel dorsal lines; beneath light yellow.

Coluber quadrifasciatus. *Col. supernè lætè brunneo-virescens fasciis dorsalibus* iv. *nigris, albo interruptis; infra flavus.*

Scuta abdominalia 248.
Scutella subcaudalia 82.

Habitat. Asám.

Above light greenish-brown, with 4 black dorsal bands interrupted with white; beneath yellow.

Coluber curvirostris. *Col. supra partim lætè olivaceo-viridis, punctis et lineis obliquis albis nigrisque, partim æneus; abdomine subfusco.*

Scuta abdominalia 220.
Scutella subcaudalia 85.

Habitat. Bengal.

Above bright olive-green, with white and black dots, and oblique bronze-coloured lines; beneath light yellow.

Vernacular name, Tukkr-Bora.

Coluber reticularis. *Col. supernè brunneo-nigrescens, annulis albidis reticulatis, contiguis et lineis ejusdem coloris transversalibus ornatus, caudá brunneâ nigrescenti, alternè griseo-flavescenti; infra griseo-flavescens nigro-maculatus.*

Scuta abdominalia 229.
Scutella subcaudalia 75.

Habitat. Chirra Púnji.

Blackish-brown, with whitish confluent netted rings and trans-

verse lines of the same colour; the tail alternately blackish-brown and yellowish-grey; beneath yellowish-grey spotted with black.

Coluber bipunctatus. *Col. supra tristè vinoso-purpureus squamis albo bipunctatis, subtus albo-cœrulescens.*

Scuta abdominalia 181.
Scutella subcaudalia 52.

Habitat. Bengal, Asám.

Deep claret-purple above; each scale with two white dots; beneath bluish-white.

Coluber monticolus. Hodgson. *Col. supernè luteo-rubescens fasciis transversalibus nigris, scutis abdominalibus albo-flavescentibus nigro marginatis.*

Habitat. Nepâl.

Reddish dun-coloured above, with black transverse bands; the abdominal scuta yellowish-white, with black margins.

Subgen. Hurriah, Daudin.

Hurriah sanguiventer, (Coluber sanguiventer, Hodgson.) *Hur. supernè vinoso-purpureus æneo nitens, abdomine sanguineo.*

Scuta abdominalia 207.
Scuta subcaudalia 14.
Scutella subcaudalia 85.

Habitat. Nepâl.

Above claret-purple, with metallic lustre; beneath blood-coloured.

Genus Herpetodryas, Boie.

Herpetodryas prionotus. *Her. supra fusco flavescens, nigro-punctatus, fasciâque dorsali serratâ nigricante; abdomine flavo, fasciâ serratâ nigricante utrinque incluso.*

Scuta abdominalia 153.
Scutella subcaudalia 65.

Habitat. Malacca.

Above yellowish-brown, dotted with black, and with a serrated blackish dorsal band; the abdominal surface yellow, with a blackish serrated band on either side.

Genus Psammophis, Boie.

Psammophis cerasogaster. *Psam. fulvus aureo pallidè nitens, squamis hexagonis rhomboidalibus summis carinatis, cæteris lævibus tectus; abdomine ceriseo, lineâ læte flavâ utrinque incluso.*

Scuta abdominalia 149.
Scutella subcaudalia 60.

Habitat. Bengal, Asám.

Yellowish-brown, shining with a pale gold colour, with hexagonal rhomboidal scales, the uppermost of which are keeled, the rest smooth; the abdominal surface cherry-coloured, with a bright yellow line on either side.

Vernacular name, Lál Mitállee.

Psammophis nigrofasciatus. *Psam. supernè subflavo-rubescens fasciis latis transversalibus nigris, lineisque duabus barbatis*

dorsalibus ejusdem coloris, interstitium quarum nigro partim punctatum; abdomine albido.

Scuta abdominalia 245.

Scutella subcaudalia 75.

Habitat. Sincapore.

Light reddish-yellow above, with broad transversal black bands, and with two barbed dorsal lines of the same colour; the interval between these dorsal lines dotted with black; the abdominal surface whitish.

Genus Dendrophis, Boie.

Dendrophis Boii.* *Den. supernè nigro-brunnescens, vittâ dorsali subfuscâ, abdomine albo-flavescenti vittâ ejusdem coloris utrinque incluso, rostro subobtuso.*

Scuta abdominalia 186.

Scutella subcaudalia 129.

Habitat. Bengal, Ceylon.

Brownish black, with a light brown dorsal band; the abdominal surface yellowish white, with a band of the same colour on either side; the rostrum subobtuse.

Vernacular name, Kálla Lawrýnca or Nawdúnga.

Genus Dipsas, Boie.

Dipsas Ferruginea. . *Dip. supra ferrugineo-brunnea, nigro alboque rarè maculata; abdomine ferrugineo-flavo, albo nigroque maculato.*

Scuta abdominalia 171.

Scutella subcaudalia 57.

Habitat. Asám.

Rusty-brown, with a few black and white spots; the abdominal surface rusty-yellow, dotted with white and black.

Dipsas monticola. *Dip. supernè tristè fusca, striis aliquot nigris obliquis; infra flavo-brunnescens.*

Scuta abdominalia 193.

Scutella subcaudalia 82.

Habitat. Naga Hills (Asám).

Dull dark brown above, with a few black oblique stripes; beneath brownish-yellow.

Genus Tropidonotus, Kuhl.

Tropidonotus Quinque. *Tro. supernè griseo-brunnescens, nuchá numero Quinque* (v.) *nigro inscriptá, fasciisque duabus nigris dorsalibus, albo punctatis; abdomine flavo-albescenti, fasciá nigrâ utrinque incluso.*

Scuta abdominalia 259.

Scutella subcaudalia 97.

Habitat. Mergui.

Brownish-grey above, with the cypher V in black on the neck, and with two dorsal black bands dotted with white; the abdominal surface whitish-yellow, with a black band on either side.

* Chrysopelea Boii, Dr. Andrew Smith.

Tropidonotus mœstus. *Tro. supernè tristè olivacco-nigri ans subtus flavus.*

Scuta abdominalia 138.

Scutella subcaudalia 77.

Habitat. Bengal.

Dull blackish olive-colour above; yellow beneath.

Vernacular name, Kalla Mittállee.

Tropidonotus surgens. *Tro. lætè olivacco-viridis, abdomine flavo lineâ nigrâ serratâ utrinque incluso.*

Scuta abdominalia 148.

Scutella subcaudalia 23.

Habitat. Bengal.

Bright greenish-olive; the abdominal surface with a black serrated line on either side.

Vernacular name, Bahr.

Tropidonotus plumbicolor. *Tro. supra plumbeus, fasciâ sagittatâ occipitali nigrâ et albâ fasciisque nigris serratis transversalibus, squamis altè carinatis tectus, mento albo, abdomine plumbeo.*

Scuta abdominalia 162.

Scutella subcaudalia 51.

Habitat. Malwa (Saugor).

Lead-coloured above, with an occipital arrow-shaped black and white band, and with black serrated transversal bands, covered with sharply-keeled scales; the chin white; the abdominal surface lead-coloured.

Genus Cerberus, Cuvier.

Cerberus cinereus. *Cerb. supernè cinereus fasciis nigris transversalibus, subtus albicans fasciâ nigrâ undulatâ.*

Scuta abdominalia 143.

Scutella subcaudalia 59.

Habitat. Bengal.

Ash-coloured above, with black transverse bands; beneath whitish, with a black undulated band.

Vernacular name, Jál Ginthéa.

Genus Homalopsis, Kuhl.

Homalopsis olivaceus. *Hom. supernè olivaceus lineis nigris inter squamas variegatus, abdomine albicante, lineâ mediâ nigrâ diviso, vittâ albo-virescenti utrinque incluso.*

Scuta abdominalia 167.

Scutella subcaudalia 71.

Habitat. Bengal.

Olive-coloured above, variegated with black lines between the scales; the abdominal surface whitish, divided in the middle by a black line, and with a greenish-white band on either side.

Vernacular name, Metíllee.

"The descriptions and figures of these serpents were made in India in 1835, 1836, and 1837. For the specimens from Asám I am indebted to the kindness of the eminent botanist Mr. William Griffith;

for those from Chirra Punji, to the friendship of Mr. J. W. Grant, of Calcutta. I have also to acknowledge the liberality of Mr. Hodgson, the Hon. Company's Resident at the court of Nepâl, who allowed me to publish the undescribed specimens in his collection of Nepâlese serpents."

LINNÆAN SOCIETY.

Nov. 5, 1839.—Edward Forster, Esq., V.P., in the Chair.

The Rev. William Wood, B.D., F.L.S., exhibited specimens of a variety of *Typha angustifolia*, remarkable for its small size, and the shortness of its female catkins, collected by himself in the extensive marshes situate between Sandwich and Deal.

Read, "Descriptions of some new Insects collected in Assam, by William Griffith, Esq., Assistant Surgeon in the Madras Medical Service." By the Rev. F. W. Hope, M.A., F.R.S. & L.S.

The insects described in this paper, some of which are remarkable for their size and splendid colours, were mostly collected in Assam by Mr. Griffith, during the stay of the late Scientific Mission from Calcutta, to which he was attached. They chiefly belong to the longicorn beetles, and to the family of *Lamiadæ*. The following are the characters of the new genera and species:

LAMIA.

1. *L. Horsfieldii.*

Long. lin. 26; lat. lin. 8½.

Corpus cinereum; antennis corpore longioribus, elytrisque flavo-cretaceis maculisque ornatis, antennæ articulis tribus primis subscabris.

This species, which has been named in compliment to Dr. Horsfield, is the largest of the family, and is nearly related to *L. catenata* of De Haan from Japan.

G. N. EUOPLIA.

Corpus subdepressum. *Antennæ* lamiæformes, ferè ut in Omacantha. *Thorax* utrinque spinosus, dorso punctulatus. *Elytra* depressa, apicibus 2-spinosis, spinâ suturali minore, lateralibus majoribus. In reliquis Lamia convenit.

1. *C. polyspila.*

Besides the one enumerated, the author possesses five other species, all natives of India, and which are still undescribed.

G. N. OPLOPHORA.

Caput ferè quadratum. *Mandibulæ* falciformes. *Antennæ* corpore paullò longiores, articulis basi pallidis. *Thorax* utrinque armatus, dorso fortitèr rugoso, tuberculo in medio disci posito. *Elytra* thorace 4-plò longiora, basi sinuata, subscabra, gradatim e humeris ad apicem magnis tudine decrescentia, apicibus rotundatis. *Corpus* infrà annulis abdo-

minis ad apicem sensim attenuatis. *Pectus* valdè convexum, mucrone armatum. *Pedes* difformes et robusti.

1. *O. Sollii.*

This splendid species is dedicated to Richard Horsman Solly, Esq., F.R.S. & L.S., in whose cabinet the chief part of the insects described in this paper is contained. To the same genus belong *Lamia punctata* of Fabricius, and two undescribed Indian species.

G. N. ANOPLOPHORA.

Caput quadratum. *Antennæ* corpore duplò longiores, ultimo articulo valdè elongato. *Thorax* utrinque spinosus, medio depressus. *Elytra* anticè et posticè ferè æqualia, apicibus rotundatis. *Corpus* infrà squamosum, pectore inermi. *Pedes* difformes et robusti.

1. *A. Stanleyana.*

This insect, distinguished for its brilliant colours, which rival those of some of the more splendid Lepidoptera, has been named in honour of the Lord Bishop of Norwich, President of the Linnean Society.

CALLICHROMA, *Latr.*

1. *C. Cantori.*

Long. lin. 21; lat. lin. 5.

Viride, nitidum; antennis violaceis, femoribus tibiisque lætè cyaneis tarsisque aureo-ornatis.

This species is named in compliment to Dr. Cantor, a distinguished zoologist in the service of the East India Company, and whose valuable collection of Indian Reptilia and drawings are deposited in the Radcliffe Library at Oxford.

2. *C. Griffithii.*

Long. lin. 20½; lat. lin. 8.

Obscurè atrum; antennis tarsisque luteis, elytris nigris et flavo-fasciatis.

This species is dedicated to its discoverer, an acute and enterprising botanist, and author of two valuable memoirs on the development of the ovulum of Santalum and Loranthus, printed in the 18th Volume of the Society's Transactions.

MONOCHAMUS, *Megerle.*

1. *M. ruber.*

Long. lin. 11; lat. lin. 4½.

Ruber; antennis corpore duplò longioribus, thorace elytrisque nigro-maculatis, pedibus concoloribus.

Read also, "On *Cuscuta epilinum* and *halophyta*." By Charles C. Babington, Esq., M.A., F.L.S.

The first of these species has been recently added to the British Flora by J. E. Bowman, Esq., F.L.S., having been found by him growing abundantly on flax, near Trelydan Hall, Montgomeryshire,

in August last. The other species, which occurs on the coast of Norway, growing upon *Chenopodeæ*, has not been hitherto observed in this country. The author gives the following characters of the two plants :—

1. *C. epilinum* (Weihe), florum glomerulis bracteatis sessilibus, squamis palmati-subsexfidis tubo corollæ semper ventricoso adpressis, sepalis carnosis basi deltoideis corollâ vix brevioribus.
2. *halophyta* (Fries), " florum glomerulis subbracteatis" sessilibus, squamis bifidis tubo corollæ ventricoso adpressis : segmentis bifidis, calyce corollâ multò breviori.

Nov. 19.—Edward Forster, Esq., V.P., in the Chair.

Read, " A Monograph of the genus *Disporum*." By D. Don, Esq., Libr. L.S., Prof. Bot. King's College.

This genus was first suggested by Mr. Brown, in his ' Prodromus Floræ Novæ Hollandiæ'; and the name of *Disporum* was subsequently given to it by Salisbury in the first volume of the Transactions of the Horticultural Society of London. It remained, however, undescribed, and almost unnoticed, until the publication of the author's work on the plants of Nepal, in which a detailed description of the genus, and the characters of two additional species were given. The characters of the genus consist in its campanulate perianthium, with the sepals produced into a pouch or spur at the base, in the cells of its ovarium bearing two ovula, in its baccate pericarpium, and in its umbellate inflorescence. These distinctions will be found to be common to all the Asiatic species hitherto referred by most botanists to *Uvularia*. We subjoin the characters of the species described in this paper.

1. *D. calcaratum*, umbellis pedunculatis sub-5-floris, sepalis lanceolatis acutiusculis basi longè calcaratis, antheris filamentis stigmatibusque stylo triplò longioribus, foliis ovato-lanceolatis sessilibus.

   Uvularia calcarata. *Wall. Cat. n.* 5087.

2. *D. Wallichii*, umbellis subsessilibus sub-5-floris, sepalis lanceolatis acuminatis, calcaribus rectis abbreviatis, antheris filamentis 4-plò brevioribus, stylo stigmatibus longiore, foliis ovato-lanceolatis subpetiolatis.

   Uvularia Hamiltoniana, B. et C. *Wall. Cat.* n. 5088.

3. *D. Hamiltonianum*, umbellis pedunculatis sub-5-floris, sepalis lanceolatis acutis, calcaribus abbreviatis recurvis, antheris filamentorum longitudine, stylo stigmatibus subæquali, foliis ovato-lanceolatis subpetiolatis.

   Uvularia Hamiltoniana, A. *Wall. Cat.* n. 5088.

   U. Betua. *Ham. MSS.*

4. *D. Horsfieldii*, umbellis pedunculatis sub-5-floris, sepalis spathulatis

mucronatis puberulis, antheris filamentis duplò brevioribus, stylo stigmatibus duplò longiore, foliis ovato-lanceolatis subpetiolatis.

Uvularia Hamiltoniana, δ. *Wall. Cat.* n. 5088.

5. *D. Leschenaultianum*, umbellis sessilibus 3—5-floris, sepalis ovato-lanceolatis acutis basi gibbosis, antheris filamentis vix duplò brevioribus, stylo stigmatibus ter longiore, foliis ovatis subpetiolatis.

Uvularia Leschenaultiana. *Wall. Cat.* n. 5089.

6. *D. Pitsutum* (Don, Prodr. p. 50.), umbellis pedunculatis 7—9-floris sepalis cuneato-lanceolatis obtusiusculis basi gibbosis, antheris filamentis ter brevioribus, stylo stigmatibus duplò longiore, foliis lanceolatis subpetiolatis.

7. *D. parviflorum* (Don, Prodr. p. 50.), umbellis subsessilibus 2—7-floris, sepalis lanceolatis acuminatis basi gibbosis, antheris filamentis duplò brevioribus, stigmatibus stylo ter brevioribus, foliis lanceolatis subpetiolatis.

8. *D. fulvum* (Salisb. in Hort. Trans. i. p. 330.), umbellis sessilibus sub 4-floris, sepalis lanceolatis acutis basi breviter calcaratis, antheris filamentis vix brevioribus, stigmatibus styli longitudine, foliis lanceolatis subpetiolatis.

The author concludes his paper with the description of a new and nearly-related genus, founded upon a plant which was introduced from New South Wales into the Royal Botanic Garden at Kew, in 1823, and which is remarkable for its unenclosed embryo, and for the singular appendages, similar to those of *Parnassia*, which are seated at the inner base of the sepals. The following is the description of this interesting genus :—

TRIPLADENIA.

Perianthium 6-phyllum, petaloideum, patens, æquale, deciduum : *foliolis* æstivatione involutis, basi biappendiculatis! sessilibus. *Stamina* 6, toro, nec basi sepalorum inserta. *Antheræ* erectæ, extrorsæ, biloculares, duplici rimâ longitudinali dehiscentes. *Ovarium* liberum, triloculare : *loculis* biovulatis : *ovulis* campylotropis, collateralibus, erectis. *Stigmata* 3, recurvata. *Pericarpium* subbaccatum, 3-loculare, 3-valve, loculicido-dehiscens : *loculis* 1—2-spermis. *Semina* sub-orbiculata, hinc convexa, inde angulata, v. concaviuscula, glabra, nitida, colore succinea, hilo maximè fungoso-strophiolato, chalazâ orbiculatâ concavâ fusca, raphide dimidio seminis vix breviori, elevatâ : *testâ* tenui, membranaceâ : *albumen* copiosum, corneum, album. *Embryo* oblongus, albus, hinc convexus, inde planiusculus, more Graminum extra albumen locatus, eodemque facie planâ applicatus, funiculo maximè strophiolato solummodò obtectus ! extremitate radiculari (cauliculari) paullò latiori.

Herba (Novæ Hollandiæ) *perennis, rhizomate multicepite, caulibus subsimplicibus multangulis, foliis amplexicaulibus ovato-lanceolatis, pedunculis axillaribus solitariis unifloris infra medium articulatis involucelloque 3-phyllo munitis.*

1. *T. Cunninghamii.*

MISCELLANEOUS.

NOTE RELATIVE TO DR. WESTENDORP'S MEMOIR ON A NEW SPECIES OF EPILOBIUM, ERRONEOUSLY PUBLISHED AS MR. W. H. WHITE'S.

From what we have just learnt with regard to this paper, it is our unwelcome duty immediately to make the following statement. A translation of it was published in our 1st volume, p. 208, as an original paper by Mr. W. H. White, read before the Botanical Society of London on March 2nd, 1838, and communicated to us from the Secretary of the Society. It is, however, we are informed, merely a verbal translation of Dr. Westendorp's memoir, which appeared in the Bulletin of the Brussels Royal Academy of Sciences for November 1836. As this fact has been publicly denounced in the Bulletin for March last, and severely reprobated in a publication by Dr. Westendorp, a regard to justice, as well as to the reputation of our Journal, calls on us to state all that has come to our knowledge, and to inquire what explanation can be given.

Should this have happened through any mistake, we still must think that Mr. W. H. White ought, in justice to Dr. Westendorp, to the Botanical Society, and to ourselves, to have warned us of the error as soon as possible after it had occurred.

BLOOD CORPUSCLES IN THE MAMMALIA.

Mr. Gulliver has been lately occupied in some observations on the blood disks of mammalia, of which the following are some of the results:

In five Australasian animals the corpuscles have the form and size most common in mammals, their diameters varying from $\frac{1}{4800}$th to $\frac{1}{3000}$th of an inch. These Australasian animals are the *Perameles lagotis*, *Petaurus Sciurus*, *Macropus Bennettii*, *Dasyurus Ursinus*, and *D. Viverrinus*.

In reference to the interesting discovery by M. Mandl of the oval blood corpuscles of the Dromedary, Mr. Gulliver has found the blood-disks of the *Auchenia Vicugna*, *A. Paco*, and *A. Glama*, also very distinctly elliptical. In the *Vicugna* they are rather smaller than in the other species.

In the Musk Deer (*Tragalus Javanicus*) Mr. Gulliver observes that the blood disks are smaller than those, hitherto described, of any other mammal whatever. In the *Tragalus*, the disks, though very distinct in form, measure on an average $\frac{1}{12000}$th of an inch only; but many variations in size are to be seen, from $\frac{1}{15000}$ th to $\frac{1}{9600}$th of an inch in diameter.

NOTES ON IRISH BIRDS.

Quail, *Perdix Coturnix*, Lath. This species, considered migratory in England with the exception of some few individuals that winter in the south*, has of late years remained permanently in the north of Ireland, and during winter occurs in considerable numbers. Throughout this season, quails are daily exposed for sale in the town of Belfast, and several brace often exhibited together in a single shop. In stating the following particulars respecting the number of these birds shot by a sporting relative during part of one winter, all that were obtained by him within that period are not enumerated, but merely those on the days mentioned, with the "returns" of which I was favoured. On November 11th, 1834, my friend shot two and a half brace, and on the 13th two brace of Quails, and on the latter day saw altogether about seven or eight brace; on the 19th he obtained three brace. On December 10th he killed four and a half, and saw altogether about ten brace; on the 15th he bagged three birds. These were all obtained in their summer haunts in the county of Down, within six miles of Belfast. The same gentleman about the 1st of January 1835, shot four brace of Quails in one day near Larne in the county of Antrim, and saw many more: he remarks, that he never met with more of these birds when partridge shooting early in the season or in September than he has done throughout the month of December 1834; they were however considered by him to be rather more numerous than usual that winter. It must be added, that in no instance above mentioned did my friend go purposely in pursuit of these birds; he was snipe-shooting, and merely when walking from one bog to another, the Quails occurred. In the winter of 1836–37, a person of my acquaintance in one day shot ten brace of Quails in stubble-fields bordering Belfast Bay, to the north of Carrickfergus. During the winter of 1831–32, and subsequently, they have chiefly attracted the attention of my friend and myself.

Pigmy Curlew, *Tringa subarquata*, Temm. This pretty species, characterized in the latest works of authority as a "rare visitant" to Great Britain, is one of our regular autumnal migrants to the north of Ireland. It first attracted notice here nearly twenty years ago, when an acute observer, the late John Montgomery, Esq. of Locust Lodge, distinguished the species from its congeners, and called Mr. Templeton's attention to it. Since that period, the Pigmy Curlew may be set down from observation as a regular bird of passage, chiefly occurring in the months of September and October. I have never known it to be so plentiful in Belfast Bay as during the Sep-

* Montagu and Selby.

tember of this present year, when it appeared in considerable flocks —but few are generally seen together, and not rarely it is met with singly.

Mr. H. H. Dombrain, of Dublin, informs me that he saw a few individuals of this species, and shot one at Lurgan Green, near Dundalk, at the beginning of November 1837. To the bay of Dublin the Pigmy Curlew resorts, as it does to the north-east of Ireland.

The Little Stint, *Tringa minuta*, Leisl.,—which in reference to Great Britain is regarded only as a rare and occasional visitant, may, like the *T. subarquata*, be called a regular bird of passage in the north of Ireland. About the year 1823, Mr. John Montgomery saw a bird either of this species or of the allied *Tringa Temminckii* when out shooting on the extensive sands of Dundrum, in the county of Down, but from its shyness sought in vain to procure it. On Sept. 6, 1831, the first *Tr. minuta* known to me as obtained upon our coast was shot in Belfast Bay, and came into the possession of Dr. J. D. Marshall; others were subsequently killed here in the same season. My attention having since that time been particularly directed to such subjects, I find by reference to notes, that every autumn from 1831 to 1839 inclusive, with the single exception of 1835, when I was absent from home, this bird appeared in Belfast Bay, though in every instance in very small numbers. Early in September, 1837, a flock consisting of nine individuals were seen in the bay, and although very wild, were so perseveringly followed, that within a fortnight they had all fallen victims to the gun. So early as the end of July they have been met with here.

By Thomas W. Warren, Esq., of Dublin, I was favoured with a specimen of this bird, which he shot in Dublin Bay about the 1st of November, 1831.

Ruff, *Tringa pugnax*, Linn. Although I have not at present sufficient data to enable me to designate this species as a regular autumnal bird of passage to the north-east of Ireland, it may be set down as a frequent visitant at this period, when its sojourn is but of short continuance. So early as the end of August, 1828, when the first migration of snipes for the season arrived in the neighbourhood of Belfast, a few Ruffs were found associating with them—within the succeeding two months they have not unfrequently occurred. In spring too Ruffs arrayed in their nuptial garb have on a few occasions been obtained in different parts of Ireland.

Ample details on the four species here noticed are reserved for their proper place in my series of papers on the Birds of Ireland, but such facts as those brought forward seemed to call for special announcement.—W. Thompson, Belfast, Oct. 1839.

ON THE REMARKABLE DIFFUSION OF CORALLINE ANIMALCULES FROM THE USE OF CHALK IN THE ARTS OF LIFE, AS OBSERVED BY EHRENBERG.

An examination of the finest powdered sorts of chalk which are used in trade has afforded Professor Ehrenberg the following result, that even in this finest condition not merely the inorganic part of the chalk is become separated, but that it remains mixed with a great number of well-preserved forms of the minute shells of Coral Animalcules. As powdered chalk is used for paper-hangings, Professor Ehrenberg also examined these as well as the walls of his chambers which were simply washed with lime, and even a kind of glazed vellum paper called visiting cards, and obtained the very visible result,—demonstrating the minuteness of division of independent organic life,—that those walls and paper-hangings, and so doubtless all similar walls of rooms, houses, and churches, and even glazed visiting cards prepared in the above-mentioned manner (of which cards, many however, are made with pure white lead, without any addition of chalk) present, when magnified 300 diameters, and penetrated with Canada balsam, a delicate mosaic of elegant coralline animalcules, invisible to the naked eye, but, if sufficiently magnified, more beautiful than any painting that covers them.—*Pogg. Ann.* 1839. No. 9.

NOTE ON PELORIA. BY MR. ADAM WHITE.*

Linnæus, in the 'Amœnitates Academicæ' for 1749 (i. p. 282. tab. 3.) described and figured the *Peloria* as a distinct genus of plants, which he however subsequently in his 'Species Plantarum,' (ii. p. 859. ed. 2.) included with the *Antirrhinum Linaria* (*Linaria vulgaris*, DC.) of which he considered it a monstrosity ("*naturæ prodigium*") caused by the corolla of the plant becoming regular, that is being furnished with 5 lobes to the lip, 5 basal spurs and pentandrous flowers: even in 1763 Linnæus thought it might form a peculiar genus, "*nisi fructus semper abortiret.*"

Since that time this kind of variation has been observed in many other plants, as for example by M. Mirbel in the *Teucrium campanulatum* and many other *Labiata* ('Elémens de Physiologie Végétale,' &c. p^tie^ i. p. 221. note.).

M. Bosc alludes to its occurrence in the genera *Rhinanthus* and *Dracocephalum* ('Nouv. Dict. d'Hist. Nat.' xxv. p. 146.).

M. Guillemin observed it in *Sideritis* ('Dict. Ch. d'Hist. Nat.' xiii. p. 164.).

M. DeCandolle has found it in several species of *Linaria*, *An-*

* Read before the Botanical Society of London, 21st Dec. 1838.

tirrhinum, Digitalis, Sesamum, Galeopsis, Viola, Orchis, and hence believes that it is a phænomenon common to all irregular flowers (' Organographie Végétale,' i. pp. 518. and 519. ed. 1827.). The last-mentioned author figures the *Viola hirta* in various states of pelorization; and Guillemin, in the work above-quoted, mentions that he has frequently found the *Linaria spuria,* DC., in the same state, some specimens with 5 spurs, others with 4, 3, or 2. I am indebted to a friend for the sight of a pelorian variety of a species of *Tropæolum,* and have also much pleasure in showing the Society an imperfectly developed pelorian variety of the pretty *Pinguicula vulgaris,* which I gathered on Roydon Fen, near Diss in Norfolk, in the summer of 1835. This is perhaps interesting, inasmuch as it still further corroborates the inference drawn by M. DeCandolle, and because, as far as I am aware, the occurrence of such a monstrosity has not been before observed in the order *Lentibulariæ.*

Linnæus attributed the production of peloria to the fecundation of the *Linaria* by the pollen of another plant; other authors think it is caused by the puncturing of insects, which produces a deviation in the flow of the sap.

M. DeCandolle attributes it to "the phænomenon of a glandular, thread-shaped body being developed into a true stamen," (Organogr. u. s.) when the other parts of the flower return to symmetrical arrangement.

ADAM WHITE.

December 7, 1838.

METEOROLOGICAL OBSERVATIONS FOR OCT., 1839.

Chiswick.—Oct. 1. Foggy: very fine. 2. Foggy: rain. 3. Very fine. 4. Rain: stormy with rain at night. 5. Boisterous: clear. 6. Fine. 7. Cloudy: fine. 8. Hazy: very fine. 9. Very fine: heavy rain at night. 10. Showery: sultry at intervals. 11. Very fine. 12. Fine: rain at night. 13. Foggy: fine. 14. Fine. 15, 16. Slight fog: fine. 17. Foggy. 18. Drizzly. 19, 20. Foggy: fine. 21, 22. Hazy: fine. 23, 24. Rain. 25. Overcast: fine. 26, 27. Clear and fine. 28. Stormy: showers of rain. 29, 30. Hazy and cold. 31. Rain.

Boston.—Oct. 1. Fine. 2. Cloudy: rain P.M. 3. Fine. 4. Rain: rain early A.M. 5. Cloudy: rain early A.M. 6. Cloudy. 7, 8. Fine. 9. Cloudy. 10. Rain. 11. Fine. 12. Cloudy. 13. Cloudy: rain early A.M. 14, 15. Cloudy. 16. Fine. 17. Cloudy. 18. Cloudy: rain A.M. 19. Fine. 20, 21. Foggy. 22, 23. Cloudy. 24. Rain. 25. Cloudy. 26. Fine: rain early A.M. 27. Fine: rain P.M. 28. Rain: rain early A.M. 29. Cloudy: rain: stormy night. 30. Stormy. 31. Cloudy.

Applegarth Manse, Dumfries-shire.—Oct. 1. Wet throughout. 2. Very wet morning: cleared at noon. 3. Fair till 11 A.M., when began to rain. 4. Fair all day. 5. Fine calm day: hoar frost morning and ice. 6. The same: hoar frost still stronger. 7. A very good harvest day: getting cloudy P.M. 8. Drizzling all day. 9. The same. 10. The same A.M.: fair P.M. 11. Fair throughout. 12. The same. 13. The same: overcast in the evening. 14. Drizzling all day. 15. Dull, cloudy, and damp: rain P.M. 16. Sunshine and showers alternately. 17. Very fine day: hoar frost early A.M. 18, 19. The same: ice on the ponds. 20. Very fine day. 21. Fair; but dull and foggy. 22. Fair till noon, when rain came on. 23. Rain all day. 24. Rain all day though slight. 25, 26. Fair throughout. 27. Clear and temperate. 28. Fine October day. 29. One slight shower, when it cleared. 30. Fair: air very keen. 31. The same: keen and cold like a day in March.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. ROBERTON; *by* Mr. THOMPSON *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. VEALL *at Boston, and by* Mr. DUNBAR *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1839. Oct.	Barometer.						Thermometer.									Wind.				Rain.				Dew point.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc. Fahr. 9 a.m.	Roy. Soc. Self-register.		Chiswick.		Boston. 8½ a.m.	Dumfries-shire.			London: Roy. Soc. 9 a.m.	Chiswick 1 p.m.	Bost.	Dumfries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	8½ p.m.	9 a.m.	Max.	Min.	Max.	Min.		Max.	Min.										
1.	30·000	29·988	29·856	29·55	29·79	29·59	53·4	58·4	48·4	68	41	51	54	42	ENE.	SE.	calm	SW.		...	...	...	...	51
2.	29·688	29·803	29·659	29·20	29·39	29·56	55·8	61·8	50·9	66	37	52	54	45½	S.	W.	calm	W.		...	·12	...	...	51
3.	30·004	29·992	29·790	29·44	29·70	29·53	48·7	63·0	44·2	64	48	47·5	53	39	SSW.	S.	calm	SW.		·102	·21	·10	...	44
4.	29·456	29·655	29·447	28·94	29·50	29·83	54·8	55·3	47·9	65	49	53	50	43	S.	S.	calm	N.		·172	·27	·42	...	51
5.	30·018	30·277	29·978	29·60	30·07	30·16	49·5	60·0	49·3	55	41	50	51	34	NW.	N.	N.	N&SW		·538	...	·47	...	49
● 6.	30·302	30·351	30·302	29·82	30·22	30·19	49·8	52·3	44·7	58	38	51	50	29	N.	N.	calm	Var.		...	...	...	1·23	47
7.	30·298	30·315	30·226	29·73	30·13	29·97	51·3	52·0	45·9	62	43	51	54	38	N.	NE.	calm	SW.		...	...	...	...	46
8.	30·120	30·130	29·861	29·52	29·83	29·73	52·8	53·3	51·0	66	56	49	52½	48½	NW.	SE.	calm	S.		...	...	...	...	47
9.	29·876	29·800	29·690	29·24	29·57	29·49	59·7	60·0	51·4	68	56	58	54	48½	S.	SW.	calm	S.		...	·23	...	...	55
10.	29·642	29·687	29·618	29·02	29·29	29·35	60·6	60·8	58·2	68	48	58	57	49	S.	S.	W.	SSE.		·027	·07	·11	...	57
11.	29·598	29·651	29·495	29·02	29·44	29·58	59·7	62·3	54·7	71	52	59	61	50	E.	S.	NE.	E.		·036	·31	·03	...	57
12.	29·844	30·050	29·788	29·23	29·63	29·85	56·3	63·5	54·3	60	42	58·5	60	51	S.	S.	S.	E.		·250	·01	...	...	53
13.	30·020	30·016	29·987	29·38	29·84	29·70	52·3	52·4	49·6	65	37	55	57	44	SE.	W.	calm	E.		...	...	·09	...	51
☽ 14.	29·938	29·920	29·815	29·44	29·59	29·55	54·8	55·0	48·0	61	42	52	57	50	SE.	S.	calm	E.		...	·02	...	1·27	52
15.	29·818	29·937	29·833	29·30	29·67	29·68	52·2	59·0	50·2	59	38	52	55	47½	S.	...	calm	SE.		...	...	...	...	49
16.	30·074	30·066	30·037	29·47	29·66	29·72	52·7	52·5	46·2	61	36	47	54½	44½	SW.	S.	W.	S.		·033	...	...	...	48
17.	30·092	30·085	30·050	29·61	29·98	30·00	48·0	51·3	43·8	57	48	46	54	40½	S.	S.	calm	E.		...	·14	...	...	46
18.	29·866	29·917	29·861	29·30	29·88	29·82	50·8	54·7	47·5	59	45	51	52	35	E.	S.	calm	WSW.		·219	·06	...	...	50
19.	30·044	30·133	30·033	29·53	29·89	29·91	50·2	51·6	47·0	61	35	45	50	30½	SW.	SW.	calm	SE.		·019	...	·07	...	48
20.	30·092	30·097	30·036	29·62	29·96	29·90	41·2	55·6	49·6	60	44	45	51½	35	W.	SE.	calm	NE.		...	...	...	...	43
○ 21.	30·064	30·075	30·048	29·55	29·89	29·85	54·0	54·3	41·0	59	51	52	52½	36½	ENE.	NE.	calm	S.		...	...	...	2·30	49
22.	30·156	30·148	30·106	29·59	29·80	29·83	53·3	53·6	52·8	56	51	52	54	45	SE.	S.	calm	SE.		...	·01	...	...	50
23.	30·086	30·090	30·062	29·54	29·80	29·80	53·2	53·4	52·7	54	49	53	54½	48	SE.	SE.	calm	SE.		...	·24	...	...	49
24.	30·050	30·131	30·032	29·04	29·87	30·08	48·8	49·5	49·3	54	44	50	53½	50	E.	S.	S.	ENE.		·175	·30	·15	...	49
25.	30·264	30·358	30·252	29·76	30·27	30·35	48·3	50·0	46·4	52	41	49	54	45	NNE.	E.	calm	ENE.		·266	...	·28	...	47
26.	30·330	30·338	30·208	29·88	30·35	30·31	46·3	50·4	44·0	53	36	44	48½	39½	N.	NE.	calm	ENE.		...	...	·01	...	45
☾ 27.	30·272	30·296	30·247	29·78	30·28	30·32	42·0	50·0	40·6	51	39	43	57	37½	NW.	NE.	calm	ENE.		...	·02	...	...	42
28.	30·314	30·480	30·322	29·91	30·41	30·47	42·7	49·0	40·4	46	37	44	48½	36	N.	NW.	NE.	ENE.		...	...	·26	0·05	39
29.	30·316	30·446	30·222	29·96	30·43	30·40	42·7	47·2	37·3	47	39	44·5	48½	36	NE.	NE.	NE.	ENE.		·060	·12	·42	...	37
30.	30·142	30·161	30·038	29·81	30·30	30·22	41·4	45·0	39·8	48	38	47	49	38½	NE.	NE.	E.	ENE.		...	...	...	...	38
31.	29·940	29·974	29·853	29·60	30·11	30·02	39·3	44·8	39·8	42	38	43	47½	43	NE.	E.	E.	ENE.		·061	·10	...	...	38
Mean.	30·023	30·076	29·959	29·49	29·885	29·895	50·5	54·3	47·3	58·58	44·23	50·	53·2	41·9						Sum. 1·958	2·23	2·41	4·85	Mean. 47·7

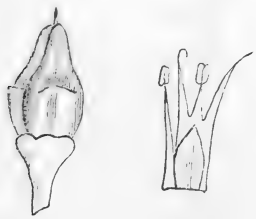
ANNALS OF NATURAL HISTORY.

XXXI.—*On* Allium Porrum *and* A. Ampeloprasum. By Charles C. Babington, M.A., F.L.S., F.G.S., &c.

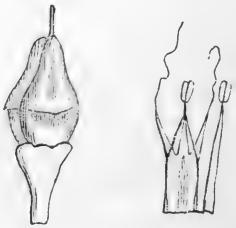
In my 'Primitiæ Floræ Sarnicæ,' p. 95, I have mentioned the great difficulty which exists in distinguishing between *A. Porrum* and *Ampeloprasum*, and am induced to communicate the following attempt at their discrimination to the 'Annals of Natural History,' in the hope that it may assist other botanists in determining the plants. Unfortunately the root is not usually to be found upon specimens of such large size as these leeks, for when that is present there can be no difficulty in distinguishing the species; the root of *A. Porrum* (the true leek,) being formed of numerous concentric coats like that of an onion, producing no offsets whatever, and therefore its duration being not more than biennial; whilst that of *A. Ampeloprasum* consists of a few concentric coats, including from two to four large offsets, and thereby somewhat resembling, in its transverse section, the bulb of a hyacinth, but having much larger offsets in proportion to the concentric coats. Happily the structure of the flowers, which at the first view appears similar in both plants, will supply us with excellent characters when examined with care. I have endeavoured in the wood cuts which accompany this short communication, to give some idea of the form of the germen, and of the form and proportions of the perigone and stamens in each plant. It will be seen that in both of them the germen is constricted at about the middle, but that in *A. Porrum* the constricted part is continued upwards, and in *A. Ampeloprasum* it is continued downwards; this is best seen at the time of flowering, as the enlargement of the fruit often nearly obliterates it, but will not be always found so strongly marked as in my figures. In the former the segments of the perigone are shorter than the common filament of the 3-pointed

stamen, and the anther-bearing point is only half the length of either the common filament or of the barren points; but in the latter the segments of the perigone are longer than the common filament, to which the anther-bearing point is equal, but at the same time only one-third of the length of the barren points.

In Gaudin's Fl. Helv. v. ii. t. 11. the perigone of *A. Ampeloprasum* is figured as longer than the stamens, and thus not at all agreeing with our plant, which more resembles his figure of *A. rotundum*, t. 10, in which he represents (and at p. 482 describes) the stamens as longer than the perigone, differing in this from all other writers who have described *A. rotundum*, quoting Clusius, Hist. v. i. p. 196. (for 190.) for *A. rotundum* instead of *A. Ampeloprasum*, to which it is usually, and, as it appears to me, correctly referred, and omitting *A. Ampeloprasum*, Wald. and Kit. t. 82. which is generally considered as a good figure of *A. rotundum*. He has not given a representation of the root of *A. rotundum*, but those of *A. Porrum* and *Ampeloprasum* are pretty characteristic. I am not satisfied with his figures of the fruit.



1. *A. Porrum.*



2. *A. Ampeloprasum.*

It is remarkable that all the writers to whom I have referred describe the heads of both these species as bearing capsules and not bulbs; for I find that some individuals of the former produce bulbs on the head, amongst the flowers, in cultivation, and that the same is the case with the latter in a wild state in Guernsey.

I propose the following specific characters for these plants, both of which are distinguished from *A. rotundum* by their exserted stamens.

1. *A. Porrum* (Linn.). Caule ad medium folioso, foliis planis,

umbella globosa capsulifera bulbiferave, filamentis 3 interioribus 3-cuspidatis perigonio paulo longioribus, cuspide antherifera filamento ipso cuspidibusque sterilibus duplo breviore, bulbis simplicibus. Pars superior germinis contracta et dorsum utriusque segmenti appendiculo transversali ascendente instructum.

2. *A. Ampeloprasum* (Linn.). Caule ad medium folioso, foliis planis, spatha elongata, umbella globosa capsulifera bulbiferave, filamentis 3 interioribus tricuspidatis perigonio paulo longioribus, cuspide antherifera filamentum ipsum subæquante cuspidibus sterilibus triplo breviore, bulbo e bulbulis paucis in tunica nidulantibus formato. Pars inferior germinis contracta et dorsum utriusque segmenti appendiculo transversali descendente instructum.

St. John's Coll., Cambridge, Nov. 1, 1839.

XXXII.—*Notice of some Fungi collected by* C. Darwin, Esq., *during the Expedition of H. M. Ship Beagle.* By the Rev. M. J. Berkeley, M.A., F.L.S.

[With Plates, No. VIII. and IX.]

The Fungi here noticed were placed in my hands some time since by Prof. Henslow. I am not certain whether they are all that were collected by Mr. Darwin, though it is probable, from the great mass of other matter upon his hands, that such is the case. Though the number is small, two of them at least are quite new, and the *Dædalea* is one of the most beautiful of its race.

1. *Polyporus sanguineus*, Meyer (No. 464).

Rio Janeiro. May.

2. *Stilbum lateritium*, n. s. Gregarious, bursting from beneath the bark, solitary or subfasciculate, pale brick-red; stems about 1 line high, thickest at the base and dusky; often confluent and flattened, pruinose from the presence of short curved obtuse flocci. Capitula ovate or subhemispherical, minutely setulose. Sporidia oblong.

Rio Janeiro. May. With the last. This is certainly very near to *Stilbum cinnabarinum*, Montagne, 'Ann. d. Sc. Nat.' n. s. vol. viii. p. 360, a species found in Cuba, of which I have

received a specimen accompanied by a sketch, from the learned author, who most liberally sent me half of the only specimen he possessed. The habit is very different. There is a variety of *St. lateritium* from St. Vincent's in Sir W. J. Hooker's collection with a smooth stem. A third species, *S. aurantiacum*, approaching very near to either, has been lately discovered in Leicestershire by Churchill Babington, Esq. It is probable that at some future time it may be thought right to separate the three species from *Stilbum*. The structure of the capitula is distinctly filamentous, and the sporidia, in Mr. Babington's plant at least, originate from the tips of the flocci.

3. *Thelephora lobata*, Kz. Fr. in Linnæa, (No. 599.)
Rio Janeiro. May.

4. *Polyporus pinsitus*, Fr. El. (No. 599.)
Rio Janeiro. May.

5. *Polyporus australis*, Fr. (No. 600.)
Rio Janeiro. June.

6. *Polyporus versicolor*, Fr. (No. 1345.)
Falkland Islands on the underside of timber. Entirely resupinate.

7. *Sporidesmium adscendens*, n. s. Flocci bent at the base and filiform, flexuous, above abruptly incrassated; apex attenuated, truncate. Forming elongated black patches on the pileus of *Polyporus versicolor*. Allied to *Sporidesmium hormiscioides*, but in that species the threads have no distinct thickened portion above as in the present species. The articulations contain a large globule.
With the last. Falkland Islands.

8. *Dædalea erubescens*, n. s. Cæspitose, confluent. Pileus $4\frac{1}{2}$ inches broad, coriaceous, depressed in the centre with the margin broadly deflexed, minutely velvety and silky, zoned, fulvous-cinnamon, nearly even, with the exception of one or two well-marked ridges; margin irregular, slightly fringed. Gills broad, unequal, distinct, rigid, much jagged, tinged with pink towards the margin, running down to the very base of the stem, on which they anastomose, and are clothed with a beautiful velvety pile. Stem central, 2 inches high, $\frac{1}{5}$ of an inch thick, solid, dilated upwards into the pileus, velvety marked with oblong reticulations from the decurrent gills,

fulvous-cinnamon, growing out of a thick spongy mycelium, which is attached to wood and leaves.

It is matter of doubt whether this species should be placed in *Dædalea* or *Lentinus*, though the habit is rather that of the former genus. The gills are not the least sinuous, and do not anastomose at all above; their colour is nearly that of deep tinted specimens of *D. biennis*. The pileus resembles somewhat that of *Polyporus perennis*, and in young plants is probably infundibuliform. The sporidia appear to have fallen out entirely, as is in general the case with exotic Hymenomycetes, and the cells of the surface of the hymenium have grown since the plant was gathered, so that the form of the sporophores (*basidia*, Decaisne) cannot be detected. This is frequently the case in the coriaceous fungi, and can only be prevented by very prompt drying, care being taken to place the specimen when laid to dry in its natural position. No number being attached to this species, I am not able to say where it was gathered, but probably at Rio Janeiro.

Two other species are in the same collection which I am unable to determine; one a byssoid production, of doubtful affinity, from Terra del Fuego, No. 496; the other an imperfect *Thamnomyces* (probably *T. chordalis*) from Rio Janeiro, No. 575.

EXPLANATION OF PLATE VIII.

Fig. 1. *a*. *Sporidesmium adscendens* on resupinate *Polyporus versicolor*, natural size.
b, *c*, *d*. Filaments, more or less magnified.
Fig. 2. *a*. *Stilbum lateritium* on bark, natural size.
b. The same, magnified.
c. Two individuals more highly magnified.
d. Flocci, of which the capitula are composed.
e. Sporidia.

PLATE IX.*

Dædalea erubescens.

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* Plate IX. will be given next month in the Supplement Number.

XXXIII.—*Zoological Notices.* By Dr. A. Philippi*. With Plates III. and IV.

[Continued from p. 96.]

6. *Pandorina coruscans*, Scacchi. Plate IV. fig. 1—4.

Sr. Arcangelo Scacchi has described this remarkable genus in his 'Osservazioni Zoologiche,' p. 14 (May 1833), in the following words: "Testa bivalvi, transversim oblonga, alba; latere antico (i. e. anali) productiore, truncato, hiante; postico (i. e. orali) rotundato; valvis inæqualibus, fragilissimis, subpellucidis, intus margaritarum nitore coruscantibus, exterius ad ambitum tenuissimo epidermide obductis, longitudinaliter striatis, ad umbones læviusculis; striis transversis obsoletis; valva dextra (i. e. sinistra) majore, umbone ac limbo superiore (i. e. ventrali) sinistram superante; valva sinistra (i. e. dextra, si animal incedens inspicitur) inferius ad latus anticum (i. e. posticum) super dextram producta; membrana prætenui ad latera umbonum valvas revinciente; cardine edentulo; linea prominula obliqua pro ligamenti insertione; ligamento tantum interno oblongo; ultra pollicem lata, altitudine 5 lin." To this description I have only the following remarks to add. The longitudinal striæ are extremely delicate, elevated, and every fourth is as it were beset with small points, which proceed from the epidermis. The membrane, which unites posteriorly the dorsal margin of the shells, I would without hesitation call an *external ligament*. An *area* and a *lunula* may be distinguished, which are rather sharply defined, and are smoother than the rest of the shell: both are narrow and asymmetrical; the *lunula* is broader on the left shell, the *area* on the right. The *muscular impressions* are tolerably near to the margin; the anterior one is longitudinally oval, the posterior one more quadrate and far nearer to the margin on the left shell than on the right, which corresponds to the line defining the *area*. The *impression of the mantle* has a very slight incurvation, which forms nearly a right angle with the part of the shell parallel to its ventral margin. This indicates two very short tubes, which the animal actually possesses. The *hinge* is quite toothless; never-

* Translated from Wiegmann's 'Archiv,' Part 2. 1839.—The Plates will be given next month, in the Supplement.

theless the margin projects directly before the vertex of the right shell in the form of a little tooth (see fig. 3.). The *cavity* for the ligament runs very obliquely backwards and is perfectly linear. To my great surprise, I found in my three young specimens, instead of the ligament, a *bone*, as in *Osteodesma* and others, of an elongated nearly pentagonal form, with the apex directed anteriorly, the slightly hollowed basis posteriorly, and moderately gibbous on the ventral side*.

The *animal* of *Pandorina* has, according to a drawing communicated to me by Sr. Scacchi, two short slightly projecting siphons, with fringes at the margin, and a long compressed and narrow foot, the situation of which proves that at least a third part of the mantle anteriorly is split.

I had found this shell in a fossil state in Sicily, and named it *Pandora? æquivalvis* in my 'Enumeratio Molluscorum Siciliæ,' and I also noticed the resemblance and difference between it and *Pandora* as far as they were to be seen on the fossil specimens. The principal differences in the shell are as follows: 1. The right half is perfectly flat in *Pandora*, in *Pandorina* only a little less vaulted. 2. *Pandora* has teeth on the hinge. Lamarck's statement in 'Hist. Nat. des Anim. sans Vert.' is not good; on the contrary, that of Deshayes in the second edition of the same work is excellent: they consist, on the left shell, in a front tooth (which in those *Pandoræ* that I have at hand to compare is perfectly flat), and a deep cavity between it and the ligament, into which fits a tooth of the right flat shell. In *Pandorina* every trace of a tooth has disappeared on the left shell, and on the right one only an exceedingly slight analogue to it exists in the projection of the margin. 3. *Pandora* has quite simply an internal ligament. I must however remark, that *Pandora* appears to me to possess also a second ligament, namely, immediately at the margin, fig. 5 *a*; fig. *b*. is the usual one. 4. *Pandora* has a perfectly simple muscular impression, whilst in *Pandorina* only a

* Sr. Scacchi remarks, 'Enum.,' p. 6. Note on *Thracia*, "in utraque specie reperimus ossiculum mobile ad cardinem, quum specimina juniora observavimus; at in adultioribus seu majoribus etiam cum molusco perquisitis, illud nunquam invenimus. Miramur sane ossiculum illud adolescente conchylio evanescere; sed sic observatio pluries repetita nos cogit opinari, neque inspectio testarum suspicari permittit, specimina majora diversas constituere species." May not this also be the case with *Pandorina*?

slight incurvation of the mantle can be recognised. From this it appears that *Pandorina** is certainly the most nearly allied to *Pandora*; but on account of the internal bone of the ligament, the absence of teeth to the hinge, the gaping of the posterior side, this genus also joins on to *Thracia*, which (at present I can only compare *Thr. phaseolina* or *Tellina papyracea*, Poli) is distinguished by a short external ligament resting on distinct nymphæ, by a far more decided incision beneath the apex and a deeper incurvation of the mantle; here too the left shell is the more convex, as in *Corbula*, not the right one, as in *Pandora* and *Pandorina*. But *Pandorina* is distinguished from both these by the *longitudinal striæ*, which, as far as I am acquainted, do not occur in them or even in the whole family of the *Myæ* and *Corbulæ*.

From this last circumstance, the complete absence of hinge teeth, the double ligament, the brittleness of the shell, and lastly from the thinness of the epidermis which covers the whole shell, *Pandorina* brings to mind the singular genus *Galeomma*, which is truly very different at first sight, from the equality of the shells and the wide gaping of the ventral side, as also from the existence of only one tube, or if we choose the second obliterated, as in *Solenomya*†; nevertheless, I believe that *Galeomma* is more nearly allied to this genus than to any other. M. Deshayes, who was only acquainted with the mere shell, classes it with *Glycymeris*, which genus however differs very considerably by its very thick epidermis, rather reminding us of *Solenomya*, its strong prominent nymphæ, its small foot, its slightly slit mantle, and the long thick cohering siphons.

There are at present therefore six genera with a little bone in the ligament: *Anatina*, Lamarck, Desh.; *Periploma*, Schum.; *Osteodesma*, Desh.; *Thracia*, Leach; *Pandorina*, Scacchi, which all belong to the family of the *Myaceæ*, to which Deshayes with good reason unites the *Corbulaceæ*; and *Cleidothærus*, Sow., which is allied to the *Chamæ*.

* See note in the following article, p. 305.

† On the outside of *Solenomya* where we expect to find the anal tube, it presents a circle of papillæ, which is however *not* perforated, as is very accurately stated by Sr. Scacchi. This explains why M. Deshayes has ascribed two siphons to the *Solenomya*, I on the contrary only one. We both saw correctly, but not accurately enough.

PLATE IV. *Fig.* 1. *Pandorina coruscans*, Scac., a small specimen, lying upon the left, more strongly vaulted, shell.

Fig. 2. The same lying on the ventral side in order to show the *area* and *lunula*.

Fig. 3. The same opened and twice magnified.

a. The little bone in the ligament.

b. The cavity into which the bone fits.

c. The external ligament.

Fig. 4. The animal of *Pandorina* after a drawing of Sr. Scacchi.

Fig. 5. A shell of *Pandora rostrata* for comparison.

a. An external ligament?

b. The internal ligament.

c. The hinge tooth.

7. On the Animal of *Astarte incrassata*, De la Jonk. Plate IV. fig. 6.

I obtained two specimens of this rare animal which were still alive, but as they would not open their shells I was compelled to use force. The animal was therefore seen in a half contracted state: the mantle is almost entirely split: a narrow band separates posteriorly a small roundish aperture, which supplies the place of the anal and branchial tubes, as was to be expected from the analogy of the shell with that of the genus *Venus*. At the margin of this aperture, as well as at the margin of the hinder portion of the front aperture, the mantle is of a dark brown colour and beset with very delicate white filiform cirri. More anteriorly these cirri become smaller and take in some degree the shape of white folds. The *foot* is securiform, acute behind and in front, therefore constricted, and in this way distinctly separated from the mass of the intestines; it is of a scarlet red colour. The *branchiæ* are dissimilar; the interior one is nearly triangular, and exhibits a dorsal, a ventral, and a front side. It is connected by the dorsal side to the outer branchia, which is only about half the size, not projecting so far anteriorly, and is rounded where the inner one exhibits the strongly projecting angle. Both the branchiæ are fastened by their common apex to the narrow connexion of the two lobes of the mantle between its anterior and posterior aperture, yet so slightly, that they are easily separated. The *appendices buccales* are two in number on each side, small and oblong.

Sr. Scacchi observed this animal some years ago, and gave

a short description of it in his 'Osservazioni Zoologiche,' (No. II. May 1833, p. 15.) which are but little known. His statements perfectly agree with my observations, with this one exception, that I cannot find the large reddish brown spot which he saw on the mantle in the region of the umbones. I must also fully subscribe to his views upon the systematic classification of the animal which he adds to his description. The description proves that the animal of *Astarte* has no resemblance to that of *Venus*, as was supposed from the constitution of the shell by Cuvier, 'Règne Animal,' edit. 2. vol. iii. p. 150, and Rang, 'Manuel de Malacol.' p. 314, and Deshayes in Lamarck, 'Hist. d. Anim. sans Vert.' edit. 2. vol. vi. p. 256, but on the contrary it quite agrees with *Cardita*.

I cannot help remarking on this occasion, how frequently the laws of analogy which we expect to find between animal and shell fail in the Molluscs. Whilst in the vertebrate animals, almost without exception, a similar osseous skeleton, and even some similar bones, necessarily belong to animals which are also similarly formed in their other systems, we find that in very many cases this is not so in the molluscs. To quite similarly formed shells belong animals of decidedly different structure. I only refer to *Vermetus* and *Serpula*, *Sigaretus* or *Coriocella*, and *Cryptostoma** and *Buccinum*, Lamk., where *B. undatum* is hardly distinguishable from *Fusus antiquus* by anything but its black spots, whilst *B. Linnæi* and *B. maculosum* agree with *Purpura*, *Columbella* and *Mitra*; and many other species, as *B. mutabile*, greatly differ from both mentioned forms; lastly, *Fusus* and *Pleurotoma*. On the contrary, a very similar animal often inhabits very dissimilar shells. I will mention for example *Achatina* and *Carocolla*, *Mitra* and *Purpura*, *Cerithium* and *Rostellaria pes pelecani*, *Cardita* and *Astarte*, &c.

I have still one correction to add concerning the synonyms of *Astarte incrassata*. I formerly added to this the *Venus Danmoniensis* and *V. sulcata* of English authors; but my friend M. Koch has pointed out to me that the English species is decidedly distinct. M. Deshayes also in his second edition of Lamarck, represents the *Astarte incrassata* (*Venus incras-*

* See note in the following article, p. 307.

sata, Brocchi,) and *A. fusca* (*Tellina fusca*, Poli,) as two distinct species (p. 257.), but I must persist in my view, that they are identical. I have at this moment twelve perfect individuals before me; in which I find every transition, from a perfectly smooth shell, only obliquely grooved at the apices, to one which is covered as far as the margin with great regular grooves. Moreover, the shell is sometimes flat, sometimes strongly vaulted.

Fig. 6. *Astarte incrassata*, de la Jonk. One and a half times magnified. The upper mantle lobe is thrown back in some degree, in order to show the form of the foot and the two branchiæ.

8. On the Animal of *Pleurotoma Bertrandi*, Payr. Plate IV. fig. 7.

I have also now seen the living animals of two species of *Pleurotoma*; *Pl. Bertrandi* was very frequent. That which greatly distinguishes the animals from *Fusus* is, that they are quite without operculum. The *foot* when stretched out is somewhat longer than the last whorl of the shell, rather narrow, truncated anteriorly, and slightly emarginate, with an oblique groove; narrowed gradually posteriorly, and at last emarginate. The *branchial tube* projects tolerably far out of the canal. The *head* is small; the *tentacula* are short, filiform and obtuse, thickened half-way up, where they carry the *eyes* externally; they do not unite in an acute angle, as is the case in *Fusus*, *Murex*, *Mitra*, but the head forms a slightly rounded projection, just such a one as is seen in the species of *Tritonium*. The colour is transparent, marbled with yellowish-white, sometimes with reddish-white opake points upon the siphon. The other species, either *Pl. gracile** or a new nearly allied species, is distinguished, with regard to the animal, from the present species solely by the foot being posteriorly acute, and the siphon being decidedly spotted with red.

Fig. 7. *Pleurotoma Bertrandi*, Payr. Magnified four times.

9. On the Eggs of *Vermetus gigas*, Bivona. Plate IV. fig. 8.

During October and November I found *Vermetus gigas* almost always with eggs in different stages of development. They are inclosed in oval, flatly compressed cases, which have

* This is *Murex attenuatus*, Mont. Test. Brit.—J. E. G.

at one end a point with an aperture, the membrane forming the envelope being contracted into a narrow chord. The less developed smaller cases are nearly 2‴ long and 1‴ broad, and contain about twenty to thirty yellow eggs, which appear to be kidney-shaped when slightly magnified, but when more strongly magnified they already show 1 to 1½ whorls of a shell. The larger egg cases are nearly twice the size, and the embryos may be very plainly seen. We recognise a regular shell of two whorls wound to the right, and two black eyes behind, which have between them a blackish stripe, the intestinal canal; the aperture of the shell is extended beneath, as in *Proto*, Defrance. I did not succeed in examining the embryo more accurately. The young shell did not dissolve in vinegar, and from this appears to be of a horny nature. In trying to lay bare the little animal by compression, it was completely crushed every time.

Fig. 8. Eggs of *Vermetus gigas*, Biv.

a. A mass of eggs but little developed.

b. One more developed, in which the embryos are already furnished with one whorl and a half of the shell; both of the natural size.

c. An embryo strongly magnified, with two perfect whorls of the shell. The eyes and the alimentary canal are seen through.

10. *Hersilia* apodiformis*, a new Genus of *Entomostraca*. Plate IV. figs. 9, 10, 11.

On the second of November I found in some sea water two small Crustacea, which at first sight appeared to be similar to *Apus*, with a long tail and swimming about very briskly. A closer examination proved that they were two pairs in the act of coitus, which I was able to place under the microscope without their separating; one pair even held together after death; the tail was the male. They differed in colour; in one pair the female was perfectly transparent, the male on the contrary coloured with large purplish red moveable points; in the other pair it was the reverse, the female was so coloured and the male colourless. From this I suppose that the colour is only in consequence of the food taken.

* This name will require to be changed, having been used by Savigny for a genus of Spiders.

The female, without the tail bristles, is $\frac{2}{3}$rds of a line long, and oval; the male not quite half so long, and narrower. The body was quite covered by a quadriarticulated *shield*; the first segment occupies nearly the half of its length, the last a fourth, the second and third each an eighth part; the first three segments have a point on each side at the end. On the first segment I saw in front two round points at a moderate distance from each other, which I am inclined to take for eyes. Under the shield anteriorly only the two great antennæ appear, posteriorly the tail and the extremities of the posterior legs. The antennæ are only two in number, inserted beneath the shield, near to the anterior margin. They attain to half the length of the body, and appear to consist of five articulations. The basal joint is very short, concealed beneath the shield; the second articulation is longest of all, then the fifth; the fourth is the shortest after the first. Perhaps the fifth consists of several articulations: I was however unable to assure myself of this. Anteriorly all these joints are ciliated with long stiff bristles, posteriorly there is only one bristle at the end of every joint. There are four pairs of distinct feet; one to each segment of the shield. The three first pairs are quite similarly formed, and consist of a biarticulated stalk, which bears two ramifications. The stalk has posteriorly a long bristle on the first joint, a shorter one on the front end of the second. The front ramification consists of three articulations, of which the third is as long as the two first together; it has upon its anterior side three strong bristles, and posteriorly five longer but weaker ones, whilst the two first articulations have only a short bristle at the anterior end. The hinder ramification is just as long and has also three articulations, but these are alike and densely beset with cilia on the posterior side. The fourth pair is simple, biarticulated; the first articulation is very short, the second rather long and armed with four bristles. The tail is about the third part of the whole length of the animal, but only half of it projects from beneath the shield. It is not distinctly articulated, tapering towards the end, and terminates in two obtuse small projections, each of which bears five long bristles. The inner bristles are the longest, in the male more than half as long as the body, in the female considerably

shorter. In the tail on each side is the orifice for the female sexual apparatus.

What I could observe of the *cibarian apparatus* is as follows: Behind the tentacula are two diverging *mandibles*, which are of the form of an obtuse-angled quadrant, and upon the posterior side of the second joint it is beset with long and thick cilia. Between their insertion is a triangular space with the apex directed posteriorly, perhaps the mouth. Beneath the cilia, on each side, are three *maxillæ*, which terminate in a forked bristle, and consequently remotely remind us of the pincers of *Limulus*. In both sexes between these parts and the first pair of feet is situated a *foot jaw* on each side. It is nearly quadrate, and terminates at the anterior and inner angle in a long acute tooth: on the front side it also carries a small appendage of a vesicular form, and exteriorly a biarticulated flagelliform palpus. I could not distinctly recognise the sexual apparatus of the male from the minuteness of the animal. Two large almost clavate organs which were inserted in the vulva of the female are situated on both sides of the mouth, besides which there are two antenniform setigerous organs, which take their origin close behind the true antennæ. At first sight the animal reminds us of *Apus* by its great shield, but it is more nearly allied to *Cyclops* by its tail and the biramified legs. It is still more nearly allied to the genus *Sapphirina* of Thomson, with which I am acquainted only from Lamarck's 'Hist. Nat.' (2nd edit. &c. vol. v. p. 171.), which also has a flat compressed shield-like body, biramified legs, and only two tentacula, but is distinguished from it by a shield of nine segments and four pairs of biramified legs. The essential characters are briefly contained in the following description: Corpus clypeo magno e segmentis quatuor formato obtectum. Antennæ duæ magnæ, filiformes, 5-articulatæ. Pedum paria quatuor, tria pinna bifida, quartum simplex. Cauda apice bifida et setigera.

Fig. 9. *Hersilia apodiformis*, mihi. A female lying on its back. Sixty times magnified.

i. The eyes.

a. The mandibulæ?

b. The maxillæ.

c. The foot jaw with its biarticulated flagelliform palpus.

d. The three pairs of biramified legs.

e. The pair of simple legs.
f. The vulva.
Fig. 10. The male in the act of coitus hanging to the tail of the female, magnified with the same power.
g. The posterior antennæ?
h. The two penes.
Fig. 11. A female of *Hersilia apodiformis*. Natural size.

11. *Peltidium purpureum*, a new genus of *Entomostraca*.
Plate IV. fig. 12 and 13.

I have only one specimen of this little animal, which is scarcely $\frac{1}{2}'''$ in size. The body is expanded in a shield of seven segments, which in its general contour is ovate. The first segment is nearly as large as the following segments together, and has in some degree the form of a trapezium whose base is turned backwards, and is bounded by a concave line. Anteriorly it has a truncated protuberance, on which two small round points appear, and probably are the eyes. The following five segments are of a narrow crescent form; the last and smallest is again in the form of a trapezium. Behind this projects the very short two-pointed tail; each of its points is furnished with four bristles, of which the inner one is the longest. The antennæ are two in number; they proceed from the angles which the first segment forms with its appendage, attain nearly a third part of the length of the animal, and consist of six short articulations, the two last of which are very small. On the front side, and especially at the apex, they are provided with long bristles. I find six pairs of legs. The *first pair*, which appear to be inserted after the first segment, is simple, and seems to consist of three articulations only. (Fig. 13, *c*.) The second articulation, somewhat thickened at its base, has a tooth towards the end of the hinder side; the third articulation is a narrow moderately curved claw. The following four pairs of feet are biramified, and have this character in common, that the hinder or inner branch originates at a moderate distance from the apex of the stalk. (See fig. 13. *d*, *e*, *f*.) Both the outer and inner branches of the *second pair* have two articulations, and the first branch is twice as long as the second. Its second articulation is the longest, and ends with three short bristles, two of which are bent in the form of a hook. (*d*.) The *third pair* (*e*.) is distinguished from the two following

by its inner branch being triarticulated, whilst the latter have only two joints. The outward branch is in them also triarticulated; the first and second have at the end in front a thick bristle, and posteriorly a similar one in the centre; the last joint, which is twice as long as the preceding, has in front four short strong bristles, and behind five longer weaker bristles. The *last pair of feet* is again simple, biarticulated? the last joint longish, slightly curved, and has three spines exteriorly, four at the apex, and one behind. (*g.*) From the small size of the animal, and as I had only one specimen, I could but very imperfectly distinguish the cibarian apparatus. Nevertheless I plainly saw, in the first place, behind the antennæ, a *mandible*, consisting of two linear joints of equal length and breadth, the first of which bears posteriorly in the centre a four-branched bristle, and the last one several simple bristles at the end (see fig. 13. *a.*), manifestly the same organ which appears in a slightly differing form in *Hersilia*; in the second place, a *foot jaw*? likewise consisting of two equally long joints; the second of these is very narrow, and bears at the apex a short unguis or some very short bristles. (*b.*)

The colour of the animal was a dark purplish-red; the antennæ, tail, and legs pale red; the fore margin of the cephalic appendage colourless.

This genus stands between *Hersilia* and *Sapphirina*, and is distinguished from both of them by the different number of thoracic segments and of the feet, as well as by the structure of the first pair of feet. It may be thus briefly characterized: Corpus clypeo magno, e segmentis septem formato obtectum; segmento primo maximo. Antennæ duæ magnæ sexarticulatæ. Pedum paria sex; par primum simplex, ungue longo terminatum; paria secundum, tertium, quartum et quintum ramos duos gerentia; par sextum simplex. Cauda apice bifida et setigera.

Fig. 12. *Peltidum purpureum mihi*, natural size.

Fig. 13. The same lying on its belly, magnified sixty times.

a. The mandibles.

b. The foot jaw?

c. A foot of the first pair.

d. A foot of the second, *e.* of the third, *f.* of the fourth or fifth, *g.* of the sixth pair.

XXXIV.—*Notes on* Dr. Philippi's *Zoological Notices in the preceding Article*. By J. E. Gray, Esq.

Pileopsis Garnoti, *Payraudeau*.

In Dr. Philippi's account of the animal of this shell, (No. 22. p. 90,) he does not appear to be aware that I established a genus for it under the name of *Gadinia* in the Philosophical Magazine for April 1824, where I showed the difference between it and *Siphonaria*. It certainly is not *Acmæa* of Esschholtz, which is synonymous with my genus *Lottia* (Phil. Trans. 1833) and Quoy and Gaymard's *Patelloides*.

Mr. G. Sowerby, in consequence of some confusion, has in the Proceedings of the Zoological Society described two or three other species of the genus *Gadinia* under the name of *Mouretia*, erroneously considering it as my name for the genus, so that the synonyma of this genus will run thus :—

Gadinia, *Gray*, 1824, from *Gadin* of *Adanson*.
Mouretia, *Sowerby*, not *Gray*.
Clypeus, *Scacchi*.
Patella, *Philippi*.
Pileopsis, *Payraudeau*.

Pandorina, p. 296.

This shell has been long described, although many authors, in common with Sr. Scacchi and M. Philippi, have considered it as a new species. On comparing a Neapolitan specimen which I have received under Scacchi's name, it appears to have the following synonyma :—

1. Mya Nitida, *O. Fab. Naturforscher*, iv. 44. t. 10. f. 10.
2. Mya Norvegica, *Chemnitz*, x. f. 1647. 48. *Turton, Syst. Nat.* iv. 170. *Turton, Dict.* f. 100.
3. Anatina truncata, *Lam. Hist.* not *Sow.*
4. Amphidesma corbuloides, *Lam. Hist.*
   Osteodesma corbuloides, *Deshayes*.
5. Mya striata, *Montagu, Linn. Trans.* xi. t. 13. f. 1. *Turton, Dict.* f. 99.
   Lyonsia striata, *Turton, Bivalves*, t. 3. f. 67.
   Magdala striata, *Brown, Brit. Shells*, t. 11. f. 2.
   Myatella ————, *Brown, Man.*
6. Mya pellucida, *Brown, Wern. Trans.* t. 24. f. 1.

7. Pandora striata, *Dict. Hist. Nat.* xxv.
8. Pandorina? equivalvis *Philippi, Sicul.* xviii. t. 1. f. 11. *a. b. c.* Pandorina coruscans, *Scacchi, Sp. Zool.* 14. *Costa.*

There is a second species very nearly allied to it, but which differs in being much narrower and longer in proportion. *Lyonsia* is the oldest published name for the genus; *Magdala* was the name that Dr. Leach first gave to it in his MSS., but he afterwards used *Lyonsia*. Brown, not satisfied with adopting Dr. Leach's earlier manuscript name, instead of *Lyonsia*, has also added a new one, viz. *Myatella*. The shelly plate which is found in the hinge of this genus in the most perfect state of development, was, I believe, first described and figured by Mr. Wood in his Conchology. This plate is peculiar to a group of genera, which I think for several reasons, especially on account of the general structure of the animals, should be formed into a family separate from the *Myadæ*. This family contains the following genera:—

Anatina=Auriscalpium, *Schum.*

Cochlodesma=Anatina, §. 2. *Turton.*

Periploma, *Schum.*=Osteodesma (part) *Desh.*

Thracia=Odoncinetus, *Costa.*

Lyonsia = Magdala and Myatella, *Brown* = Osteodesma (part) *Desh.*=Pandorina, *Scacchi.*

Myadora, *Gray.*=Pandora (species) *Sowerby.*=Anatina, *Stutchbury*, for Pandora brevis, *Sow.*

Chamostrea, *Roissy.* = Cleidotherus *Stutchbury*, not *Sowerby*, as quoted by Dr. Philippi.

Myochama, *Stutchbury*, and probably Cardilia, *Desh.*=Hemicyclonosta, *Desh.*

I described the animal of this genus in the first number of my 'Spicilegia Zoologica,' when describing *Lyonsia cuneata*. The species of the different genera of *Anatinidæ* pass very gradually into each other, and I do not think that *Lyonsia* has any affinity to either *Pandora*, *Solenomya* or *Galeomma*, the latter having many characters in common with *Gastrochæna*. *Lyonsia* has the piece in the hinge both in the young and adult state; and it may be remarked, that all bivalve shells, *Pandora* as well as the rest, have both a ligament and a cartilage, which is often called a double ligament.

Cryptostoma, p. 298.

There must be some mistake here. Neither the shell nor the animal of *Cryptostoma* in the least resembles either *Coriocella* or *Buccinum*; but is closely allied to *Natica*, and passes by means of *Natica melanostoma* into the typical form of that genus. The reason why the animals of various species of Lamarckian *Buccina* differ so considerably from each other, is that he has confounded in that genus many shells belonging to other genera. Thus, of the species noticed above, *Bucc. Linnæi* is a *Columbella*; *Bucc. mutabile* a *Nassa*; and *Bucc. maculosum* a *Pollia*, or subgenus of *Triton*, Lam. On the other hand, *Cardita* is by no means so very different from *Astarte*, into which it readily passes by means of *Venericardia*. Indeed, two fossil Astartes have been described by Lamarck as species of *Cypricardia*, which is the next genus to *Cardita*.

XXXV.—*Notices of Botanical Excursions in the Neighbourhood of Trieste.* By Edward Forbes, M.W.S., For. Sec. B.S., &c.*

I visited Trieste in the month of June 1838, and spent five most delightful weeks in the neighbourhood, making the town my head-quarters. No locality could afford greater pleasure to the botanist, Illyria being famous for the peculiarities of its Flora; and I was especially fortunate in finding two of the most distinguished Italian botanists resident in Trieste, M. Tommasini and M. Biasaletto, to whose guidance and to whose company I chiefly owe the profit and the pleasure I reaped during my stay. Trieste is beautifully situated on the Adriatic at the base of Monte Spaccato, one of the border elevations of that great and singular calcareous plain the Karst. On the south-east side of the town the country bordering the sea is somewhat flat as far as the boundary of Istria, a few miles distant, and presents us with the salt marshes of Zaule; on the north-west the bounding precipices of the Karst rise directly from the sea. The excursions which I shall notice in

* Read before the Botanical Society, Nov. 14, 1839.

this paper are, 1st, the immediate neighbourhood of the town; 2nd. Zaule and its neighbourhood; 3rd, Monte Spaccato and Lipizza on the Karst; and 4th, Contobello on the coast. These four excursions present a pretty good picture of the vegetation of the Triestine territory.

I. In the immediate neighbourhood of the town, in fact forming one extremity of it, is a little wood called the Boschetto, the favourite promenade of the inhabitants, which it well may be, since there alone you find anything like a collection of trees, the country of Illyria being exceedingly bare, and trees are great treasures in such a warm climate. This grove is laid out in pleasant walks, and there are one or two coffee-houses where the Triestine gentlemen breakfast in the open air at a very early hour of the morning, and where the Triestine ladies sip coffee towards dusk. In the evening it presents a very gay scene, and the botanist, resting there after his day's labour, finds himself greatly refreshed by the change from pretty flowers to pretty faces. In the Boschetto abound several rare and very interesting plants, such as *Chrysanthemum montanum*, *Chrysanthemum corymbosum*, *Thesium divaricatum*, *Inula hirta*, *Tragopogon floccosum*, *Potentilla pedata*, and *Polygala comosa*. Also some critical species of much interest to the British botanist, as *Lotus ciliatus*, Tenore, a southern form of *Lotus corniculatus*, *Ononis antiquorum*, and the *Lathyrus sepium* of Scopoli.

II. The salt marshes of Zaule are about four miles from Trieste, and abound in rare and interesting plants. The road to them is rather level and uninteresting; by the wayside however I gathered undoubted specimens of the *Ranunculus verrucosus** of Sternberg, this being the original locality. Also in corn-fields *Bupleurum obovatum*, *Polygonum Bellardi*, and *Bifora radians*. On the hedges near Zaule I found two rare and beautiful plants, *Clematis viticella* and *Aristolochia rotunda*. In the meadows at Zaule grow *Holoschœnus australis*, *Veronica latifolia*, *Brokhousia hispida*, *Gladiolus illyricus*, *Plantago altissima*, *Scorzonera laciniata*, *Scabiosa hybrida*, *Asparagus marinus*, and *Ornithogalum narbonense*, &c. The

* Perhaps not distinct from *Ranunculus Philonotis*.

ditches were filled with *Gratiola officinalis.* Several British plants abounded, such as *Scabiosa arvensis* and *Rhinanthus crista-galli* and *major,* here accompanied by *Rhinanthus hirsutus**, a plant which possibly may be found in similar situations in our own country. The marshes of Zaule are famous for Orchideæ. Of that tribe I observed *Orchis pyramidalis, O. acuminata*? *O. laxiflora, Epipactis palustris, Gymnadenia conopsea,* and *Serapias oxyglottis,* certainly identical with the *Serapias longipetala,* as here were flowers of each species to be seen on one plant. The plant I have noted as *Orchis acuminata* exactly accords with Reichenbach's description of Defontaine's species; nevertheless M. Tommasini informed me that he sent it to Reichenbach as such, who sent it back as *Orchis variegata,* identical with the German species.

Ascending the hills of Istria, above Zaule, we found *Scabiosa integrifolia* and *hybrida* growing together—certainly only one species. *Trifolium patens* and that beautiful shrub the *Colutea arborescens* were common. On the hills themselves we found *Athamanta Matthioli, Marrubium candidissimum, Drypis spinosa,* and *Silene saxifraga*; and by the road side on our return to Trieste we gathered *Oenanthe gymnorrhiza* and *Rubus tomentosus.*

III. The excursion to Monte Spaccato and the Karst is probably the most characteristic of this singular country. To any one but a botanist the Karst is a place to be avoided, or passed over as quickly as possible. It is thus described by an English writer: "It is a table land of bare limestone rock, believed by geologists to correspond in age with the chalk separating Carniola from the coast land, or Littorale. It is a waste like no other; not a tree within sight, scarce a shrub or even a blade of grass to relieve the painful glare of the white shattered stones which strew the surface. To use the words of a German traveller, the landscape might be painted with ashes and chalk." Horrid however as the Karst thus appears to be to the ordinary traveller, to the botanist it is a paradise blooming with rare and beautiful flowers, for every crevice on its bare surface presents him with plants which

* The seed of the Zaule plant does not however answer to Reichenbach's character of being "exalatus."

grow nowhere else, and every little oasis in its barren desert is radiant with flowers of exquisite loveliness, and odorous with fragrance of sweetest herbs. In ascending Monte Spaccato from Trieste, we pass over two different geological formations, the lower part being composed of conglomerate and the upper of limestone, each presenting a different Flora. The latter rock especially abounds with rare and local plants. The hill is a natural botanic garden; it is so covered with various species, which greeted us in such quick succession, that it was as much as I could do to carry away a few examples of each for myself without taking duplicates. Our progress upwards was first hailed by *Polygala comosa*, which abounds alike on lime and sandstone. *Andropogon Gryllus* and *Festuca glauca* are likewise frequent on the latter rock. The sides of the hill are covered by *Ostrya carpinifolia*, *Quercus pubescens*, *Pistacia Terebinthus*, *Rubus discolor*, *Cytisus capitatus*, and *Genista sylvestris*. Amidst these I picked a beautiful specimen of the splendid *Limodorum abortivum*. As we ascended to the calcareous strata many species quite new to me appeared, often of great beauty, such as *Berinia andryaloides*, *Convolvolus Cantabrica*, *Euphorbia fragifera* and *Onosma stellulata*, and plants past flowering of *Pæonia peregrina* were not rare. But the summit surpassed the sides: there were concentrated the more beautiful plants we had passed, accompanied by *Genista sericea*, *Linum perenne*? and *narbonense*, *Veronica austriaca*, *Arenaria laricifolia*, *Euphorbia* (nov. species near *Gerardiana*, Thomas,) *Genista diffusa*, *Arenaria verna* (the true plant, not the British), *Astragalus vesicarius*, *Silene Pseud-otites*, *Orobus versicolor*, *Hieracium peleterianum*, *Dictamnus fraxinella*, (which with *Clematis erecta* also adorned the sides), *Centaurea variegata* and a hundred others, "too numerous to mention." Of great interest to the botanist, on the highest point, grew *Spartium radiatum*, first found here by Mr. Bentham last year, and refound by myself. Among the plants past flowering I remarked *Gentiana angulosa*, *Scorzonera austriaca*, *Mercurialis ovata* and *Cineraria arachnoidea*, while *Centaurea splendens* and a host of *Dianthi*, as yet in bud, gave evidence of a harvest in a month or two as rich and as varied as that present. The view from the summit of the hill

was very magnificent, stretching over Frioul, Carniola and Istria, bounded on three sides by the snow-topped chains of the Alps, on the fourth by the blue Adriatic. At our feet lay Trieste.

Among the green spots on the Karst the most remarkable is Lipizza. Lipizza is truly an oasis in a desert: it is a wood about seven miles from Trieste, where the emperor breeds horses for his stud. Many of the most beautiful and rare plants of Illyria are found there, and some of its flowery denizens grow nowhere else. From Lipizza I obtained *Lilium carniolicum* and *bulbiferum*, *Delphinium fissum* (rariss.), *Medicago Karstiana*, *Potentilla recta*, *Potentilla inclinata* (not distinct from *P. canescens*), *Hieracium bracteatum*, *sabinum* and *obscurum*, *Scorzonera villosa* and *glastifolia*, *Loranthus europæus*, *Quercus cerris*, *Ornithogalum comosum*, *Lactuca perennis*, *Dianthus atrorubens* and *virgineus*, *Vicia sordida*, *Rosa rubrifolia*, *Iris graminea*, *Coronilla montana*, *Centaurea adonidifolia* and *Cerinthe maculata*. At Lipizza and other places on the Karst the localities richest in plants are singular basin-shaped depressions of the surface.

IV. The excursion to Contobello, though not so rich as that to Monte Spaccato or Zaule, is interesting as exhibiting the sea cliff vegetation of this part of the shores of the Adriatic. On the way side between Contobello and Trieste grows the rare and beautiful *Rosa sempervirens*. On the sea-coast I gathered *Lathyrus Nissolia*, *Chlora serotina*, *Dorycnium pentaphyllum*, *Ruta divaricata*, *Lonicera etrusca*, *Palinurus spinosus*, *Rhamnus alpinus*, *Ethionema saxatilis*, *Teucrium montanum*, *Trifolium angustifolium*, *Smilax aspera*, *Coronilla Emerus*, *Quercus Ilex*, *Verbascum nigro-austriacum*, *Salvia officinalis*, *Rubia peregrina*, *Phillyrea media*, *Ligustrum vulgare*, and last, not least, the loved plant of lady and poet, *Myrtus communis*, on its native rocks in full bloom, as fair and sweet there wild, as when petted and caressed in the finest garden.

XXXVI.—*On the Habits of the* Apteryx Australis, *a Bird of New Zealand, closely allied to the* Struthionidæ, *and named by the native Inhabitants* Kiwi. By the late Allan Cunningham, Esq.*

This most remarkable bird inhabits the densest and darkest forests. In those near the Kerikeri and Waimate missionary stations, a few miles from the shores of the Bay of Islands, it was formerly frequently observed and taken, as it is still to be found in the woods of the Hokianga river. It is however by no means confined to any particular district, for it is to be met with in all the wooded parts of the northern island. In these humid forests it reposes during the day, either beneath the tufts of long sedgy grass, a species of *Carex* everywhere abounding in the woods, or it hides itself, shunning the light, in the hollows at the base of the "*Rata*" tree, (*Metrosideros robusta* A. C.—N. S.†) In these situations it constructs a very simple nest, laying, as all agree, but a solitary egg, which is about the size of a duck's, or as some natives assert, nearly as large as that of a goose, with which bird they are now familiar, the missionaries and other Europeans having some time since introduced it to their poultry-yards. Its period of incubation could not be ascertained from the natives. No sooner are its native woods darkened by the presence of night, than it ranges about in quest of food, which (as all accounts inform us) is exclusively *worms*, procured by burrowing with its feet, and perforating slightly the soft humid subsoil with its attenuated bill; and doubtless it is directed in the night by powerful instinct to the spots where these abound; for its eyes are very small, and its upper mandible, with the nasal orifices at its extremity or tip, possesses doubtless an acute sense of smelling.

It is not gregarious, and but very seldom indeed to be seen in small numbers: generally they are in pairs (a male and female); and in the larger forests, less frequented by the natives, these pairs may be met with at distances of about a quarter of a mile.

The cry of the *Kiwi* at night is similar to the whistling made by

* Read before the Zoological Society, May 14, 1839. The communication was entitled "Rough Notes collected from the New Zealanders (by aid of the Missionaries), on the habits of the *Apteryx australis*," dated Sydney, N. S. Wales, 26th Nov. 1838, and accompanied the skin of an *Apteryx*, and also the body, preserved for dissection, which Mr. Cunningham had procured during a visit to New Zealand.—Our readers will learn with deep regret the loss which science has sustained by the death of Mr. Cunningham, who has so greatly contributed to our knowledge of the Natural History of Australia and New Zealand; and those valuable Flora of the latter country has just been completed in our pages.—Ed.

† Ann. Nat. Hist. Vol. iii. 112.

boys by the help of the fingers placed in the mouth,—a whistle with a hiss; and it is by imitating this sound that the natives decoy them, and either catch them by the help of dogs, or having induced the bird to approach near to them by the whistle, they suddenly surprise it by the glare of a lighted torch, which they have with them, concealed under their mats, when they seize it by the neck, and thus capture it alive.

In this manner the bird, the skin and body of which are now sent to England, was taken and brought to me alive. It may here be observed, that the natives, when they proceed to the forest to capture these birds, choose the darkest night: and as the Kiwies usually wander about in pairs, the New Zealander, readily distinguishing, by some difference of voice, the sexes, endeavours to secure the female first, since the male will always linger about the spot to protect its mate, and will thus give the natives a fair opportunity to capture it also.

When alarmed in the forest, the *Kiwi* retires precipitately into its darker recesses, running with considerable swiftness; although its *legs* appear, from their shortness and strength, more fitted for burrowing than fleet movements.

The legs afford the bird a means of formidable defence; for, when hunted and overtaken by the small dogs and the natives, it uses its feet effectively: and it is said the dogs unskilled in the mode of seizing their prey have been greatly injured by its kick.

Formerly, when the natives, wearing solely their loose, airy, mat-dresses, were altogether more hardy than they are in the present day, in which every man is rolled up in a thick, heavy double-blanket of our introduction among them, and has thus become, comparatively speaking, effeminate and inert;—formerly the natives were skilful "*Kiwi hunters*," delighting in the pursuit; and many a group would they form to go and pass a dark tempestuous night in the forest to decoy and catch these birds, the flesh of which, although said to be hard and sinewy, they greatly esteem. The feathers also were in request for making or decorating mats, by sewing them upon a groundwork of their native flax. Thus by their frequent night-prowlings in the woods, the natives have extirpated the *Kiwi* in some districts where it once abounded: and although it is still an inhabitant of timbered regions less disturbed by the natives, it is rarely to be obtained, because these people have become less energetic and enterprizing, and certainly less hardy by their adoption of the habits of civilized man than formerly, and therefore cannot often be induced, by a promise of reward however considerable, to spend

a gloomy night in the forest, in search of the bird; and without the aid of the New Zealander it cannot be obtained.

The skin now sent home, the natives said, was of a male bird, and certain it is that whilst living it had a very strong and highly offensive smell. Some natives of the country at East Cape, on the coast, south of the Bay of Islands, who are residing with the church missionaries at Paihia, on its southern shore, observed that the *Kiwies* of their forests are much larger and more powerful birds than my specimen taken on the Hokianga river. Might not those southern birds be of a distinct species? A. C.

XXXVII.—*Characters of Four New Cape* Orchidaceæ. By Professor Lindley.

Liparis *Capensis*; foliis binis ovato-oblongis obtusiusculis, caule erecto foliis longiore, racemo multifloro, bracteis herbaceis linearibus acuminatis pedicellis ovariorum longioribus, sepalis lateralibus oblongis obliquis labello æqualibus quam petala linearia brevioribus, labello subrepando basi cucullato, apice obtusissimo emarginato apiculo interjecto.

Hab. ad *Cap. B. Spei*, inter Zandplaat et Komga, *Drége*.

Habenaria *Dregeana* (A. § 1. xx. *c.*); foliis radicalibus binis orbicularibus; caulinis lineari-lanceolatis setaceo-acuminatis imbricatis, racemo densissimo cylindraceo obtuso, bracteis floribus æqualibus, petalorum laciniâ anteriori glabrâ posteriori ciliatâ duplò breviore, labelli tripartiti laciniis carnosis acuminatis intermediâ longiore et obtusiore, calcare pendulo obtuso labello longiore.

Hab. ad *Cap. B. Spei*, inter Basche et Omtata, *Drége*.

Habenaria *ciliosa* (A. § 2. *b.*); caule folioso, foliis erectis lanceolatis canaliculatis imbricatis margine pubescentibus, bracteis foliaceis lanceolatis acuminatis margine et costâ ciliatis floribus longioribus, racemo denso cylindraceo, sepalis ciliatis, petalis obtusis glabris, labelli tripartiti laciniis filiformibus intermediâ longiore, calcare pendulo clavato ovarii longitudine.

Hab. ad *Cap. B. Spei*, inter Basche et Omtata, *Drége*.

Habenaria *lævigata* (A. § 2. *b.*) ; glaberrima, lævigata, caule folioso, foliis lanceolatis canaliculatis acuminatis erectis imbricatis, bracteis foliaceis acuminatis subspiralibus floribus longioribus, labelli tripartiti laciniis filiformibus obtusis verruculosis ovario brevioribus intermediâ longiore, calcare filiformi longissimo.

Hab. ad *Cap. B. Spei*, inter Basche et Omtata, *Drége.*

XXXVIII.—*On the Occurrence of* Squalus spinosus, *Linn., on the Coast of Yorkshire.* By Arthur Strickland, Esq.

On the 11th of August 1838, a large fish was brought on shore at Burlington Quay, differing from any I had seen before, which had been caught that morning in a trawl net; its characters evidently bespoke it to belong to the shark tribe, but differing in many respects from any of those usually met with. Its whole length was $7\frac{1}{2}$ feet; its girth in the largest part (just behind the pectoral fin) was 3 feet 8 inches; its whole surface was covered with a skin strikingly different from the rough file-like surface of most of the shark tribe, being very smooth and slimy; but the upper part of the back was studded over with sharp white spines hooking backwards, the largest not above $\frac{1}{4}$ of an inch long, but varying greatly in size. Each spine was set upon a thin hard circular base about the size of a fourpenny piece. In some instances two, and in a few, three spines were clustered together, but were usually separate about one inch asunder. I could not perceive that they were placed in any order or pattern. These spines continued less abundantly down the sides, and seemed to cease altogether as they approached the belly, but were abundant upon all the fins. A distinct lateral line commenced above the insertion of the pectoral fin where it was slightly bent, and from thence ran in a straight line to the tail, where it bent upwards, and followed its course nearly to the extremity. The top of the head was quite flat, ending in a blunt round snout, the space between the eyes being somewhat more than that between the eye and the end of the nose; the eyes were large, and placed in the projecting edge that overhung the mouth: nearly halfway between the eye and the end of the nose were placed the

nostrils, about $1\frac{1}{2}$ in extent the longest way; they were partially divided in the middle by two valves, the posterior one short and blunt, the anterior longer and pointed. The distance from the end of the nose to the mouth was 6 inches; the whole of this space between the nose and mouth was covered with numerous small open pores, probably the glands for the secretion of the mucus that covered the whole surface of the body. The mouth was furnished with three rows of teeth, with the commencement of a fourth row imperfectly formed. The outer or larger row was set upon an edge, but evidently movable, as some of these were doubled backwards; the rest were set behind these in lines, each tooth diminishing in size to the last. The teeth were thin and sharp, about half an inch broad, and a quarter of an inch high: the posterior edge was formed into two longish points, the upper one pointing partly upwards; the anterior side was formed into two much smaller points, pointing in different directions. There was no tongue, nor any appearance of one, the bottom of the mouth being smooth and hard. Seven inches from the mouth commenced the brachial openings, which were five in number, all placed in front of the pectoral fin; the first was 3 inches long, each increasing in size to the last, which was 6 inches. Immediately behind the centre of these commenced the pectoral fin, which was 11 inches in length, very thick and fleshy in substance, particularly at the base, the posterior edge thin and flexible; but as in all the fins except the tail, there were no perceptible fin rays or membrane, all being smooth and fleshy. This fin opened perfectly horizontally, or at right angles to the sides of the fish. Eighteen inches behind these commenced the ventral fins, which were equally thick and fleshy, 14 inches long and 11 inches broad, cut nearly square; between the posterior base of these fins was placed the vent. The space from that to the lower end of the tail was only 17 inches; from this point to the upper extremity of the tail was 23 inches, in one unbroken line, there being no distinct lobes of the tail as in most of the shark tribe. The edge of the tail was composed of indistinct fleshy rays covered with smooth membrane. A little behind a perpendicular line above the anterior base of the ventral fin was placed the first dorsal fin, which was 6 inches long, upon a base of the same length; 4 inches behind

this was placed a second fin, similar in all respects, except perhaps being cut a little more square at the end. From the front of the first of these fins to the end of the nose was a space of about 5 feet, without any other fin or projection except the small spines before mentioned. The colour of the fish was when I saw it, a few hours after it was caught, a nearly uniform reddish slate-colour, somewhat lighter on the lower parts; but it was described by the fisherman who caught it as having been more of a red cast, with blotches of a lighter colour, before it died.

The peculiar characters of this fish consist in the smooth slimy spinous skin (resembling in this respect some of the Ray tribe), the thick fleshy fins with the five brachial openings all placed in front of the pectoral fins, in having no central dorsal fin, no temporal orifices, no anal fins. In these respects it differs from any fish hitherto described as a British species. Nor does it agree with any I have been able to discover in any work I have yet had an opportunity of referring to.

ARTHUR STRICKLAND.

Burlington Quay.

This species is the *Echinorhinus obesus* of Smith, who says in reference to it, "This shark is comparatively rare at the Cape of Good Hope. It is described by the fishermen as sluggish and unwieldy in its movements, and but seldom to be observed towards the surface of the water. When they obtain specimens it is generally at a time when they are fishing in deep water, and when the bait with which the hooks are armed is near to the bottom. In this respect it resembles the Scyllus or Ground Shark. If we were to regard only its internal organization we should be disposed to consider it as closely allied to that genus."—*Illustrations of the Zoology of South Africa*, by Andrew Smith, M.D., Part I. Pisces, pl. 1.

After an attentive examination of the particulars on this subject published in the Supplement to Mr. Yarrell's History of our British Fishes, Part II. p. 54, I have no doubt that all the specimens, and the various synonyms employed, refer but to one and the same species at different periods of its existence.—A. S.

Note.—Since the receipt of Mr. Arthur Strickland's communication, the second portion of a systematic arrangement and description of sharks by Drs. Müller and Henle, published at Berlin, has been received in this country, a reference to which appears to confirm the opinion given by our friend that the various published accounts of a spiny shark refer but to one species. The following are extracts from this valuable German work, p. 91 :—

Second Family. Scymni.

Second Genus. *Echinorhinus*, Blainv.—*Goniodus*, Agassiz.

Species 1. Echinorhinus spinosus, *Bonap.*

Le Bouclé, *Brouss.* p. 672. 21.
Sq. spinosus, *Linn. Gm.* 1500. 27.
Squale bouclé, *Lacep.* i. p. 30. tab. 3. f. 2. *Cop. Encyc.* p. 11. n. 22.
Sq. spinosus, *Bl. Schn.* 136.
Squale bouclé, *Risso. Ichth.* 42.
Scymnus spinosus, *Risso. Hist.* 136. *Cuv.* 393.
Leich bouclé, *Dict. des Sc. Nat.* pl. 28. f. 2.
Echinorhinus spinosus, *Bonap.* 13.
Sq. (Echinorhinus) spinosus, *Blainv. Faun. Franç.* p. 66.
Goniodus, *Agassiz*, vol. iii. tab. E. f. 13. (Teeth).

Hab. Mediterranean sea and the ocean.

Examples stated to have been seen by the authors of the work :—One in the Museum at Leyden ; one from the Cape by Dr. Smith.

The coloured figure of this shark sent us by Mr. Strickland, so closely resembles Dr. Smith's figure, as to make a second illustration unnecessary.—Edit.

XXXIX.—*Horæ Zoologicæ.* By Sir W. Jardine, Bart.

No. II. *The History and Habits of* Crotophaga *continued from page* 171, *by the Notes of Mr. Schomburgk on the Manners of the Birds in Guiana.*

In a lately published number of the *Annals* we commenced a series of papers with the view of giving information as it occurred, and in the hope of calling attention and eliciting additional facts relative to the subjects which were treated of. It is highly satisfactory for us to think that our anticipations have

been so soon replied to. Mr. Schomburgk, in a recent visit, communicated many interesting traits in the manners of the birds of Guiana; and upon submitting to him the proof sheets of the preceding paper, p. 160, which had been just received, he kindly offered to write out for our "Horæ" the notes which he had collected upon the habits of the *Crotophagæ* in the different localities where he had met with them. These notes in general agree with those of our Tobago correspondent; and, in the breeding of the birds particularly, confirm what was stated regarding the incubation of *C. rugirostra*, identical with the smaller Guiana species. They leave however the curious question of some species at least (*C. major*) using a common nest in a manner undecided; though we must confess that information gathered in a proper way from natives has been generally found to be correct in its most important parts. The facts mentioned of their feeding, proved them as observed to be nearly omnivorous; but we still consider insects and fruits to be their principal food. We should also be prepared to find them occasionally eating carrion; but it may be a question worthy of notice whether the birds observed by Mr. Schomburgk on the dead sheep were employed in eating the flesh, or in collecting insects or larvæ which in a warm climate might be very soon attracted to, or engendered in animal matter*. Their resemblance in manners to the *Corvinæ* is also strikingly related; this may be one of analogy only, both the external form of the members and the internal structure appearing to lead to other groups; at the same time, as our facts accumulate, it may be found that the *Crotophagæ* may be more correctly placed among the "Rasorial Crows," the *Glaucopinæ* of Sw. exhibiting in the form of the foot the scansorial deviation.

"I have perused with great pleasure your notes on the History and Habits of *Crotophaga*; and as this genus, by the pe-

* Mr. Schomburgk informs us that "without further proofs to warrant a belief of their being carnivorous, he should rather think they were feeding on the larvæ. The distance was too great to determine whether they were tearing at the carrion or merely regaling themselves on the insects. In either case it would seem that they are not over nice in the selection of their food, and that the smell of putrefaction is not repulsive to them."—Ed.

culiar form of its beak, and its curious manners, is so well qualified to attract the attention of the most careless observer, it may be naturally supposed that it did not escape me.

"You observe very justly, that at this time the specific distinctions of this genus are not well understood; and that only with the possession of an extensive series from various localities, the value of these distinctions will be ascertained. The bird which you consider allied or identical with Mr. Swainson's *C. rugirostra* appears to be the most common and the most widely distributed species. I have now a specimen before me which so accurately agrees with your description of that from Tobago, that there is not the slightest deviation in the dimensions or markings. My specimen was shot in the neighbourhood of Fort San Joaquim on Rio Branco, in lat. 3° 1′ N. The same species inhabits also the Virgin Islands, where they are known under the name of '*Black Witches*.'

"The account of your correspondent, Mr. Kirk, of their habits is graphic, and does not materially deviate from my own observations; but he has forgotten to note that they prove very destructive to pigeon-peas (*Cytisus cajan*), and their sojourn in the negroes' provision-field is by no means cherished by them. Mr. Kirk alludes to the circumstance of having found Guava seeds (*Psidium pyriferum*) in their stomach; and I have to add, that they are partial to this fruit. I recollect that on riding one day from Cruxbay towards the eastern part of the island of St. John's, I saw in the vicinity of the estate Biverhoutberg a flock of *Crotophagæ* on the carcase of a sheep, on which they were feeding. I was astonished at the circumstance, but not so my companion, who told me he had noted their carnivorous habits before. They resemble in that regard the *Corvidæ*; indeed there are several points from which we might trace an affinity to that group. You have noted, p. 170, the resemblance of the tongue of the *Crotophaga* to that of the *Corvinæ*, and the intestinal canal which approaches to that of some of the *Fissirostres*. But there are other resemblances in their characters and habits which are perhaps more striking. They live in numerous bands, are omnivorous, build their nest in the manner of the *Corvidæ*, are clamorous, bold, advance on the ground by hopping, and like our raven and mag-

pie, have at all times been objects of superstition to the common people.

"Setting aside the peculiar shape of its beak, the Crotophaga resembles the Corvidæ further in some points of its outer appearance. Its form and graceful motions when gliding through between the branches of the trees and shrubs or when on the wing remind us of the genera *Pica* and *Garrulus*; at the base of the bill we observe setaceous feathers, a character of the Corvinæ; the fourth quill is the longest, colour entirely black, glossed with violet reflexions like the genus *Corvus*. The flesh has a disagreeable odour; nevertheless I have been informed that this does not deter some of the negroes from eating them; and I have been more than once told, that they are used as substitutes for pigeons or rooks in pies.

"I agree perfectly with Mr. Kirk that they do not build their nest on the ground; it is generally built in the fork of trees: but although the construction of the nest resembles that of the Corvidæ, it is built at a less height from the ground. I cannot substantiate by ocular evidence that they breed in community, but I have heard it always asserted of the larger species (*C. major*). The Indians have told me on inquiry, that in the nest of the smaller species, which you call *C. rugirostra*, they find only from five to seven eggs; but in those of the larger they are so numerous that they fill a whole calabash. The Indians, at least the Warraus and Arawaks, eat these eggs; and their evidence that they take such a large number of eggs from the nests of *C. major*, confirms the belief that they use a common nest. Sororeng, one of the Indians who has accompanied me to London, and who served me as interpreter during the last expedition, assures me that he has seen three birds of the larger species (*C. major*) which they call *Woworima*, sitting in one nest; and on asking him how many eggs he saw in the nest, he designated the number by pointing to the number of his fingers and his toes.

"I have noted both species (*C. major* and *Ani rugirostra*?) along the rivers of Guiana; they are therefore not peculiar to savannahs. When ascending the rivers Essequibo, Parima, Rio Branco, Orinoco, &c. we observed them frequently along the woody banks of these rivers: disturbed by the noise of our

canoes, they sounded their shrill notes, and followed in short flights from shrub to shrub. The Indian is no friend to the Crotophaga; he has an idea that this bird cannot bear the human whistle, and flies as soon as it is sounded. Our Indian guides amused themselves therefore frequently in breaking out on a sudden in a shrill whistle; and were highly delighted when the startled birds took to their wings. I subjoin the Indian names for the lesser Crotophaga (*C. rugirostra*). It is called in the Lingua Geral which is spoken in the province Para *Ano Curauca*, in the Arawak *Cunuba*, in the Macusi *Owowi*, in the Wapeshana *Houwi*. *C. major* is called *Wowo-rima* by the Macasis, and *Cosac* by the Warraus."

[To be continued.]

XL.—*Information respecting Botanical Travellers.*

Mr. Schomburgk's recent Expedition in Guiana.

[Continued from p. 266.]

There are contradictory accounts among the Indians of a species of a cat, which in size and spotting resembles the Cheta (*Felis jubata*). Its ground colour is yellowish-fawn, and the spots are of a uniform colour and full and complete. Such appeared the cat to me which I saw watching me as related above*; and although I have doubted the evidence of my eyes, the existence of such a species has gained additional strength by the circumstance, that, on visiting the British Museum with the three Indians who accompanied me from Guiana to England, they took the Cheta to be a specimen of that species which is indigenous to Guiana, and identical with the one which annoyed us so much.

In the Supplement to Buffon's 'Histoire Naturelle,' tome iii. planche 38†, the figure of a cat is given which agrees with the one which I saw at Curassawaka, and it would be remarkable if, after all

* See p. 265.

† Nous donnons ici la figure d'un animal de l'espèce des léopards ou des jaguars. Le dessin nous en a été envoyé par feu M. Colinson, mais sans nom, et sans aucune autre notice. Et comme nous ignorons, s'il appartient à l'ancien ou au nouveau continent, et qu'en même temps, il diffère de l'once et du leopard, par la forme des taches et plus encore du jaguar et de l'ocelot, nous ne pouvons décider auquel de ces animaux on doit le rapporter; seulement il nous paroit qu'il a un peu plus de rapport avec le jaguar, qu'avec le léopard.—*Ibid.* p. 218.

traces of the animal which that figure represents appear to have been lost, it should be found to be a native of Guiana.

I mention another species from the reports of the Indians, and which the Arawaks call *Waracabba Arowa* or Trumpeter Tiger*. They are equal in size to the former, and are said to go in small packs of six or eight, following their prey as well by scent as by sight. The Indians describe them as very ferocious, and say they will attack man and all the larger quadrupeds which range through the forest. They shun human habitations, and are only to be met with in the thickest forest. They are called Waracabba Arowa from having a bluish breast, resembling that of the gold-breasted trumpeter (*Psophia crepitans*), otherwise they are described to be yellow and spotted; whether contiguous or ringed I could not ascertain.

The *Abouya Arawa* or Peccary Cat of the Arawaks is a powerful animal for its size. It measures about 4 feet in length, and the tail from 16 to 18 inches: its colour is a yellowish-brown, not near so yellow as that of the jaguar (*Felis onca*). The lower parts are white, and the forehead is marked by four or five bands, which run transversely from the eyes towards the muzzle. The spots on the back are formed in oblong stripes, running from the neck to the tail, and each having a spot in the middle. The two lateral bands extend to the fore limbs; the rest of the body is covered with irregular blotches, which in the vicinity of the neck and the breast assume the form of small spots. Its tail is much shorter in proportion than any of the other species; its head is large, the neck thick, with great strength in its fore quarters. It frequents the habitations of man, and commits great destruction among sheep and hogs. In case of necessity it does not despise poultry. I conceive this species to be the *Felis macrourus* of Prince Maximilian of Neuwied.

The Labba Cat.—As I have not myself seen that species, I add Mr. Vieth's account. "This species is about the size of a wild cat. The spots are larger in proportion than on the other species, and are on a light brown ground; indeed the blotches resemble those of the jaguar, and are more frequent on the legs. They are very destructive to poultry, and enter the fowl-houses without fear. I have stuffed several of them; one, which was brought by one of my huntsmen, was sticking all over full of the prickles of the porcupine, which animal I have no doubt it had been attacking."

Labba is the Arawak name for the spotted cavia, on which they prey as well as on other small animals. The subject which Mr.

* I repeat again that the name of Tiger is bestowed generally by the colonists on these cats.

Vieth described to me appears identical with Wilson's *Felis Pardalis*.

There is a variety of that species which the Indians call the *Aguri* or *Aguti-cat*; it is of the same colour as the foregoing, but the spots are small, and very thickly spread over the whole body. They are somewhat larger than a domestic cat, and are equally destructive to the feathered stock as the former. They frequent the plantations, as the sugar-cane fields afford them always a safe retreat. They have received their name from the Aguti (*Dasyprocta Aguti*). It forms no doubt one of the varieties of *Felis pardalis*.

The following two spotted species are considerably smaller than the foregoing, and are named by colonists 'tiger cats.' The Rat-tiger of the Arawak Indians is beautifully marked. The ground colour of the skin is of a fawn colour, marked with black oblong spots on the head and shoulder, and with circular patches, which surround spots of a redder colour along the back and sides; the thighs are surrounded with black bands, assuming a lighter tint inside: the tail is alternately ringed white and black. They are not so large as the former species, and vary from 2 feet to 2 feet 4 inches, of which the tail alone measures from 8 to 9 inches. I think it may be identified with Linnæus's *Felis tigrina*.

The second variety is less than a domestic cat, and has large spots on a bright yellow ground; its fore paws are remarkably strong in proportion to its size, and it frequents chiefly thick woods, where it preys upon birds.

I shall now give a short description of the spotless cats which inhabit Guiana, of which the first that engages our attention is the black cat (*Felis nigra*?) or tiger as it is called *par excellence* by the Brazilian of the Rio Negro. During our expedition in the interior of Guiana, we were not so fortunate as to fall in with a specimen of this cat; although we were told by the Indians that it existed in British Guiana, and frequently committed great ravages among the herds of wild cattle in the savannahs of the rivers Takutu and Branco, and was not unfrequent on the Upper Orinoco and the Rio Negro. Its geographical distribution extends therefore from the coast regions of Guiana beyond the equator. Mr. Vieth had been told by the Waccawais, that they had killed specimens from time to time above the great cataract of the Demerara river; and there can be no doubt of it, as those tribes who inhabit Guiana possess names for it. They are called Maipuri-tiger, either from their colour, which resembles that animal (*Tapir americanus*), and perhaps, and more likely, from their preying on the *Tapir*, as it is a common custom among the Arawaks,

if we except one or two instances, to name those cats generally after the game on which they prey. I have seen a fine skin of that species, the back of which was of a shining black, lightening to a mouse colour on the belly; the paws were black, and its claws larger than those of the jaguar; the whiskers strong; and a tawny-coloured spot above each eye must give to that organ a peculiar appearance when the creature is alive. The tail is longer in proportion to the size of the animal, if compared with that of the jaguar; and in its head and form it resembles much more the Wawula (*Felis concolor*), than the Arichibana (*Felis onca*). It is said to be more ferocious than the latter, and attacks man more frequently. The skin measured from the tip of the nose to the insertion of the tail 3 feet 7 inches, the tail 16½ inches, or the whole skin almost 5 feet; but if the accounts of the Brazilians on the Rio Negro are to be believed, it surpasses in size the largest jaguar. I could not judge whether it was a young or a full-grown animal. The Indians told us, that they subsist upon the Tapir, the Capybara (*Hydrochærus capybara*), the Peccary (*Dicotyles subniger*), the different species of deer which frequent the forest and savannahs, which they surprise by stealth. The Indians appear to have a great dread of them.

The Indian distinguishes two species of the Puma, the Wawula or Deer Tiger and the Soasoaranna. The latter appears to be more restricted to the open savannahs of the Orinoco, the former frequents as well the coast regions as the savannahs. I have recognised in the two specimens which the Museum of the Zoological Society possesses, the Puma of the Orinoco; and although they are generally not known in British Guiana, I have seen a skin of one which had been killed above 40 miles up the Demerara river. The head seemed to be small in proportion to its size, the body was long, and the fore feet very stout; its tail, as far as I can remember, more than half the length of the body, and ending in a tuft of black hair.

I am enabled to give a more detailed account of the second species, the Wawula Arowa of the Arawaks, or Deer Tiger of the colonists. In colour they are of a reddish-brown which lightens on the outside of the limbs, and assumes a white colour on the belly. Of a similar colour is the breast, and the reddish-brown which is the prevailing colour of the body is of a lighter tint at the muzzle and chin. It is covered with thick fur, which relates likewise to the tail, which, as in the Puma of the Orinoco, is black on the tips. The eyes are of a brown colour. The head is small; higher in proportion than any of the spotted kinds, strongly built before and light behind. Its proportion will become apparent from the following

measurement of a subject which was killed at the savannahs of the Rio Branco, and which is now in my possession. It stood behind 2 feet, and before 1 foot 10 inches; and its whole length from the nose to the tip of the tail was 6 feet 2 inches.

	ft.	in.
Length from back of skull bone to insertion of tail	3	1
Length of tail	2	4
Length from point of shoulder to malleolus of fore foot	1	5
Girth of fore leg below point of shoulder	0	$8\frac{1}{2}$
Girth of fore leg immediately below the knee	0	$5\frac{1}{2}$
Length of the knee joint to malleolus	0	10
Length of the sole of the hind foot	0	4
Breadth of ditto	0	4
Girth of the middle of the belly	2	2
Girth of the body near the shoulder	1	10
Length from tip of snout to posterior extremity of the skull	0	9
Space between the base of the ears	0	4
Length of the ears	0	$3\frac{1}{2}$
Space from eye to nostril	0	$2\frac{1}{2}$
Hind leg from hip joint to sole of foot	1	9
Hind leg from knee joint to ditto	0	5
Length of fore claws / Length of hind claws } middle claw	0	$0\frac{7}{8}$

It is very destructive to the cattle farms, and it is so powerful an animal, that I have been told by an eye witness, that it killed a mule and dragged it across a trench to the opposite side, although the trench was not quite full of water, and the Puma had to drag it a few feet up hill, after it landed with its prey on the other side. My informant, who had watched its proceedings, had meanwhile sent for his gun, and shot him while attempting to pull the mule into the wood. They seem to be particularly partial to dogs, and a great number of those which are kept by the settlers for the purpose of hunting, are killed and eaten by them. They follow in the woods the herds of Peccaries, and watch their motion in order to seize upon the stragglers, being well aware that if they attacked the flock, they would be overpowered and torn to pieces. They hunt as well by day as in the night, and feed also on deer and the smaller domestic animals. They give birth to two young ones, seldom three, which have spots of a darker hue, more or less visible, according as the lights fall upon them, and which I have been told they lose after the first year.

Cuvier doubts that the cats just described form two different spe-

cies. I do not venture to combat his opinion, as I saw only a skin of the Puma of the Orinoco, which was similar to the specimens at the Museum of the Zoological Society, and agrees with Mr. Bennett's description, while the second, and of which I possess a specimen, resembles Wilson's figure of the *Felis concolor*.

The Willibissiri Arowa is likewise un unspotted cat, and is exceedingly rare in Guiana. It is of a light gray colour, approaching to white on the belly; its snout is of a reddish-brown and has a white spot on the breast; its tail is of the same thickness throughout, and it does not possess the black tip of the Puma. It is about 2 feet 6 inches long, and stands high in proportion to its size, strongly built before with stout neck and small head. Mr. Vieth gave me the following note on this cat: "I have had two of these animals; one was killed by a negro at Mr. Patterson's at the Demerara river, while in the act of killing a turkey, the other in the same neighbourhood while swimming across a river. I had them both at the same time, and showed them to Mr. Brandes, famed as a great huntsman, and who has killed of almost every species of animal in our colony, but who appeared to be unacquainted with that species of cat. However the Waccawai Indians who inhabit the upper Demerara river, and some of whom I had in my employ, did not seem to think it a rarity, and told me they had seen and killed them from time to time." It has received its Arawak name *Willibissiri Arowa*, from the smallest species of deer which Guiana possesses, which this cat resembles in colour and on which it preys. I conceive it to be the *Felis jaguarondi*, or rather that variety which Dr. Traill describes as *Felis unicolor*.

The Hacca Arowa is the last species of cat that I have met with or heard of during my expeditions in Guiana. It resembles the preceding in size and form, but differs in colour; the adults being of a deep shining black, the belly dark mouse, with a tawny-coloured spot over each eye: the tail is without rings. Although not very common in Guiana, they are by no means rare, and the Indians use the skins for manufacturing caps, shot pouches, &c. They prey upon small animals, as Pacas, Agutis, and are also destructive to the feathered game. It appears to agree with Temminck's variety of the *Felis jaguarondi*, which he saw in the Paris Museum.

From the above description it will be observed, that eight spotted, and five spotless cats are named, all of which the Indian distinguishes by different names; but while the naturalist would hesitate to adopt his distinctions as specific, and considers the greater number mere varieties, we must confess that we know but little how far their

structure diverges, and might warrant us to adopt them, in addition to the difference in spotting and colouring, as specific characters. I have had but little opportunity to extend my investigations to anything further than to the observations which a skin, sometimes mutilated, afforded; but it is evident that Guiana possesses two very distinct forms, of which the Jaguar (*Felis onca*) and the Puma (*Felis concolor*) offer the typical forms. The jaguar is the strongest, and most powerful of the *Felinæ*, and to what astonishing size it reaches, may be concluded from the circumstance, that Mr. Vieth found during our last expedition, on a savannah on the banks of the river Padauiri, a tributary to the Rio Negro, a skeleton of a tiger which measured nine feet. It had been much mutilated by the vultures, but Mr. Vieth carried the skull, which was perfect, and which is now among my collections. The spotted kinds all bear a striking resemblance to each other: their heads are broad, the fore quarters remarkably strong and full of muscles; the chest broad, and their tails shorter in proportion than those of the spotless cats. Not less remarkable is the likeness of the unspotted species; their heads are small, the neck nearly the same thickness, the fore legs very strong and powerful, the hind legs taller in proportion, and the tail long, furry, and brush-like. These two forms are evident to every common observer, but it will want more knowledge of their anatomical structure to form the subordinate sections. In their habits they are all voracious, and prey upon animals much larger than themselves. They hunt chiefly by night, but when pressed by hunger destroy and carry away their prey in the open day. The larger species of the spotted kind are all excellent swimmers, and cross over rivers, or visit the islands where the Capybaras are generally found, and which seldom escape the fatal bound. Although there are several instances, yet comparatively speaking they seldom attack man; but they do not seem to fear him, as they enter the huts of Indians, and carry away their dogs, while they leave their owners undisturbed in their hammocks. Their claws are the chief instruments of attack and defence, and they are for that purpose strongly hooked, and capable of being retracted whilst not in use. Their canine teeth are strong, two in each jaw, cutting teeth small, and grinders shaped like an arrow-head.

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Histoire Naturelle des Poissons d'eau douce de l'Europe Centrale. Par L^{s}. Agassiz. 1er Livraison, contenant les Salmones. Oblong folio. Neuchatel, 1839.

Natural History and Illustrations of the British Salmonidæ. By Sir William Jardine, Bart. Part First. Elephant Folio. Edinburgh, 1839.

On the Growth of the Salmon in Freshwater. By William Yarrell, F.L.S., V.P.Z.S., with Six coloured Illustrations of the Fish of the Natural Size. Oblong Folio. Van Voorst. London, 1839.

The titles of the works which we have placed at the head of this notice will show that the interest which the Natural History of the Salmonidæ has of late excited, has in no way decreased either in this country or on the Continent, and we sincerely trust that the individuals who are now devoting their talents to the elucidation of the habits and structure of this family of fishes, of much importance commercially and possessing great scientific interest, may be enabled to carry on their investigations until the complete history of the subject is attained.

At the commencement of the present century, the history of the British fishes composing this family had for a considerable period remained stationary. But then, various experiments began to be tried, with the view of ascertaining the time required by the fry or smelts to attain a certain weight after leaving the rivers, which was very satisfactorily established, showing a remarkably rapid increase in weight and size. This fact, previously surmised, had given rise to the conclusion, that the young on hatching from the ova increased with equal rapidity, while the history of a little fish provincially known in Scotland as the *Parr*, created much discussion, and no little difference of opinion, whether it was a young state of the Salmon or a full-grown and perfect fish. The immense decrease of the Salmon fisheries also called for investigation; and although the habits of the species which composed the chief staple of the fisheries were practically known to the Taxmen, the proprietors or their factors were not sufficiently conversant with their growth, migration, or breeding, either to impose salutary restrictions in the leases, or to check the indiscriminate and over-killing of the fish, which was almost the sole cause of the decrease; the latter caused the appointment of various Parliamentary Committees, which published reports containing an

immense but undigested mass of information, and which might have elicited much more had the members of them given some attention to the obscure points in the history of the family before examining the witnesses. The difficulty of investigating the subject is we acknowledge great, and when we know that it has been undergoing strict research by persons well qualified for the task for several years without complete information being obtained, we feel even more anxious to understand the mystery which involves the "lives and loves" of these very valuable inhabitants of our rivers and oceans. Mr. Yarrell, Sir W. Jardine, Dr. Parnell, and Mr. Shaw of Drumlanrig are all either now, or have been very lately working on this subject, and the fruits of their researches will eventually leave little to be accomplished. Sir Francis Mackenzie of Garloch is about to form extensive stews for the breeding of salmon, and to re-perform some of Mr. Shaw's experiments. The experiments of the latter observer detailed to the Royal Society of Edinburgh, and published in Professor Jameson's Journal, are of the greatest importance; they have been conducted with great care, and so far as they have been prosecuted have been accompanied by results as satisfactory perhaps as we could expect from the whole difficulty of the subject. The sum of our knowledge at the present time, so far as regards the common Salmon, is, that we have hitherto been in error in considering its growth to be rapid during the first stages of its existence, and that it does not migrate until at least one year's residence in the fresh waters. On reaching the sea however the increase in size becomes very great, exceeding one pound in weight monthly. It has been further proved incontestably we think by Mr. Shaw, that the great proportion of the small fish called *Parrs*, or in the English rivers *Pinks**, are the first state of the young Salmon previous to its assuming the migratory dress; but the additional proposition that the *Parr* does not exist at all as a distinct fish, is extremely questionable, and still requires investigation. At present the opinions of all our best ichthyologists are in favour of its distinctness, and the minute and careful differences detailed by Dr. Parnell in his "Fishes of the Frith of Forth," go very far to prove everything that is wanting. The history of the other migratory fish remains nearly in the same state in which it has been for the last thirty years, though the works before us have commenced their elucidation, and some experiments are now in progress. The geographical distribution of the species has not been at all at-

* See Mr. Yarrell's figures in the work we have placed at the head of this notice.

tempted, and the facts which relate or bear upon it are few in number.

The publication of the History of the Freshwater Fishes of Central Europe by M. Agassiz has been looked forward to with interest by British ichthyologists. Some of the plates for it were engraved so far back as 1832, and the long time which it has been known to be in preparation, with the high scientific character of its author, raised the expectations of those who were studying the same subject. The first livraison of plates has now reached this country, accompanied only with simple explanations, so that we do not yet receive the views of M. Agassiz upon many of the obscure points, but can only guess at what may be his probable conclusions. The mode of publication is however otherwise excellent, each livraison being intended to contain complete illustrations of a family or group, so that the whole is brought under review at once, and is not scattered about as so commonly occurs in works which appear in numbers. The descriptive letter-press to this part is promised with the plates of the second, which are to illustrate the *Coregoni*.

The plates are lithographic, are minutely executed, and those devoted to the details of the fins, scaling, and magnified figures are very useful. A plate of details is given with each species. The others represent the fish in its various states incident to age and season. The first series show the Salmon, M. and F., in its breeding dress, and a female in the state of summer or high condition after having newly entered a river. These figures lead us to believe, what we have long suspected, that the Salmon of many of the continental rivers differed or was not identical with the common British fish. They are reduced from specimens upwards of three feet in length; at this age and size the tail in both sexes of the latter would be completely square, and the scale represented fig. 3. tab. 1 *a*. is fully two-thirds less. The markings in tab. 2. also differ much. Six plates are devoted to the illustration of *S. fario*. Some of the figures are of importance as showing what is to be understood by the *S. marmoratus*, Cuv., and the *S. sylvaticus* of Shrank: but with the English synonyms we cannot agree, they are given, "the Trout, the common Trout, the river Trout, the *Gillaroo*, the *Parr* (*a young Trout*)." Now the *Gillaroo* of Ireland still requires investigation, and we have reason to believe that it will form a distinct species. The *Parr* of Scotland has no connexion with *S. fario**, and the

* For distinctive characters between the Scotch *Parr* and common *S. fario* see Sir W. Jardine in Proceedings of Berwickshire Club. For characters separating it from the young of the Salmon and migratory Trout, see Mr. Yarrell's British Fishes; and Dr. Parnell, Fishes of the Frith of Forth.

figure given as the supposed "*Parr* or young Trout" has been undoubtedly designed from a young specimen of true *S. fario*. We may also remark that all the examples figured are from specimens agreeing with a very marked but not uncommon variety of the Scottish *S. fario* found in the smaller alpine streams. On tab. III *b*. are given representations of the head of a deformed Trout, similar to that represented by Mr. Yarrell, and which we know to occur in several lochs in Wales and in Scotland, and to be not uncommon in the localities where it is found. The malformation is extremely uniform or similar in all the specimens or representations of it which we have seen, but the cause has not yet been noticed, nor has it been attempted to be accounted for. Is the race continued by breeding?

Seven plates illustrate two species of migratory Trout which are given under the names of *S. trutta* and *lacustris*, Linn.*. In these we think we recognise the two British fishes which have been confounded under the provincial name of "Sea Trout." They are very distinct in some of their states, and the form of the tail distinguishes them, together with the colours during the breeding season, but we should have preferred to have seen figures of these species when in high condition; residence in a lake may in various ways influence the form. The young of these fish constitutes the *S. albus* of Fleming. Should the *S. trutta* of this work not stand as *S. eriox* of Willughb.?

The Char are all placed under *S. umbla*, Linn., and the "Welsh Char" is given as an English synonym. Although we know the Char to vary very considerably, we are inclined to refer the British fish to two species, chiefly distinguished by the great difference in the scaling. Those figured by M. Agassiz seem all referable to the "Northern Char" of modern British writers.

S. hucho of the Danube, unknown in the British waters, is represented in the young and adult states, and the last plates delineate the *Thymallus vexillifer*, Agass., or Common Grayling, found only by the British ichthyologist in certain districts in England.

In looking at the list of the Salmon of Britain and Central Europe comparatively, we are prepared for a close resemblance of species; but from the work before us we perceive one species, *S. hucho* of the Danube, which does not occur in Britain or Ireland, while we find omitted the *Bull Trout* of the river Tweed, (the *S. eriox* of some authors, but not of Willughby,) and the great Trout of the Scotch, Irish, and North of England lakes. These we have no doubt in being distinct species, and it appears to us remarkable that the latter should

* We are presuming that the *S. lacustris* here given is a migratory species, and if so we think the name objectionable.

be wanting to the Swiss lakes. Among the common Trout, *S. fario*, we feel inclined to adopt more species than those of the Swiss ichthyologist, but as the specimens now figured are chiefly river varieties, and certainly all one species, we are not so able to judge how the varieties in the lakes of Central Europe agree with those from the lochs of Scotland and Ireland, or how the characters which we think entitle them to separation are kept up in other localities. We shall look anxiously for the appearance of the Second Livraison and the letter-press, when we shall endeavour to enter more fully upon this curious subject; in the mean time we would wish that encouragement to the work in this country which is due to the persevering zeal of its author.

The History of the British Salmonidæ, by Sir W. Jardine, which stands next upon our list, is a work which has also been some time in preparation, and of which the first Fasciculus of six plates is now published*. The figures are here drawn as near the size of life as that of the paper will admit of, and are engraved with the view of giving the effect of the newly taken fish; all the details of anatomy, scaling, and outward structure, which require most minute execution, being reserved for the volume which will contain the descriptive letter-press, and which will appear with the last fasciculus of the plates. The sketches for the colouring we know to have been nearly all made at the water's edge from the fish when newly caught; thus endeavouring to preserve an imitation of the rich tints which so quickly fade, and are lost in preserved specimens; and the department itself has been entrusted to, and performed with much credit by Mr. Bayfield of London. It is expected that the whole species found in the waters of Britain and Ireland will be illustrated in six fasciculi, or upon from thirty-six to forty plates.

On the two first plates before us are figured the Gilse or state of *S. salar* before having spawned, the second being named with a? and considered to represent the same state of the second species of British Salmon, whose history has scarcely yet been noticed by our ichthyologists. Plate 3. represents *S. albus* of Fleming, given under that name to identify without doubt the fish alluded to in the "British Animals," and so often referred to by our modern writers. This is now known to be the young of our migratory species confused together, and in this state extremely difficult to separate. 4. is a variety of the large *S. ferox*, which we noticed M. Agassiz does not include in his list of the fishes of Central Europe; the specimen is

* See Prospectus published in Annals of Nat. History, vol. ii. p. 138.

remarkable for the close and numerous spottings over the whole body: 5. are two beautiful lacustrine varieties of *S. fario*, and 6. exhibits figures of the Lochmaben *Coregonus*, *C. Willughbeii*, Jard. The second fasciculus, which is in preparation, will contain, 1. *S. salar*, adult male in the dress of the spawning season; 2. *S. salar* in a very young state; 3. *S. trutta*, adult; 4. *S. trutta* in the dress of spawning season; 5. *S. fario* river varieties; and 6. *S. fario* in the spawning dress.

The work of Mr. Yarrell forms another interesting addition to our knowledge of the Natural History of the Salmon. The young of the Salmon (in the district where the experiments were made called Pinks) were put into an artificial lake on the property of Thomas Upton, Esq. of Ingmire Hall, having no outlet or feeder by which other fish could gain admittance. These were afterwards taken at intervals of from eleven to twenty-seven months, and Mr. Yarrell's description and plates detail and exhibit the changes and appearance of the fish when taken from the lake. The experiments of Mr. Upton and Mr. Parker corroborate in general what Mr. Shaw has so successfully proved in Scotland, and are interesting as showing the change in colouring undergone by the Pinks at the period when the clear and silvery scaling is assumed; but beyond the time when the migratory change takes place we cannot depend upon the increase of weight or size. Any one accustomed to see many Salmon in different states fresh from their native rivers, and to compare them with fish kept artificially, could at once say that Nos. 4, 5, and 6 had been kept in fresh water; this is particularly evident in the form of Nos. 4 and 5, and we would account for the comparatively fine condition of No. 6 by the lake being newly completed, and unstocked (we presume) with other fish. It is well known how much common Trout are influenced in their condition by being placed in a newly formed pond or lake. The drawings by Mr. C. Curtis illustrating Mr. Yarrell's paper were exhibited to the British Association at Newcastle, and were then much admired. The coloured engravings from these now published, are executed with great minuteness and delicacy.

Narrative of an Expedition into Southern Africa during the years 1836 *and* 1837, *from the Cape of Good Hope through the Territories of the Chief Moselekatse to the tropic of Capricorn.* By Captain W. C. Harris. 8vo. Bombay, 1838. Murray, London. (Reprinted) 1839.

This volume may perhaps be thought by some scarcely to come

under the range of works which should be noticed in the 'Annals,' but as the author tells us that "both from education and taste," he "possessed an ardent desire to contribute his mite to the geography and natural history of the countries" he "was about to explore;" and that there are interspersed through the work anecdotes of several rare animals, which though not written for the naturalist are extremely interesting to him; we have thought it worth while to bring it under the notice of our readers. Capt. Harris seems to have been born a sportsman, possessing the bump of destructiveness in its fullest development. At a very early age (16) he received a commission in the army in India, where he was "entered" at the Lion and Tiger of the East: but not satisfied with the gorgeous scenery and abundant game which this continent produced; hankering after the tales of travellers in the plains of Southern Africa, and considering that country as the "fairy land of sport," the "hunter's paradise," he took advantage of a banishment to the Cape of Good Hope by the Medical Board, to project a realization of his young dreams of the interior; and, having found a brother sportsman, they set out upon their expedition with a retinue of horses, oxen, wagons, and Hottentots for Graham's Town, travel by Kuruman or New Litakoo to the residence of Moselekatse the Matabili chief, penetrate still northward to the river Limpopo, and return again to the colony by the route of the Vaal river. The volume is pleasantly written, and carries on both the sportsman and naturalist. Some of the descriptions of scenery are beautifully sketched; and if some of the hunting scenes seem as if coloured with a sportsman's licence, and the rifle is used with Kentucky precision, we can excuse the enthusiasm which prompted the tale, and knowing the feelings which excite the comparatively puny European sportsman, who has hooked and mastered his first twenty-five or thirty pound Salmon, or sees his first red Deer fall in the glens of Athol or the wild forests of Ross, we can join with the "tingling excitement" experienced when galloping side by side with the "Swan-necked Giraffe," and the "bursting exultation" when looking down on the first noble prize he had won.

To the naturalist the volume is interesting as detailing different traits in the habits of several of the rarer Antelopes. It confirms the remarkable manner in which many of the species are restricted, as it were almost by a line, within certain boundaries, and the incredible troops in which they migrate and are spread over the interior, where the arrows and pitfalls or traps of the natives, and the ravages of the larger *Felinæ* are as nothing compared with the

increase. All these animals are said by Capt. Harris to be easily overtaken by a good and well-conditioned horse, their very speed being their destruction, frantic terror at such novel enemies causing them to spend their strength in the exertions of a few miles. The speed of the Camelopard is extraordinary, but "our best horses were able to close with him in about two miles."

The great fault of Capt. Harris's book is a constant attempt to assume a scientific character, which every page contradicts. There is no precise information on the subject either of zoology or geography, the two branches which the author particularly boasts of his desire to investigate; he does not appear to have made a single observation to ascertain either the latitude, longitude, or elevation of the places he visited, nor to have carried any instruments for that purpose; and this is the more to be regretted, as he visited a part of the country very seldom penetrated by Europeans. The positions on his map are consequently laid down at least 20° wrong in latitude, and their longitude of course must have been taken at random. Though not a practised zoologist, Capt. Harris's hints on habits and localities are often valuable, and they are given but as incidental to the great thread of his discourse, which is a lively narrative of a shooting excursion and nothing more; but this very character deprives them of suspicion. To the end of the volume is added a descriptive Catalogue of the Mammalia of Southern Africa, but which contains little that was not previously known: it is in fact chiefly copied (though without acknowledgement) from Dr. Andrew Smith's "African Zoology," a small work printed at Cape Town about eight or ten years since, and we believe never published, though freely circulated among the friends of the amiable and talented author.

We have thus attempted to give a fair and impartial account of Capt. Harris's volume. It is written in the lively dashing spirit of a soldier and a sportsman: no one can read it without amusement, and few without some instruction; and if truth has obliged us to mingle some slight censure with our general praise of the performance, it is because the pretensions which the author makes to scientific knowledge create expectations which are disappointed in the perusal.

Deutschlands Lebermoose in getrockneten Exemplaren. Herausgegeben von Dr. J. W. P. Hübener und C. F. E. Genth. 8vo. Mainz. Florian Kupferberg, 1836—1839. Nos. 1 to 5.

To such of our readers as are students or collectors of Cryptogamic plants, and we hope and believe that this class of botanists has

greatly increased of late in this country, we strongly recommend this collection of specimens of the Hepaticæ of Germany. Each number contains 25 specimens, with the names and localities, but unaccompanied with descriptions. As might be expected, the great majority of the plants given belong to the genus *Jungermannia*, but specimens referred to the genera *Riccia*, *Marchantia*, *Anthoceros*, and others recently separated from these are also given, so that the collection may ultimately include, as far as possible, all the species of Hepaticæ found in Germany. The specimens are good, and very well preserved.

A. Bertolonii Flora Italica, sistens Plantas in Italia et in Insulis circumstantibus sponte nascentes. Bononiæ, 1833–39. 8vo.

We have recently received the first Fasciculus of the 4th volume of the above work, which we must crave the pardon of our botanical readers for not having sooner introduced to their notice. It is quite unnecessary for us to say anything in praise of the high botanical attainments of Prof. Bertoloni, since they are universally allowed to have raised him into the first rank of modern botanists; a character fully supported by the work before us. It is the author's intention to describe all the plants indigenous to Italy and the adjacent islands, and this he has now done (in the first three volumes), as far as the end of Pentandria, in a more complete manner, with fuller descriptions, more numerous synonyms, and with a greater number of critical and explanatory observations than we have met with in any other Flora. In the part commencing the fourth volume, which is now more particularly under our notice, the class Hexandria is commenced; and in order to convey some idea of the extent of the Flora, and the space devoted to the several species, we append a list of the genera described in this fasciculus of 128 octavo pages, and mark by the numbers following each name, the number of species included in each genus:—*Galanthus* 2, *Leucojum* 5, *Narcissus* 12, *Pancratium* 2, *Sternbergia* 2, *Allium* 31, *Lilium* 5, *Fritillaria* 3, *Erythronium* 1, *Tulipa* 8, *Ornithogalum* 12, *Scilla* 12, *Asphodelus* 5, *Anthericum* 4. In Sir J. E. Smith's 'English Flora' the corresponding genera occupy only 22 pages and include 24 species; in Bertoloni's work they occupy 128 pages, and include 114 species.

We cannot too highly recommend this work to the notice of British botanists, more especially from its including (as far as at present published) nearly all the native plants of our own country, and placing them in juxtaposition with the numerous allied species which are found in the south of Europe.

Verzeichniss der in Jahre 1832 im östlichen Theile der Altai-gebirges gesammelten Pflanzen. Ein Supplement zur Flora Altaica, von Al. v. Bunge. 8vo. St. Petersburg, 1836.

This Supplement to the Flora Altaica is quite essential to all those who possess that excellent work. It is extracted from the Mémoires de l'Académie de St. Pétersbourg, and contains a catalogue, with numerous descriptions and observations, of the plants collected by M. Bunge in the eastern part of the Altai Mountains in 1832, and notwithstanding its German title, is wholly written in Latin. Many new plants are described, and fuller accounts given of species incompletely noticed in the Flora Altaica.

Fungorum et Byssorum Illustrationes, &c. By F. Fulg. Chevallier. Fasc. I. With 52 coloured Plates. Lipsiæ, Strasburgi et Parisiis, 1837.

This work contains many beautifully drawn and well-executed plates, especially of the larger Fungi. The illustrations of the more minute species we think far less happy, and they are extremely poor in anatomical details. We find, too, more than one well-known species published as new.

Pterodinia nivea is clearly *Isaria intricata*, var. *subsimplex*, Schum.

Fusisporium palustre has long since been published by Desmazière, under the name of *Psilonia Arundinis*, and it is described in the third volume of Fries.

Psilonia Buxi, already placed by Fries in the genus *Fusisporium*, has a new specific name given to it.

If we mistake not, *Æthalium mælanum* is a state of *Licea cylindrica*, figured by Nees under the name of *Dermodium fallax*.

A few other points of less importance might be noticed.

With these exceptions the work may be pronounced as a beautiful contribution to the stock of Mycological illustrations, though it does not make any important addition to our knowledge of Fungi.

Linnæa. Vol. XIII. Part 3. 1839.

On the development of the spores in *Anthoceros lævis*; by Prof. Mohl. With a Plate.—Appendix to observations on the hairs in the air-tubes of *Limnanthemum* and *Villarsia*; by Dr. S. F. Hoffmann.—Observations on American *Bauhiniæ*; by Dr. Vogel.—Synopsis of Scandinavian *Drabæ*; by Al. Ed. Lindblom.—Notice of the continuation of Bartling and Hampe's Vegetabilia Cellularia by Hampe alone.

British Coleoptera delineated, consisting of Figures of all the Genera of British Beetles drawn in outline. By W. Spry, M.E.S., edited by W. E. Shuckard, Lib. R.S. Nos. 1—6. To be continued Monthly, each Number containing Six Plates and Illustrating nearly fifty Genera.

This work, of which six numbers have regularly appeared, is adapted to serve as an illustration to the different works on the subject published without plates. The figures of the insects are faithfully and correctly drawn, considering at the same time the low price at which they are published, scarcely three farthings a genus. They are not indeed to be compared to the artistical plates of Curtis; but they are accurate enough to serve the purposes for which they are intended, and are executed in a style of lithography which we have not before seen employed in this country though much used on the continent for natural history publications, and are well adapted for the purpose of illustration.

PROCEEDINGS OF LEARNED SOCIETIES.

LINNÆAN SOCIETY.

December 3.—Edward Forster, Esq., V.P., in the Chair.

The Rev. W. S. Hore exhibited a specimen of a remarkable variety of Duck, supposed to be hybrid between the *Anas Boschas* and *Anas acuta* of Linnæus.

Read, "Descriptions of three Vegetable Monstrosities lately found at York." By the Rev. W. Hincks, M.A., F.L.S.

Two of these monstrosities occur in species of Iris, and much resemble each other. The species are *I. versicolor* and *I. sambucina*. They have 5 parts in each circle, except that the inner circle of petals consists of 4 in one instance and only 3 in the other. It is sufficiently manifest that they are produced by the union of two flowers to form each, and they lead to the conclusion that when Irises with 4 parts in each circle occur (which are not very uncommon) they are unions of two flowers, one-third part of each having perished in the junction. Various other monstrosities consisting in the union of two flowers were compared with the subjects of the description, particularly some of Œnothera, flowers having 7 petals, 14 stamens, and 7 stigmas, where the parts preserved in the union are in exactly the same proportion as in the Irises.

The third specimen described as a monstrous union of 4 flowers

in *Scrophularia nodosa*. The flower-stalk may be perceived to be formed by the adherence of several stalks. The parts found are 15 sepals, 16 petals, 20 stamens, 2 separate ovaria, each with 2 carpels, and a third ovarium formed by the adherence of 2 more, and consisting of 8 carpels. Explanations were attempted of the manner in which the union of 4 flowers would account for these numbers of parts. The increased developement of the circle of stamens, 5 appearing for each flower, though of these several are united in threes together, and two are imperfect, and the increased number of carpels in two of the united flowers, are interesting facts. They show that the union of the flowers had the effect of diminishing and rendering more equable the pressure on the interior circles so as to allow of the growth of parts which are usually abortive.

There was also read, "A monograph of *Streptopus*, with the description of a new genus now first separated from it." By D. Don, Esq., Libr. L.S., Prof. Bot. King's College.

The genus *Streptopus* was established by the elder Richard in Michaux's 'Flora Boreali-Americana,' and was intended to include, besides the *Uvularia amplexifolia* of Linnæus, which is to be regarded as the type, two other species, then entirely new to botanists, namely, *S. roseus* and *lanuginosus*. The first is common to Europe and America, while the two last are confined to the latter continent. A fourth species, a native of Gosaingthan and Kamaon, was described under the name of *simplex* in the 'Prodromus Floræ Nepalensis.' The *lanuginosus* is considered by Professor Don as the type of a new genus, which he has named *Prosartes*, and which is distinguished from *Streptopus* by its lengthened filaments, binary pendulous ovula, and terminal inflorescence. In *Streptopus* the filaments are short, with erect sagittate anthers, the cells of its baccate pericarpium are polyspermous, the seeds erect, and the flowers are axillary and solitary. Both genera belong to the *Smilaceæ*, and serve to connect that family with *Melanthaceæ*. The characters of the new genus and of the species belonging to both are here subjoined :—

1. *S. amplexifolius* (Lam. et DeCand. Fl. Franc. 3. p. 174.), glaber; pedunculis medio convolutis appendiculatis, sepalis obtusè acuminatis, antheris sagittatis acuminatis, stigmate trilobo, baccæ loculis 6-spermis.
2. *S. roseus* (Mich. Fl. Bor. Amer. i. p. 201.), hirtellus; foliis ciliatis, pedunculis recurvatis subbifloris, sepalis lanceolatis acuminatis, antheris bicuspidatis filamentorum longitudine, stigmatibus stylo 6-plò brevioribus, baccæ loculis 4—6-spermis.
3. *S. simplex* (Don, Prodr. p. 48.), glaber; pedunculis rectis! nudis, se-

palis obtusis, antheris cordato-lanceolatis obtusis, stigmatibus styli sublongitudine, baccæ loculis 10—12-spermis.

PROSARTES.

Streptopi sp., *Mich.*

Perianthium 6-phyllum, petaloideum, campanulatum, æquale, deciduum: *foliolis* basi foveolatis v. saccatis. *Stamina* 6, basi sepalorum adnata, simulque decidua. *Antheræ* erectæ, innatæ, obtusæ, biloculares, rimâ duplici marginali longitudinalitèr dehiscentes. *Ovarium* liberum, 3-loculare: *loculis* biovulatis: *ovulis* obovatis, a placentæ apice pendulis! Stigmata 3, brevissima, recurvata. *Pericarpium* baccatum, 3-loculare. *Semina* solitaria, v. rariùs bina.

Herbæ (Amer. bor.) *perennes, pube ramosâ vestitæ, rhizomate diviso multicepite.* Caules *teretiusculi.* Folia *sessilia, dilatata.* Inflorescentia *terminalis, umbellata.* Bacca *rubra.*

1. *P. lanuginosa,* umbellis bifloris sessilibus, sepalis lanceolatis acuminatis 3-nerviis basi foveolatis, stylo glabro, foliis cordato-ovatis subamplexicaulibus utrinque pubescentibus.
2. *P. Menziesii,* umbellis sessilibus bifloris, sepalis oblongis mucronatis 6-nerviis margine revolutis basi saccatis, stylo longissimo piloso, foliis ovatis sessilibus glabriusculis.

This new species is a native of the north-west coast of America, where it was first found by Mr. Menzies in the voyage of discovery under Vancouver, and it has been very properly named in compliment to that venerable botanist.

The plant bears a close resemblance to some species of *Disporum,* and it moreover agrees with that genus in its sepals being produced into a short spur or pouch at their base. The flowers are considerably larger than those of *lanuginosa,* and they are apparently of a yellow colour. The style is long and copiously hairy. The genus is essentially distinguished from *Disporum* by its innate anthers, nearly concrete styles, and pendulous seeds.

ZOOLOGICAL SOCIETY.

March 12, 1839.—William Yarrell, Esq., in the Chair.

Mr. Ogilby communicated a portion of a letter which he had received from M. Temminck. It related to two species of Monkeys, *Colobus fuliginosus* and *Papio speciosus*; the former M. Temminck considers identical with the Bay-Monkey of Pennant, and he states that this opinion is founded upon its agreement with a coloured drawing now in his possession; this drawing having been taken by Sydenham Edwards from the specimen of the Bay-Monkey

formerly in the Leverian Museum, and which is the original of Pennant's description.

The *Macacus speciosus* of M. F. Cuvier is stated by M. Temminck to be founded upon an immature specimen of a species of *Macacus* which inhabits Japan; the habitat of Molucca Islands given by M. F. Cuvier being founded upon error. The specimen was originally taken from Japan to Java, where it died; the skin was preserved, and M. Diard having obtained possession of it, sent it to the Paris Museum; and as there was no label attached, M. F. Cuvier imagined it to be a native of the place whence M. Diard had sent it.

Mr. Fox exhibited several birds, which he stated had formed part of an extensive collection made in Iceland by the Curator of the Durham Museum.

May 14, 1839.—Sir John P. Boileau, Bart., in the Chair.

The Rev. F. W. Hope exhibited a portion of his collection of insects, in order to illustrate a paper entitled "A Monograph on Mr. William Sharp MacLeay's Coleopterous Genus *Euchlora*."

Genus Euchlora, MacLeay.

Melolontha, Linn., Fab. & Olivier.

Antennæ articulis novem, basilari conico elongato, 2do, 3tio, 4to, 5to et 6to brevibus subglobosis; capitulo ovato, triphyllo, elongato, antennarum longitudinis totius haud dimidium æquante.

Labrum prominulum, clypeo fere absconditum, margine antico lineari, ciliato, emarginato, lateribus rotundatis.

Mandibulæ latitantes, subtrigonæ suprà planæ, latere externo rotundato, interno ciliato, ad apicem 3-dentato.

Maxillæ caule subtrigono-triquetro, ad apicem inflexæ 6-dentatæ.

Palpi maxillares articulo terminali cylindrico ovato.

Labiales articulis 2do et ultimo longitudine æqualibus hoc subulato.

Mentum subquadratum, margine antico emarginato angulis truncatis rotundatis ac lateribus sinuatis, posticè valdè convexis.

Caput subquadratum clypeo lateribus rotundatis margine reflexo.

Corpus ovatum convexum posticè elytris haud opertum. *Thorax* subquadratus ad basin duplò longior quam latior, latere postico sinuato vix lobato.

Scutellum parvum cordato-truncatum. *Sternum* haud productum.

Pedes validiusculi tibiis anticis 3-dentatis. *Tarsorum* ungues

posticorum indivisi reliquorum ex unguibus unus bifidus, alter indivisus.

"It is in the warm and tropical regions of the world that we find vastness one of the leading characteristics of animal life. It is in the same regions also, amongst the class of insects, that we find a corresponding magnitude attended with a wonderful increase of species, many examples of which might here be mentioned. It is sufficient for our purpose at present to note only a few of them, such as the *Sternocera*, among the *Buprestidæ*; *Lamia*, belonging to the Longicorn beetles, and *Melolontha* and *Euchlora*, well-known genera pertaining to the Lamellicorns. With regard to vegetation, there will also be found an equal magnitude of stature and a luxuriance of foliage quite in proportion to what occurs even in the animal world. If we look to the tropical regions of Asia, Africa, and America, we shall find a similarity of character generally predominating: but it is in the tropical jungle chiefly, and on the banks and estuaries of mighty rivers, that insects will be found, not only formidable by their size, but remarkably numerous in species and individuals. The genus *Euchlora* of Mr. MacLeay, to which at present I wish to draw your attention, is not very distinguished for its size, although larger than all the allied genera belonging to the family. The predominating colour is green, and the abundance of individuals belonging to some of the species is incalculable. I may mention, *en passant*, that the thousands which have annually been imported into Europe, appear from inquiry not in the least to have thinned their numbers. On one occasion I received forty Chinese boxes, and in each of them (I speak greatly within bounds) there were at least twenty specimens of *Euchlora viridis*. These boxes are imported into England, and other parts of Europe, in great quantities, and there is scarcely a museum at home or abroad, however insignificant it may be, but exhibits its Atlas Moths, its purple-coloured Sagra, and less attractive Euchlora, in tolerable profusion. I have stated above that the prevailing colour of the species is green, but there are some exceptions. The under side of some of them is usually a bronze, or a rose-coloured copper; some of them green above and beneath; others green above and yellow beneath; while some again are blue on the same side, with the play of light appearing of a violet colour. With regard to the colour of insects, greens, as far as my observations go, naturally on one side merge into blues and violets, and on the other into orange and yellows. Instead of occupying the time of the meeting with a question at present (as far as regards insects) comparatively little studied or understood, I pro-

ceed to remark on the geographical distribution of the family *Euchloridæ*. Had some of the Continental entomologists been better acquainted with Mr. MacLeay's Horæ Entomologicæ, they could never would have considered *Euchlora* as an European genus. late work, published in Paris, the "Histoire Naturelle des Animaux Articulées" (at page 135), we find under the generic name *Euchlora*, not only *Mimela* and *Aprosterna* included, but also *Anomala*, &c. It is singular that the same appellation is given to twenty-two species therein specified, a short analysis of which I now place before you, and shall then allude more particularly to the genera composing the family, the range over which it extends, and mention the countries and localities in which they severally occur.

"Of the above twenty-two species, five of them appear to be true *Euchloræ*, two others belong to *Mimela*, Kirby, another to *Rhombonyx*, Kirby, and the remaining fourteen to *Anomala* of Megerle, as it now stands. Before I conclude these remarks on the species of the genus before us, it is necessary to state that I have elevated *Euchlora* to the rank of a family, the following genera properly belonging to it.

EUCHLORIDÆ, Hope.

Genera.	Country.	Species known.
1. Euchlora, *MacLeay* . .	Asia	30
2. Aprosterna, *Hope* . . .	Asia and Africa. . .	5
3. Mimela, *Kirby* . . .	Asia.	22
4. Rhombonyx, *Kirby* . . .	Siberia and China. .	2
5. Anomala, *Megerle* . .	Old and New World .	120
		179

Genus 1. EUCHLORA.

"The family of *Euchloridæ*, from the above table, consists of five genera, and nearly two hundred species, which have fallen under my notice. True *Euchlora*, I state, belongs exclusively to Asia and its isles. It occurs as far south as Manilla, appears at Singapore, and runs from thence through the continent of India up to the Himalaya; the extreme eastern point appears to be Japan, while its western range does not reach Bombay, probably from the intervention of some physical barrier. Captain Ezra Downes has taken it at Neemuch. The Entomology of that district essentially agrees in character with that of Calcutta and Madras, at the latter of which places *Euchlora* is taken.

Genus 2. APROSTERNA.

"This genus is not peculiar to Asia, as some of the species are found in New Guinea.

Genus 3. Mimela.

"This elegant genus, rivalling in colour and splendour the *Bupres-*
s confined to Asia; it ranges wherever *Euchlora* is found.

Genus 4. Rhombonyx.

"This genus is probably peculiar to Asia. One species is found in China, and the other, I have reason to think, is only found in Asiatic Siberia.

Genus 5. Anomala.

"Anomala is common to the four quarters of the globe, and may properly be divided into three if not four subgenera, which task I willingly leave to other entomologists.

"In concluding these observations on *Euchlora*, I have only to add, that it may excite some surprise that this genus extends far into the Himalayan regions; it may be explained however, satisfactorily, by the influence of local causes. It is an ascertained fact, that tropical vegetation often extends into high latitudes, and why, then, may we not expect to find insects which feed upon it, and are intended probably to keep it within due bounds?

"From information given to me by my friend Professor Royle, I state that the tropic-girt base of the Himalayas is characterized by a vigorous and luxurious vegetation.

"In the same regions there is also an uniformity or great equality of temperature, well adapted for animal as well as vegetable life. The exuberance of the latter adds to the humidity of the atmosphere, as well by the exhalation of the foliage as by preventing free evaporation from the soil. In the boundless forest and interminable jungle there will generally be found a great equality of temperature, brought about in consequence of the umbrageous shelter impeding the absorption of heat by day, as it checks the free radiation of it at night. It is then, owing to the presence of tropical vegetation, united with moisture, that there arises considerable uniformity of temperature; in a word, it is from local causes that we are enabled to explain the reasons why we meet with the representatives of tropical genera of plants and insects extending into higher latitudes than at first might naturally be expected."

Sp. 1. Euchlora viridis, Fabricius.
Long. lin. 12; Lat. lin. 7.
E. glabra, punctata, suprà viridis nitens subtùs cupreo-aurata, pedibus cupreis. Sternum haud porrectum.
Vide Oliv. Mel. Tab. 9. fig. 21[b].
Hab. in Chinâ.
Varietas *E. elytris cupreo-marginatis, corpore suprà æneo marginato, antennisque piceis.*

This species is found also at Singapore, Assam, in Bengal, and in the island of Ceylon. On the under side it is of a rose-coloured copper, appearing about the sternum and the lower rings of the abdomen of a brassy vivid green.

Sp. 2. Eu. JURINII, MacLeay.

Long. lin. 11 ; Lat. lin. 6.

E. nitidissima, glabro-punctata, suprà viridi-olivacea, subtùs viridi-cuprea, thorace utrinque punctis duobus impressis, pedibus viridibus, nitidis.

Antennæ piceæ 7mo articulo virescente. Totum corpus suprà viride, aureo-opalino colore tinctum, infrà viridi-æneum, pedibus suprà et infrà viridibus.

Hab. in Javâ, Mus. Dom. MacLeay.

" I have received this species from Java; it varies in size, and may at once be distinguished from *E. viridis* by its smooth upper surface, which is of an opalescent bright green ; its under side is also more brilliant, and of a golden-coloured bronze ; the tibiæ and tarsi are invariably green. The *E. MacLeaii* of Mr. Kirby's MSS. is only a large variety of this species."

Sp. 3. Eu. CUPRIPES.

Long. lin. 12 ; Lat. lin. $6\frac{1}{2}$.

Affinis Euchl. viridi, MacLeay, *at major. Corpus ovatum ; suprà viride glabrum, subtùs roseo-cupreum, pedibus cupreis.*

" This insect is closely allied to *E. viridis,* MacLeay ; it is, however, distinct. *Viridis* in form is oval. *Cupripes,* ovate : the under side is of a rich rose-coloured copper, without any æneous tinge. I have received one specimen from Java, and a second from the Tenasserim coast."

Hab. in Indiâ Orientali. Mus. Dom. Hope.

Sp. 4. Eu. GRANDIS.

Long. lin. 14 ; Lat. lin. 8.

E. glabra, punctata suprà viridis, nitens, subtùs viridi-cuprea, thorace utrinque puncto laterali medio leviter impresso, pedibusque viridibus.

Hab. in Calcuttâ ? Mus. Dom. Hope.

" I obtained this species from Calcutta ; I am doubtful, however, if that be its real habitat. It is stuck with a needle, like most of the Chinese insects, and may have been imported into Calcutta. It is at present the largest species of *Euchlora* I am acquainted with."

Sp. 5. Eu. MACLEAYANA, Vigors.

Long. lin. $1\frac{3}{20}$; Lat. $\frac{9}{10}$.

E. pallidè virescens, capite thoraceque punctis aureis confertis splendentibus ; elytris punctatis flavo-marginatis ; corpore subtùs pedibusque aureo-cupreis.

Antennæ aureo-cupreæ. *Corpus subtùs pedesque aureo-cuprei, albidè pilosi. Clypeus aureus. Scutellum nitidum, parcè punctatum.*

Hab. in Indiâ Orientali. In Mus. Dom. Vigors.

" It is difficult to convey, either by description or representation, a just idea of the beauty of this superb insect, which was obtained

from Madras. It was named by Mr. Vigors in honour of Mr. William Sharp MacLeay."

Sp. 6. Eu. smaragdina, Eschcholtz.

Long. lin. $11\frac{1}{2}$; lat. lin. $5\frac{1}{2}$.

E. suprà viridi-orichalcea; subtùs, femoribus, thoracis pygidiique marginibus externis fusco-auratis, capite thoraceque densè punctulatis, elytris vagè punctulatis seriebusque punctorum plurimis.

Hab. in Insulâ Luzonum, Manilla.

"The above insect I received from Dr. Eschcholtz*."

Sp. 7. Eu. Sieboldii.

Long. lin. $10\frac{1}{2}$; lat. lin. $6\frac{1}{2}$.

Affinis præcedenti; glabra punctata, suprà viridis; thoracis lateralibus marginibus fusco-auratis. Pygidium viridi-cupreum. Corpus infrà roseo-cupreum, et nitidum. Pectus subargenteâ sericie obsitum. Pedes suprà virides, subtùs cupreo-aurati; femoribus cupreis et nitidis.

Hab. in Madagascar. Captus celeberrimo Macklotio.

"This species is allied to *E. smaragdina* of Eschcholtz, but may at once be distinguished by the different colour of the *pygidium*, that of *smaragdina* being of a brilliant gold-colour."

Sp. 8. Eu. albo-pilosa, Siebold.

Long. lin. 10; lat. lin. 5.

E. glabra punctata suprà viridis subtùs roseo-cuprea et nitida albo-pilosa, femoribus tibiis tarsisque concoloribus. Caput viride antennis fusco-piceis: margines thoracis aurato-virides. Scutellum posticè cupreum. Elytra lineis longitudinalibus impressa, sutura lætè viridis, marginibus e medio elytrorum ad apicem fusco-membranaceis. Corpus infrà roseo-cupreum, albo-pilosum. Pygidium viride et tomentosum. Pedes cuprei.

Hab. in Japoniâ.

"This singular insect was sent to me by my friend De Haan of Leyden. It is remarkable for a dilated margin to the elytra, which appears to be membranous. The pubescence also of this species is singular."

Sp. 9. Eu. Martinii, Kirby's MSS.

Long. lin. 10; lat. lin. $5\frac{1}{2}$.

E. viridis, capite marginibus thoracis auratis, elytris lineis duabus longitudinalibus fortiter impressis. Pygidium viridi-cupreum. Corpus infrà roseo-cupreum, femoribus nitidis.

Hab. in Chinâ?

"This insect is evidently distinct from any species yet described; it is in a very mutilated state, no tibiæ and tarsi remaining. It is described from the Rev. William Kirby's collection, liberally given to the Entomological Society by that able naturalist."

Sp. 10. Eu. bicolor, Fab.

Long. lin. 9; lat. lin. 5.

* It has been reported that the above entomologist died of cholera: it appears however that he died of a bilious fever.

Caput viride, margine clypei rufescente antennis rubro-fuscis, glabra suprà viridis, subtùs testacea, pedibus apice aureis. Statura Euchloræ viridis at duplò minor: suprà tota viridis, glabra, obscura, immaculata: subtùs obscurior, testacea, æneo colore tincta: femora pallidiora tibiæ et tarsi aurei, (Fab). *pygidio obscurè viridi. Variat colore suprà viridi nitido, subtus aureo, et elytris interdum apice rufis.*

Hab. in Javâ.

"Fabricius described this insect from Sir Joseph Banks's cabinet, as a species from the Cape of Good Hope. Olivier copied the error, and figured one specimen, as obtained from the island of Bourbon. Both writers are in error as to locality, as the insect is peculiar to Java and the East Indian continent. Mr. Kirby has named the above species in his collection *E. Brightwellii*, which I regard only as a synonym of *E. bicolor*."

Sp. 11. Eu. PERPLEXA.

Long. lin. 8; lat. lin. $4\frac{1}{2}$.

E. glabra, suprà viridis, subtùs pallidè testacea tibiis tarsisque roseo-cupreis. Affinis præcedenti at minor. Caput viride margine antico subrufo, antennis testaceis. Corpus suprà viride, glabrum subtùs testaceum femoribus concoloribus, tibiis tarsisque roseo-cupreis, pygidio viridi, posticè flavescente.

Hab. in agro Nepalensi.

"This species I received from my late lamented friend General Hardwicke, and for a long time I regarded it as the true *bicolor* of Fabricius. Professor De Haan of Leyden has lately sent me *E. bicolor*, Fab., from the island of Java; I have therefore been obliged to name an insect which I regarded as previously described. The species are closely allied, and might have puzzled any individual. The concise descriptions of Fabricius necessarily lead to error. It is of the highest importance, then, to obtain authentic specimens from sources which may be relied on, and I feel satisfied, that with regard to insects, unless the few authentic cabinets known are carefully inspected, little reliance can be placed on specimens, without they are named from comparison."

Sp. 12. Eu. FEMORALIS.

Long. lin. 7; lat. lin. 4.

E. glabra suprà viridis, subtùs rufo-testacea, femoribus flavis. Affinis E. bicolori *at minor. Clypeus æneo-flavescens. Antennæ testaceæ. Thorax marginibus lateralibus concoloribus. Elytra suprà viridia, opalino, seu aureo colore tincta, apice bituberculato. Corpus subtùs testaceum. Pectus sericie flavo obsitum. Femora flava; tibiis, tarsis, chelisque roseo-cupreis.*

Hab. in Javâ.

"This species, by the kindness of Dr. Horsfield, I have described from the rich collection at the India House. It approaches in form the genus *Mimela*, Kirby. It is remarkable for its opaline play of colour, differing in that respect from all the species of my acquaintance."

Sp. 13. Eu. De Haani.

Long. lin. $11\frac{1}{2}$; lat. lin. 6.

E. viridis, suprà glaberrima nitida, subtùs æneo-viridis, nitido splendore conspicua. Caput viride, in medio aureo colore tinctum. Elytra glaberrima, sub lente vix subpunctata. Corpus infrà smaragdino colore ornatum, lateribus pectoris argenteis pilis obsitis, segmentis abdominis utrinque pilosis et punctatis. Femora nitida, tibiis fortiter variolosis, tarsis chelisque viridibus.

Hab. in Assam.

"I have named this species in honour of my friend Professor De Haan of Leyden, to whom European entomologists are greatly indebted for the additions made to many of their cabinets."

In Mus. Dom. Hope.

Sp. 14. Eu. dimidiata.

Long. lin. 11; Lat. lin. $6\frac{1}{2}$.

E. suprà tota viridis punctata, subtùs cyanea. Vide Gray's Zoological Miscellany, page 23, sp. 8, under *Euchlora dimidiata.*

Clypeus rotundatus, antennis, palpisque piceis. Thorax subtilissimè punctatus. Elytra viridia opalino colore tincta, glabra nitida, striato-punctata striis parùm distinctis. Corpus infrà cyaneum, violaceo colore mixtum. Pectus pilis flavescentibus obsitum. Pedes cyanei.

Hab. in agro Nepalensi.

"This species was originally described by me among other *Coleoptera* belonging to General Hardwicke's superb collection, which has passed since his death to the British Museum."

Sp. 15. Eu. sulcata.

Long. lin. 10; Lat. lin. 6.

E. suprà viridis, punctata, elytris lineis fortiter sulcatis; corpore infrà cyaneo.

Caput viride. Antennæ piceæ. Thorax utrinque in medio puncto impresso. Elytra binis lineis longitudinalibus fortiter impressa, seu sulcata, tertia fere humerali ante medium disci interrupta. Corpus subtùs cyaneum pedibus concoloribus. Pectus ferrugineis capillis sparsim obsitum; annulis abdominis, pedibusque punctatis.

Hab. in agro Nepalensi.

"I received this insect from my lamented friend, Gen. Hardwicke, and described it concisely some years back in Gray's Zoological Miscellany."

Sp. 16. Eu. subcærulea.

Long. lin. 10; Lat. lin. 5.

Totum corpus suprà et infrà subcyaneum. Antennæ fusco-piceæ. Caput subquadratum. Oculi nigri iride pallenti. Thorax punctatissimus. Elytra substriato-punctata apice tuberculato. Corpus infrà concolor. Pectus cum femoribus flavis capillis obsitum. Tarsi chelæque picei.

Hab. in Javâ.

"This singular species I am enabled to describe through the kindness of Dr. Horsfield, of the India House, who has liberally allowed

me to describe some of the nondescripts of the Company's collection."

Sp. 17. Eu. cuprea Sieboldii.

Long. lin. $11\frac{1}{2}$; Lat. lin. $5\frac{1}{2}$.

Caput clypeo subreflexo oculis nigris. Totum corpus suprà æreum subtùs roseo-cupreum, nitidum. Caput et thorax punctulata. Elytra foveâ impressa, obsoletè striata, punctulata lineis vix distinctis, tuberculis apice conspicuis. Pygidium deflexum pilisque aspersum. Corpus infrà roseo-cupreum nitidum capellis subflavis obsitum.

Hab. in Japoniâ.

"This insect I received from Professor De Haan, of Leyden, with Siebold's name of *cuprea* attached to it, which I have consequently adopted."

Sp. 18. Eu. Cantori.

Long. lin. 10; Lat. lin. $5\frac{1}{2}$.

Affinis præcedenti at minor. Caput anticè rotundatum antennis piceis, oculisque albis. Totum corpus suprà æreum, subtùs roseo-cupreum, coloreque virescenti tinctum. Caput et thorax subtilissimè punctulata. Elytra ærea, obsoletè striata crebrissimè punctulata. Corpus infrà roseo-cupreum femoribus anticis piceo-rubris, colore nitidis, tibiis tarsis chelisque cupreis.

"This species inhabits Assam; it was given to me by Dr. Cantor, in whose honour I have named it*."

Sp. 19. Eu. costata, De Haan.

Long. lin. $8\frac{1}{2}$; Lat. lin. $4\frac{1}{2}$.

E. ærea, thorace viridi, elytris costatis, corpore subtùs roseo cupreo.

Caput viridi-auratum antennis flavis oculisque albis. Thorax auratus viridique colore tinctus, longitudinali lineâ mediâ fortiter impressâ, crebrè punctulatus. Elytra roseo-cuprea, sutura elevata, lineisque quatuor in singulo elevatis, interstitiis punctulatis. Pygidium flavum, in medio roseo-cupreum, æneo subpunctatum. Corpus infrà concolor, marginibus thoracis utrinque flavis.

Hab. in Japoniâ.

"This species was sent to me by Professor De Haan, of Leyden; it verges from the typical Euchloræ, and appears intermediate between *Euchlora* and *Anomala*. There is a variety of the above species which has the margins of the thorax yellow, and the elytra testaceous, as well as its under side and feet yellow. It is probably only an immature specimen."

Sp. 20. Eu. aureola.

Long. lin. 8; Lat. lin. $4\frac{1}{2}$.

E. aurato-viridis glabra nitida: corpus subtùs subtestaceum femoribus flavis, tibiis tarsisque roseo-cupreis.

Caput viride, antennis testaceis, oculisque fuscis. Thorax et elytra subtilissimè punctulata virescentia auratoque splendore nitentia, marginibus posticis abdominis membranaceis. Corpus infrà testa-

* "The superb collection of drawings of *Reptilia*, made by Dr. Cantor whilst in India, is now deposited in the Radcliffe Library at Oxford: it is to be hoped the University will publish them."

ceum viridi æneo colore tinctum. Femora pallidiora tibiis tarsis chelisque roseo-cupreis. Pygidium obscurè viride et punctulatum.

Hab. in Indiâ Orientali.

"This beautiful species came from the Burmese territories; it appears to be unique."

Mus. Dom. Hope.

SPECIES DUBIÆ.

Sp. 21. EU. ÆREA, Perty.

Long. lin. 6; Lat. lin. $4\frac{3}{4}$.

E. brunneo-ænea, thorace subtilissimè punctulato elytrisque obsoletè striatis rugulosis.

Staturâ et magnitudine fere E. Frischii, *aliquantulum angustior. Tota brunnea æneo-micans. Caput et thorax subtilissimè punctulata. Scutellum disco impresso. Elytra irregulariter punctato-striata, rugulosa.*

Hab. in Javâ.

"I am in doubt if this insect can be considered as an *Euchlora*, being compared with *Anomala Frischii*; it may probably belong to that genus."

Sp. 22. EU. CICATRICOSA, Perty.

Long. 7‴; Lat. lin. $3\frac{1}{4}$.

E. ænea elytris castaneis, cicatricoso-punctatis. Caput cupreo-æneum, punctulatum. Thorax æneus densè punctulatus, striâ mediâ lævi impressâ. Scutellum viridi-æneum, punctulatum. Elytra castanea, marginulo extremo æneo, substriato-punctata, punctis confluentibus cicatricosis. Antennæ et trophi picei: subtùs cum pedibus ænea.

Hab. in Brasiliâ Australi, Prov. S. Pauli.

"I am totally unacquainted with the above insect; I have given the description from the Delectus Animalium Articulatorum, the entomology of which was written by Professor Perty. I feel no hesitation in referring the above species to another genus, as I do not believe a true *Euchlora* is ever found in the New World."

Sp. 23. EU. IRRORELLA, De Haan.

Long. lin. 7; Lat. lin. 4.

Punctuée, d'un brun-jaune clair, avec deux bandes longitudinales sur la tête, plusieurs autres mêlées sur le corselet, et une foule de petites taches transversales sur les élytres, noires; dessous du corps et pattes tachetés de noir. Java.

"From the above description it appears probable that *Irrorella* belongs to the genus *Euchlora*."

Sp. 24. EU.? STRIGATA, Castelneau.

Long. lin. $7\frac{1}{3}$; Lat. lin. 5.

D'un beau vert métallique, cuivreux, très brillant; bords latéraux du corselet d'un brun-jaunâtre métallique, avec un point vert au milieu; élytres avec des stries de points enfoncés, serrés, d'un brun-jaune clair, à reflets verts métalliques, avec plusieurs taches de cette couleur à la base, sur le milieu et à l'extremité; plaque anale jaunâtre, avec deux grandes taches d'un vert métallique sur les côtés.

Hab. Coromandel.

"This and the foregoing species are described from a French work now in the course of publication, by the Count de Castelneau."

Sp. 25. Eu. TRIVITTATA, Perty.

Long. lin. 5 ; Lat. lin. $2\frac{1}{4}$.

Subtùs testaceo-metallica, thorace viridi, margine striâque mediâ flavis, elytris testaceo-viridibus.

Statura omnino E. Frischii, *sed satis minor. Subtùs testacea, metallico-nitida, abdomine obscuriore. Caput æneum, subtilissimè punctulatum, clypeo reflexo. Thorax viridi-æneus, nitidus, margine laterali lato, vittâque mediâ flavis. Scutellum viridi-æneum, politum. Elytra longitudinaliter punctulata, testaceo-viridia. Antennæ brunneæ. Pedes metallico-testacei.*

Hab. in Javâ.

In Museo Dom. Perty.

Sp. 26. Eu. SPLENDENS. Schonherr.

Suprà glabra, viridi-orichalcea, nitidissima, thorace elytrorumque dorso subtiliter parce punctulatis, clypeo reflexo integerrimo.

Hab. in Chinâ.

In Museo Dom. Schonherr.

"It is probable that the above species is a *Mimela*. It is considered by Professor Perty to be an *Euchlora*. I have added Schonherr's short Latin description; for more ample details consult the Appendix to Schonherr's 'Synonymia Insectorum,' tom. i, part 3, page 110."

Besides the above twenty-six species of *Euchlora*, there are several other insects which have been comprehended under that name; for instance, *E. Dalmanni* of Schonherr, and *Chrysea* of Kollar, both of which are true *Mimelæ*, and allied to *M. fastuosa*, Fab.; and to these may be added various species of *Anomala*, recorded by Fabricius, De Jean, and others. The latter writer, in his last catalogue of 1837, mentions the names of *E. piligera, Japonica, chalcites*: as he, however, confounds *Mimela* with *Euchlora*, little reliance can be placed on his authority; they are, moreover, manuscript names, and no names ought to be adopted without published descriptions. I may add, that in the Dutch and other collections, about six others have fallen under my notice, making in all about thirty species; which number no doubt will be considerably increased the more we become acquainted with the Entomology of Oriental India.

ROYAL SOCIETY OF EDINBURGH.

Dec. 16.—Sir Thomas M. Brisbane, Bart. President, in the Chair.

The first paper of the evening was an account of experiments on the development and growth of Salmon, from the exclusion of the ovum to the age of two years. By Mr. Shaw, Drumlanrig. This communication formed the sequel of a former one read to the Society in December 1837, and continued the account of Mr. Shaw's expe-

riments during the intervening period. These valuable observations merit a more ample detail in our pages; meanwhile, however, we supply but a few hasty hints.

In some prefatory remarks, Mr. Shaw met an objection to the inferences from his published investigations, proceeding from respectable authority, and which resolved itself into considerations connected with the small size and artificiality of his experimental ponds. Mr. Shaw repelled this by stating that the ponds were made the channel of a copious stream; that the body of running water they contained was very considerable; that the supply of the insects, &c. which constituted the food of the young fish was abundant; and that these little creatures were in as good condition as their congeners in the neighbouring river.

Mr. Shaw's former observations led to the conclusion that the Parr is nothing else than the proper fry of the regular salmon. In his former paper, his experiment was carried thus far:—salmon engaged in the process of reproduction were caught in a net; a particular spot of the running stream was selected; from this spot a channel was formed which communicated with a small pool, fit to become a temporary spawning bed; into this selected spot the adult female salmon was introduced; by gentle pressure on her sides the roe was made to flow freely from her body; this swam down the artificial channel, and was deposited in the temporary bed. Precisely the process was repeated with the adult male, whose milt followed the same course, and settled in the same pool. Portions of the ova thus impregnated were removed into the experimental pond No. 1, which, as formerly explained, was quite separate from the river, and isolated from all accidental contamination: these were carefully watched and found to become genuine parr.

Strong additional circumstances have occurred within the last two years, which have greatly confirmed the inference which naturally flows from the above occurrence. One of these is connected with the subsequent history of the little fish alluded to as placed in pond No. 1. The brood has been watched, and Mr. S. has found that a very few at the close of the first year, and the whole before the end of the second, exchanged their well-known primary river livery of parr, for the silvery migratory coat of the young salmon. With this change in appearance, a great change in their habits occurred: the so-called parr in the pond were solitary and quiet, and if a neighbour invaded their habitual retreat, he was speedily expelled from the forbidden ground. On assuming the migratory dress, the habits of the whole family became much more active, they freely associated

together, and seemed restlessly disposed to escape from the limits of their confinement.

Another still more confirmatory circumstance is the following. It had long been noticed that the young parr of the second year was a not less constant attendant upon the adult female salmon when depositing her spawn than was her own mate, the milt flowing abundantly from his body, and for no other apparent purpose than the impregnation of the salmon's roe,—no female parr in similar circumstances ever being detected. This fact led Mr. Shaw to the inference, that however different the age of these two fish, yet the union could arise from nothing but identity of species; and he therefore subjected to precisely the same experiments as those above described, the roe of the adult female salmon, and the milt of the tiny parr. Portions of the spawn thus treated were put into the artificial pond No. 2. It proved to be impregnated; the produce during the first year having all the appearance of true parr: toward the end of the second year they assumed their silvery hue, and in fact the young fish in pond No. 2, underwent precisely the same changes as those of No. 1. Nor was this a hybrid race; for one of these of the second year was again made the subject of experiment with the adult female salmon, his milt being brought into contact with her roe, and this new progeny appeared identical with those already noticed. Specimens were exhibited to the Society of the parent adult salmon, male and female, and of some of the young of the ponds, killed when they had the regular markings of the parr, and afterwards when they had assumed the migratory dress of the young salmon.

In the conversation which followed, Professor Christison stated that, along with Mr. Shaw, he had personally examined and could confirm the accuracy of every one of the author's statements, both in the previous communication and the present. Mr. James Wilson likewise offered some remarks, insisting particularly upon the fact that the specimens before the Society demonstrated that these fish had, at one period of their existence, all the genuine characters of true parr, and indisputably were the parr of the naturalist and the angler, and were as certainly at a subsequent period transformed into the young salmon; and Professor Traill closed the discussion by avowing, that although from some anatomical details there had long existed in his mind difficulties in the way of arriving at the same conclusion with the author, yet he could not withstand the evidence he had just heard; that he was a convert to Mr. Shaw's opinion, and that he considered his communication as one of the

most important contributions that had of late years been made to Natural History, both in a scientific and commercial point of view.

BOTANICAL SOCIETY OF EDINBURGH.

This Society met on the evening of the 14th November, in the Royal Institution.—Dr. R. K. Greville in the Chair.

A letter from the Marquis of Normanby was read, stating that the Diploma of the Society had been laid before the Queen, and that the same had been very graciously received by Her Majesty. A letter was also read from Baron Werther, inclosing a communication from the King of Prussia, in which His Majesty was graciously pleased to acknowledge the receipt of the Society's Diploma, transmitted on the occasion of His Majesty's election as an honorary member.

An account of botanical excursions made from Edinburgh in the autumn of 1839, was read by Professor Graham.

Mr. Forbes read a notice of excursions in the neighbourhood of Trieste*, in which he gave a sketch of the Triestine territory, a country exceedingly rich in rare and curious plants. The excursions described were four:—1st, the immediate neighbourhood of the town; 2nd, the salt marshes of Zaule, and the neighbouring hills of Istria; 3rd, the Monte Spaccato and the wood of Lipizza, on the singular calcareous plain of the Karst; and 4th, Contobello on the sea coast.

Dr. Greville laid on the table a series of specimens of *Quercus robur*, exhibiting an extraordinary range of form. From the singular variation exhibited by these specimens in the shape and texture of the leaves, and in the length of the peduncles, Dr. Greville was of opinion that there is but one species of oak indigenous in Britain.

ROYAL PHYSICAL SOCIETY OF EDINBURGH.

Of the communications read this Session to the Physical Society, we notice the following:—Edward Forbes, Esq. exhibited drawings and diagrams of the various genera of *Ciliograde Medusæ* inhabiting the seas of Britain, with comments on their structure and habits. He gave an account of two new species of *Alcinæ*—a genus observed this summer, for the first time, in the northern hemisphere; also, of a new *Beroe*, discovered near the Isle of May; and concluded with some interesting observations on the structure and use of cilia, which naturalists have generally supposed are for motion, but which Mr. Forbes showed could not be so.

* See p. 307 of our present Number.

MISCELLANEOUS.

ON DIFFERENT TISSUES THE WORK OF INSECTS.

In the 'Compte Rendu' of the sitting of the Academy of the 19th August of this year, there is an extract from a letter of M. Levasseur, who forwarded a piece of a very fine tissue, a kind of cloth made by caterpillars, which was found in Moravia. This extract has occasioned two other communications on similar facts, the one observed by Count Saumeray, near Blois; the other by M. Delahaye, librarian to the city of Amiens.

Reaumur in the second volume of his Memoirs mentioned the caterpillars which make these tissues. They are the species of Moths which entomologists have included in the family *Yponomeutidæ*, a name meant to indicate the habits of these caterpillars, which live congregated together in vast numbers under a common tent, and which, when they remove, weave for themselves galleries or covered ways, in order to be sheltered and to escape the too strong light and heat of the sun, and at the same time thus preserve themselves from the moisture of the atmosphere and the voracity of birds. They advance successively upon the different branches of certain trees, which they entirely strip of their leaves, leaving upon their track the tapestries which defended them; it is under this protecting cloth that each of the caterpillars weaves itself a small cocoon about the size of a barleycorn. In some cases these cocoons are separated, isolated and vertically suspended from the cloth which forms the roof of their tent; and in others, all these caterpillars assemble when they are ready to undergo their metamorphosis, so that in this case their chrysalises and their envelopes form a circular mass of follicles pressed together.

The species which are most known by their ravages and by the large extent of their woven fabrics, which always depends on the magnitude of the number of individuals which have made them, are those which naturalists have designated under the names of the plants which they seem to prefer, and which, with the termination which Linnæus appropriated to all moths, have become their specific names, such as *Evonymella*, *Padella*, *Cognatella*, *Echiella*, *Sedella*, &c., according as they feed on the leaves of the spindle tree, the bird-cherry, the service-tree, the quince, the whitethorn, the orpine.

M. Duponchel has described and drawn nine species of this genus in vol. vii. of the 'Nocturnal Lepidoptera of France' in plates 285 and 286.

MM. Audouin, Edwards, and Dumeril, are clearly of opinion that the tissues sent by MM. Levasseur and de Saumeray, are the work of

the caterpillars of the *Yponomeutidæ*; but with regard to that sent by M. Delahaye, they agree with him in thinking that it is the product of a number of small spiders of the genus *Epiere* of Walckenaer; for this tissue is somewhat glutinous and very much finer than that of the caterpillars, the threads of the latter not being adhesive like those of the spiders.—*Compte Rendu*, Oct. 28, p. 533.

STRUCTURE OF THE OVULE IN THE *ERICEÆ*.

In many works on botany, for instance in Lindley's 'Nat. Syst. of Bot.,' we find in the description of the *Ericeæ* the words 'radicula *hilo opposita*'. This has evidently arisen from a confusion of *hilum* and *chalaza* by a restricted consideration of the mature seed, for all *Ericeæ* which I have hitherto examined present an anatropous ovule with simple (?) integument, whence it follows of itself that a *radicula hilo proxima* must exist in the ripe seed, as also Kunth has correctly stated to be the case in his 'Flor. Berol.' 1838.—Dr. Schleiden *in Wiegmann's Archiv*, Part IV. 1839.

COLOUR OF SALT MARSHES.

A communication read November 4th at the French Academy of Sciences from M. Joli, Professor of Natural History in the College of Montpellier, states that having carefully investigated the coloration of the salt marshes of the department of the Herault, he came to the following results :—

1. The *Artemia salina* contributes only in a subordinate manner, and it may almost be said not at all, to this colouring.

2. It is owing to infusorial animalcules.

3. The *Hæmatococcus salinus* are only dead infusoria become globular.

4. The *Protococcus salinus* are the globules which escape from their bodies after death.

Upon the subject of the letter M. Audouin remarked, that being in company with M. Dunal in June 1838, he observed in the environs of Montpellier, in several of the ditches of the salt marshes whose waters appeared to be free from colour, *Artemia salina* of a red colour only. The intestinal canal of these little crustacea exhibited this colour, and it was owing to the matter which it contained. M. Audouin had previously witnessed a similar phænomenon in the *Artemiæ* which M. Payen brought under the notice of the Academy in 1836. Having put a score of them into fresh water in which he had dissolved sea-salt, he had an opportunity for a month

of observing the matter contained in their intestinal canal, renewed without interruption and always turning red, without his ever having perceived in the water in which the crustacea lived any trace of coloured substance. Can the red colour which the ingested matter assumes in the intestinal canal of the little crustacea have instantly become developed by the act of digestion? This would be a new and very curious fact to verify. M. Audouin expressed a wish that M. Joli, who is favourably situated for varying his experiments, would apply himself to the solution of this interesting problem.—*Compte Rendu*, Nov. 4. p. 570.

FALCO ELEONORÆ.

M. Géné has read before the Academy of Sciences at Turin, the description of a new species of Falcon, discovered in Sardinia by M. de la Marmora, which has been confounded with the Common Hobby (*F. Subbuteo,*) but from which it differs in its much stronger form, in the colour of the cere, which is bluish; by the form of the cutting edges of the mandible, which are not notched between the base and the tooth; and by the colour of the eggs, which are reddish, spotted and blotched with brown.—*L'Institut*, 7th November.

DESCRIPTION OF A NEW SPECIES OF *MELIPHAGA*. BY M. DUBUS.

Meliphaga cincta, capite toto, collo, pectoreque nigris; fasciculo postoculari niveo; fascia pectorali et humeris flavis; parapteris, tetricibus mediis alarum prioribus et dorso nigris, plumis singulis flavo marginatis; posterioribus alarum tetricibus mediis albis, speculum formantibus; remigibus et rectricibus fusco-nigris, pogoniis externis flavo marginatis; abdomine pallide brunnescenti-cano.

Hab. New Zealand.

This species is remarkable from the length of the hairs which clothe the base of the bill and occiput at the origin of the nasal apertures. These hairs are somewhat stiff and extend over three-fourths of the length of the bill, which is slim, slightly curved and flat at its base. The wings are rounded; the first primary is very short; the second much shorter than the third, which is nearly equal to the fourth; the fifth is the longest of all. The tail is square, with feathers terminating in a point. The bill is black and the feet are brown. Entire length 7 inch., length of the bill from the suture to the apex 10 lin., of the tarsus 1 inch, of the middle digit 8 lin.—*Bulletin de l'Acad. Roy. de Bruxelles*, Avril 6, 1839.

FLANNEL FORMED OF INFUSORIA AND CONFERVÆ.

On the 17th of October last, Professor Ehrenberg laid before the Academy of Sciences of Berlin, a foot and a half square of natural wadding or flannel, consisting of *Infusoria* and *Confervæ*, which was found to the extent of several hundred square feet near Sabor in Silesia, after an inundation. We have already had occasion in preceding numbers of this Journal, to lay before our readers Professor Ehrenberg's notice respecting the animal and vegetable nature of the meteoric paper of 1686, (See Annals, vol. iii. pp. 185 and 320,) and also the communication of Ehrenberg and Kersten respecting the natural leather of Freiberg, to which the present substance is analogous, but far more surprising from its occurrence in such an immense mass. The flannel is chiefly formed of unramified branches of *Conferva rivularis* interwoven with fifteen species of Infusoria and some shells of the water-flea (*Daphnia*). Of the Infusoria eleven belong to the family of the *Baccillariæ*, and of these six to siliceous-loricated genera; several *Closterinæ*, &c. Predominating are the *Fragillaria, Navicula viridis*, and *Cryptomonas lenticularis?* All the forms are known species.—*Berichte der Akademie*, Oct. 17, 1839.

METEOROLOGICAL OBSERVATIONS FOR NOV., 1839.

Chiswick.—Nov. 1. Hazy: rain. 2. Rain. 3, 4. Foggy: rain. 5. Rain: fine. 6. Hazy: rain. 7. Rain. 8. Hazy: rain. 9. Fine: drizzly. 10. Hazy: rain. 11. Clear. 12, 13. Hazy: overcast. 14. Fine: rain. 15. Hazy. 16. Overcast: clear and fine at night. 17. Rain. 18. Heavy rain. 19. Fine: a large halo round the moon at night. 20. Fine: rain. 21. Stormy and wet. 22. Overcast: fine. 23. Clear. 24. Rain. 25. Cloudy: rain: almost a hurricane at night. 26. Clear. 27. Dense fog. 28. Hazy. 29. Heavy rain: 30. Overcast: heavy showers.

Boston.—Nov. 1. Stormy. 2. Cloudy: rain P.M. 3. Cloudy. 4, 5. Rain: rain early A.M. 6, 7. Cloudy. 8. Cloudy: rain P.M. 9. Cloudy. 10. Cloudy: rain A.M. and P.M. 11. Cloudy. 12, 13. Foggy. 14. Cloudy: rain P.M. 15. Cloudy: rain A.M. 16. Fine. 17. Fine: rain P.M. 18. Cloudy: rain early A.M. 19, 20. Fine. 21. Cloudy: rain early A.M.: rain P.M. 22. Cloudy. 23. Fine. 24. Rain. 25. Cloudy. 26. Cloudy: rain early A.M. 27. Fine: rain and snow P.M. 28. Cloudy. 29. Rain: rain early AM. 30. Stormy.

Applegarth Manse, Dumfries-shire.—Nov. 1. Storm of wind with slight showers. 2. Fair: weather moderated. 3. Fair: fine. 4. Rather moist. 5. Clear and cold. 6. Quiet day and cloudy. 7. The same: slight drizzle P.M. 8. Cloudy and moist. 9. The same: rain A.M. 10. Quiet day: moist atmosphere. 11. Calm day: still moist. 12. Showery all day. 13. Mild day throughout: no rain. 14. Drizzly and gloomy: a true Nov. day. 15. Rain all day: heavy P.M. 16. Showery throughout. 17. Fine day and fair. 18, 19. Drizzling day. 20. Very fine day: rain P.M. 21. The same: rain A.M. 22. Fine: one shower P.M. 23. Frosty morning: shower at noon. 24. Rain all day. 25. Showery A.M.: cleared up P.M. 26. Cold and frosty morning: shower snow. 27. The same: frost increasing: more snow. 28. Freezing all day: snow lying. 29. Storm of wind and rain: snow gone. 30. Rain nearly all day.

Sun 20 days. Rain 16 days. Snow 2 days. Frost 3 days.

Wind east 7 days. South-east and south-south-east 5 days. North 1 day. North-east and north-north-east 4 days. South-east 4 days. South-west and south-south-west 7 days. West 1 day. West-south-west 1 day.

Calm 12 days. Moderate 10 days. Brisk 4 days. Boisterous 2 days. Strong breeze 1 day. Stormy 1 day.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. ROBERTON; *by* Mr. THOMPSON *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. VEALL *at Boston, and by* Mr. DUNBAR *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1839. Nov.	Barometer.						Thermometer.									Wind.				Rain.				Dew point.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc.			Chiswick.		Boston. 8¾ a.m.	Dumfries-shire.			London: Roy. Soc. 9 a.m.	Chiswick 1 p.m.	Bost.	Dumfries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	8½ p.m.	Fahr. 9 a.m.	Self-register. Max.	Min.	Max.	Min.		Max.	Min.										
1.	29·714	29·730	29·677	29·50	29·88	29·75	41·2	41·7	39·8	49	42	41·5	47	40		E.	E.	E.	E.	·044	·14	...	...	39
2.	29·618	29·641	29·585	29·30	29·74	29·60	42·7	46·0	40·0	49	42	46	48	43		N.	E.	E.	E.	·044	·30	...	...	41
3.	29·612	29·629	29·518	29·26	29·58	29·57	48·2	49·0	42·7	52	48	47	50	43		NE.	E.	calm	E.	·302	·28	·38	...	41
4.	29·512	29·533	29·503	29·01	29·48	29·43	50·3	51·7	46·2	42	39	50	49	45½		W.	E.	E.	NE.	·263	·11	·34	...	46
5.	29·572	29·768	29·599	28·99	29·49	29·62	47·7	53·3	45·2	50	39	46	47	42		W.	SW.	NW.	N.	·088	·01	·37	...	45
6.	29·746	29·763	29·659	29·22	29·62	29·60	45·7	46·5	45·3	51	45	46	47	37		W.	W.	calm	ESE.	...	·09	...	0·16	46
7.	29·624	29·681	29·608	29·23	29·60	29·60	48·3	49·2	45·6	51	47	47	49	42		E.	E.	calm	E.	·116	·10	...	.	46
8.	29·806	29·699	29·623	29·16	29·49	29·41	49·8	52·0	48·5	55	46	50·5	50½	44½		SE.	S.	calm	E.	·033	·05	...	.	48
9.	29·506	29·507	29·446	29·	29·31	29·23	49·3	49·8	48·7	55	50	50	54	46		E.	SE.	E.	SE.	...	·01	·03	..	46
10.	29·378	29·381	28·978	28·85	29·17	29·10	52·4	54·6	48·7	56	50	50	52½	47½		E.	S.	calm	SE.	...	·55	...	..	49
11.	29·248	29·409	29·253	28·70	29·04	29·10	48·7	48·4	47·5	55	38	50	50	39		S.	SW.	calm	SW.	·463	...	·37	..	49
12.	29·418	29·579	29·411	29·	29·24	29·40	47·9	48·7	46·0	55	43	40	49½	38		SE.	E.	calm	SSW.	...	...	...	..	48
13.	29·748	29·944	29·739	29·25	29·63	29·74	48·7	49·4	47·4	51	43	47	49	41		NNW.	E.	calm	SW.	...	...	...	...	48
14.	29·988	29·984	29·939	29·45	29·70	29·70	47·4	48·0	47·4	55	49	47	48	40		SSE.	SE.	calm	SE.	...	·04	...	1·66	48
15.	29·980	29·978	29·824	29·50	29·70	29·52	52·5	52·8	47·4	56	46	51	54	45½		SE.	S.	calm	SE.	...	·04	·12	...	49
16.	29·886	29·993	29·872	29·34	29·51	29·55	52·8	53·0	51·5	56	48	50·5	56	49		SW.	S.	calm	SSW.	·036	...	·06	...	49
17.	30·044	30·029	29·998	29·43	29·73	29·79	51·8	52·4	50·6	57	51	48	51	43		S.	S.	calm	SSW.	...	·26	...	...	50
18.	29·992	30·280	29·983	29·44	29·73	29·74	54·8	55·3	50·6	37	43	53	52	44		S.	SW.	calm	SW.	·150	·36	·31	...	50
19.	29·992	29·985	29·948	29·39	29 60	29·65	49·4	50·3	47·9	55	38	46	50½	47		S.	SW.	calm	SW.	·305	·08	...	...	52
20.	30·064	30·150	29·990	29·56	29·83	29·63	44·7	49·7	44·6	35	29	42	46	37		W.	NW.	W.	E.	·063	·32	...	...	50
21.	29·472	29·700	29·400	29·13	29·42	29·72	45·2	48·2	42·4	48	36	43	46	39		E.	NE.	SE.	i.	·244	...	·14	0·32	45
22.	29·916	30·152	29·907	29·49	29·91	30·07	42·2	42·7	39·6	48	30	42	45	33		NW.	NE.	calm	SW.	...	...	·03	...	44
23.	30·208	30·272	30·150	29·80	30·00	29·99	38·2	40·5	35·7	46	30	33·5	43	28		NW.	NE.	calm	W.	...	·05	...	...	42
24.	30·156	30·151	29·826	29·65	29·71	29·48	40·3	40·7	37·0	54	40	42	51½	40½		SW.	NW.	calm	WSW.	...	·01	...	...	39
25.	29·680	29·675	29·223	28·97	29·23	29·20	50·7	51·2	40·3	56	36	52	49½	41½		SW.	SW.	calm	NE.	·044	·12	·13	...	38
26.	29·420	29·432	29·410	28·98	29·21	29·21	42·2	42·5	38·2	46	21	41	38	30		SSW.	W.	calm	NNE.	·169	...	·25	...	45
27.	29·436	29·538	29·420	29·01	29·29	29·38	34·7	44·6	34·6	36	32	31·5	36	30		S.	NE.	calm	NNE.	...	·88	...	...	45
28.	29·546	29·584	29·569	29·15	29·41	29·53	39·2	39·8	33·4	41	32	37·5	34	23		E.	SE.	calm	ENE.	1·460	·06	·28	0·82	37
29.	29·268	29·298	29·159	29·04	29·41	29·24	43·3	44·0	39·4	51	41	45	44	28½		E.	SE.	E.	ENE.	·133	·37	·12	...	39
30.	29·606	29·665	29·621	29·16	29·19	29·47	42·4	42·7	42·3	48	28	43	45½	43		S.	S.	NW.	ENE.	·250	·04	·30	...	38
																							...	
Mean.	29·705	29·771	29·627	29·23	29·528	29·533	46·4	48·0	43·8	50·53	40·06	45·3	47·7	39·6						Sum. 4·207	4·27	3·23	2·96	Mean. 44·7

ANNALS OF NATURAL HISTORY.

XLI.—*On the Structure of the Setæ of* Funaria hygrometrica. By Edwin Lankester, M.D.

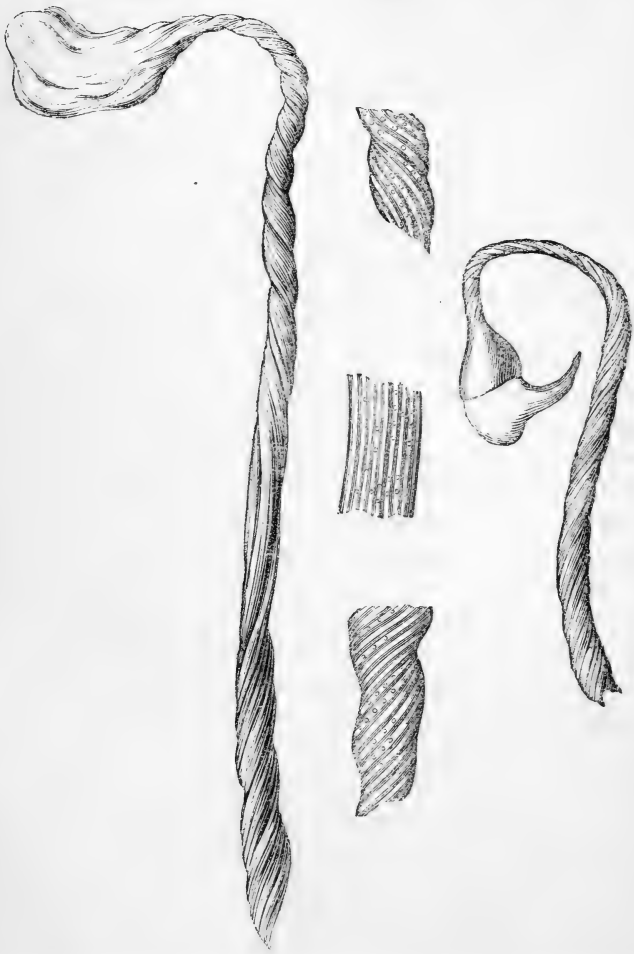
The hygrometrical properties of the *Funaria hygrometrica* have been long known to botanists, but as the movements produced in it by its sensibility to moisture are very singular, and as I am not aware of the subject having been dwelt upon by any botanist, I have been induced to prepare the following notice. This moss is one of the most common of the tribe, being found abundantly on dry banks and on the soil that barely covers the roots of full-grown trees; but it especially delights where the ashes of burnt wood cover the soil, and thus it may be frequently seen restoring the colour of the ground on those little black spots which indicate where the gipsy has pitched his tent, or in the woods or by the side of the hedges where wood has been burnt. The young thecæ make their appearance early in the spring, and in the months of April or May may be found accompanied by a number of dried setæ as well as others in all stages of their growth. If one of the dried setæ be taken in the hand, and its lower portion moistened with the finger, the capsule will be seen to turn from right to left, making two, three, or even more complete revolutions; if now the upper portion be moistened in like manner, the capsule will turn round more rapidly in a contrary direction. This phænomenon is exhibited whichever portion of the seta is first wetted. If both ends are moistened at the same time, a tremulous wavering is observed without any motion, but in a few seconds the capsule begins to move in one direction or the other. The direction in this instance is in some measure determined by the quantity of moisture applied, but the upper part seems most easily affected, and the motion arising from moistening it is much more rapid than from the lower portion. If the cap-

sule is held in the fingers the lower end presents the same motions. If both ends are held and the middle left free and moisture is applied, there is an evident effort made to curl the whole stem, but this is not effected.

On observing these curious phænomena, I was induced to submit the setæ to an examination by the microscope, and their structure explains, in some measure, the nature of the motions observed. The entire seta is composed of an elongated cellular tissue which is arranged in a spiral manner. (Figs. 1, 2.) The tissue is not however continued in the same direction through the whole length of the seta, but at about two-thirds of its length it begins to straighten, and at length in the upper part runs spirally in an opposite direction to that of the lower portion, the fibres forming a much more acute angle in the upper than the lower part of their course. This structure is most apparent in the dried setæ. In the young state the fibres are quite straight; as they increase in age they become more spiral; and in the green setæ, just before the capsule is ripened, the spiral fibres with their double direction are quite evident. (Fig. 3.) The immediate cause of the motions appears to be the absorption of moisture by the elongated spiral tissue. Whether the moisture admitted into the tissue straightens it by the force with which the fluid passes along the bent tubes, or whether it arises from the mere distension of the external tissue, may be a question. The capsule turns round in a direction contrary to that of the spiral of each end, and after the seta has been moistened and has turned round in both directions, its length is greater than it was previously. The more rapid movements of the capsule when the upper end is wetted is accounted for by the circumstance of the upper end of the seta being more twisted than the lower end. It does not however appear that the mere spiral form of the fibres is the cause of the motion, as this structure exists in the green setæ, which are entirely insusceptible of motion from the application of moisture. Nor is merely the dryness of the fibres the cause, as the green setæ, though thoroughly dried, do not exhibit any movement. But at the period of ripening the capsule is found bent towards the surface of the earth, and although I have not observed it turn-

ing round, I think it is probable that during this period a further twisting of the whole seta takes place, this direction being given by the already spiral form of the fibres, and constituting the true cause of the motions observed. This is rendered more probable by the fact that the spiral form of the tissue exists even after it has been macerated in water.

Fig. 1. Fig. 2. Fig. 3.



The subject of the spiral direction so frequently observed in the tissue of plants is one of great interest, and I believe little

has hitherto been done towards explaining the causes of the phænomenon. When the above observations were made I was not aware of any instance of a change in the direction of the spiral; but since then, Professor Morren of Liege has pointed out to me the occurrence of a double direction in the spire formed by the twisting of the tendrils of *Bryonia dioica*; and I have subsequently observed in the tendrils of a species of *Passiflora* a twisting not only in two opposite directions, but in alternately different directions for five or six times to the end of the spire.

XLII.—*On the Tentacular Classification of* Zoophytes. By John Hogg, Esq., M.A., F.R.S., F.L.S., &c.

In his able and beautiful work on the 'British Zoophytes,' Dr. George Johnston has reviewed most of the classifications that have as yet been brought forward for those extremely interesting animals, which have been generally called Polypes (*Polypi*) by most French naturalists, as well as for their *structures* or *habitations*, that have received, of late, the common appellation of Polyparies (*Polyparia*) from the same writers.

In the first place I may remark that three methods of classification present themselves to the investigator of this portion of natural history; first, that which is derived from the Polyparies or dwellings of the animals;—the second is taken from the natural organization and forms of the animals alone, that is to say, from the Polypes themselves; and the third, that method which may be founded on a combination of certain characters deduced both from the animals and likewise from their dwellings.

Now, as an example of the first method, in my sketch of the 'Natural History of the vicinity of Stockton-on-Tees,' which was written in the spring of 1825, but not published until the year 1827, I introduced an arrangement of many of our native Polyparies, grounded chiefly on the views of our own illustrious zoophytologist, the accurate Ellis; and in order that it may be clearly understood, I trust I may be pardoned for here subjoining an outline or synopsis of it.

POLYPARIA.

Section I. Simplicia.

Family I. *Corallinoidea.*

Order 1. Vesicifera.
Genus. Sertularia (of the old authors).
Order 2. Tubifera.
Genus. Tubularia.
Order 3. Cellifera.
Genera. Cellularia and Flustra.

Family II. *Coralloidea.*

Order 4. Porifera.
Genera. Cellepora and Millepora.
Order 5. Stellifera.
Genus. Madrepora.

Section II. Composita.

Order 6. Corticifera.
Genus. Corallina.

Family III. *Creatoidea.*

Order 7. Osculifera.
Genus. Alcyonium.
Order 8. Gelatinifera.
Genera. Spongia and Spongilla.

It will be obvious to every one acquainted with Ellis's work on Corallines, that the first three orders correspond with, and are nearly the same as, the primary divisions of that author; viz. 1. Vesiculated Corallines; 2. Tubular Corallines; and 3. Celliferous Corallines. And indeed, the above, if considered solely in relation to the British Polyparies or the inanimate and unorganized habitations of the animals—or as they have been aptly termed *Polypidoms* by Dr. G. Johnston—may perhaps prove to the student as useful an arrangement as any other which has hitherto appeared.

Next, in pursuance of the second method of classification, and which most zoologists will at this day coincide with me as being the only true foundation for the systematic arrangement of zoophytes, I here venture to classify them according to their tentacles (*Tentacula*); which organs, considering their structure, their great use, and functions, I have, for several years past, accounted as presenting the best and most natural

forms and characters for that purpose. Although Dr. Arthur Farre, by separating this class of animals into two divisions—the *Ciliobrachiate* and the *Nudibrachiate** Polypi—first publicly called the attention of the scientific world in his valuable paper in the 'Philosophical Transactions' for the year 1837, to the importance of the tentacula, which he has named *brachia*, with respect to a more correct classification of them.

Class ZOOPHYTA.

Sub-Class I. Binoscula.

Tribe I. *Tentaculis armatis.*

Order 1. Ciliotentacula.

Genera. Flustra, Cellularia, Cellepora, Plumatella, &c.

Sub-Class II. Unoscula.

Order 2. Noditentacula.

Genera. Hydra, Sertularia, &c.

Order 3. Pinnitentacula.

Genera. Gorgonia, Pennatula, Alcyonium, &c.

Order 4. Glanditentacula.

Genus. Coryne.

Tribe II. *Tentaculis nudatis.*

Order 5. Planitentacula.

Genus. Tubularia, &c.

Order 6. Tubitentacula.

Genera. Actinia, Madrepora, &c.

A few observations for the sake of briefly explaining this classification will be sufficient. The first subclass comprehends those zoophytes that are endowed with a higher and more perfect organization, and possess both a separate mouth and a distinct anus, which is signified in the appellation of *Binoscula*. As far as we are at present acquainted with these animals, they all have their tentacles armed, or fringed, with vibratory cilia.

The second subclass includes the *Unosculous* Zoophytes, or those which possess only a single hole or orifice, serving as well for their mouth as their anus: they are by far the most numerous. The order 2, *Noditentacula*, represents such ani-

* These terms are both somewhat objectionable, as being likely to be confounded with *Ciliobranchia* and *Nudibranchia*, names previously in use among the French writers.

mals as have their tentacula studded with minute projections, knots, or nodules, which are also said to be sometimes furnished with little bristles or setæ; for example, the *Hydræ* and the *Sertulariadæ*. The order 3 embraces the genera *Gorgonia, Pennatula,* and others, whose animals retain well-defined pinnæ along their tentacles. But in order 4, we have, I believe, as yet discovered only one genus, *Coryne*: here the tentacula are furnished at their tips with small glands.

The second tribe possess tentacles unarmed, and quite devoid of any projections or appendages whatsoever; in which, the order 5, *Planitentacula,* comprising the *Tubulariæ,* exhibit perfectly smooth and plain tentacula; and the order 6, *Tubitentacula**, as the *Actiniadæ,* have their tentacles hollow, perforated at both extremities, and much resembling tubes or siphons.

I must however beg distinctly to state, that I propose this classification merely as an attempted, but by no means as a perfect one; because there may, not improbably, occur other variations and forms in the tentacula of even our British zoophytes with which I am now unacquainted, and which may necessarily lead to some modification in one or more of the previous orders; but for those of the foreign genera, some additional orders will doubtless have to be hereafter instituted.

From this systematic arrangement the *Corallines* and *Sponges* are excluded; because in the absence of all marks of any animal organization, and of every distinct animal property as yet discoverable in them, I must agree with Doctors Link, Müller, and Johnston, and several other distinguished authors, in restoring them to the Vegetable kingdom.

* Some one may perhaps be inclined to find fault not only with the nomenclature here used, *Zoophyta Ciliotentacula, Tubitentacula,* &c., but also with founding a classification principally upon the variations and differences which are discernible in *one* set of organs; him I would remind of the Linnæan arrangement of Insects, where he will notice *Insecta Lepidoptera, Neuroptera,* and several more variations in the *ptera* or wings alone. And I need scarcely add, that this arrangement of the immortal Swede will, in all probability, long survive many of the modern systems, which are grounded on the more numerous characters afforded by *several* organs.

XLIII.—*Miscellanea Zoologica.* By George Johnston, M.D., Fellow of the Royal College of Surgeons of Edinburgh. With Plates X. and XI.

[Continued from p. 232.]

British Annelides.

In the month of June of the present year, Mr. Edward Forbes, accompanied by Mr. Goodsir, visited the islands of Orkney and Shetland, with a view to the investigation of the marine zoology of the northernmost district of Britain*. The Annelides which were collected during this tour, Mr. Forbes, with a liberality I am most anxious to acknowledge, entrusted to my examination; and I am now about to give the result of it to the public, in the hope that this may interest such naturalists as devote themselves to the study of our native Fauna.

Of the *Aphroditaceæ*, there were, in this collection, specimens of *Aphrodita aculeata* in a young state; of an Aphrodita nearly allied to the *A. hystrix* of Savigny; and of my *Sigalion Boa*. The new Aphrodita belongs to the section of the genus that is distinguished by having the scales or elytra naked or uncovered, and is the first British example of the kind. The specimen presented to me is 14 lines in length, and 4 in its greatest breadth: the body is elliptical, rather narrower posteriorly than in front, of a uniform greyish white colour, somewhat hairy and hispid on the sides from the various bristles which garnish the feet. (Plate X. fig. 1, 2.) The *scales* form a series on each side; they are roundish, smooth, thin and flexible, vesicular in the specimen, probably from immersion in the spirits; there are 15 pairs of them, but the 2 first pairs and the 3 caudal ones are so small as to be easily overlooked. The *head* (fig. 3.) is entirely concealed under the front scales. It is furnished with two proportionably large setaceous smooth *palpi*, approximated at the base, but I was not able to detect any antennæ. The *mouth* (fig. 4.) is inferior, large, circular, puckered, armed with a strong retractile *proboscis*, the orifice of which is encircled with a row of ten-

* See the Athenæum, No. 618, p. 647.

tacular papillæ (fig. 5.), but there is no appearance of jaws. There seemed to be 30 feet on each side, but, from the closeness and minuteness of the posterior pairs, the number was not very exactly to be counted: they are biramous, the branches widely apart. The *dorsal branch* (fig. 6.) of every alternate foot carries a scale or elytron, and is armed with spines, various bristles, and a sort of tangled hair, which partially covers the scale. It is shorter than the ventral branch, obtuse, somewhat sinuated, and contains two spines: the dorsal fascicle of bristles is long, reflected backwards, the bristles unequal in length, rather slender, sharp-pointed, smooth, and curved: the next fascicle consists of similar bristles but shorter; and there is a still lower fascicle of very slender ones. The *ventral branch* (fig. 7.) of the foot is strong, rugose, obtusely conoid, covered with minute transparent vesicles, and armed with five stout bristles, and with a spine of a yellowish colour. The bristles are not extruded from the extremity, but from a sort of projection beneath it: the two upper ones are filiform, obtuse, and of a dark brown colour; the two next are most protruded, smooth, paler, with a sharp slightly curved point; and the under one is short and acutely pointed like a dagger. This branch then is armed with no less than four different sorts of bristles, calculated both to cut and lacerate and to pierce any opposing body; but besides all these there is a soft filament (*inferior cirrus*, fig. 7, *a*.) that originates from a bulb near the base, and is long enough to reach considerably beyond the extremity of the foot. This is evidently a feeler, with which the worm acquaints itself with the nature of the opposing body,—whether an enemy that it needs to repulse by the extrusion of its formidable weapons, or a feebler animal that it can overcome and make its prey. To assist its tactic powers there are besides many *tentacular filaments* on each side, which originate from the dorsal branch of every alternate foot: these are smooth and subulate, and, except in their lesser size, resemble the palpi. The *spines* (fig. 8.) are of a light yellow colour, tapering from a broad base to an obtuse point, smooth and transparent: the *bristles* (fig. 9—12.) are brown with a bronzed lustre, various in size and strength, but all of them quite smooth. The surface of the *belly* has a

pearly hue, and the skin is thickly covered with minute vesicular granules (fig 13.), similar to those which are seen on certain parts of the foot. The use of these is probably to give the worm a firmer hold on the ground, and prevent any retrograde movement from the various evolutions of the feet. In examining this complicated structure it is scarcely possible to refrain from some expression of surprise. "In figuris animantium (etiam minutarum) quam solers subtilisque descriptio partium, quamque admirabilis fabrica membrorum! Omnia, enim, quæ quidem intus inclusa sunt, ita nata atque ita locata sunt, ut nihil eorum supervacaneum sit, nihil ad vitam detinendam non necessarium*."

From the remarks of Audouin and Milne-Edwards, it appears that *Aphrodita hystrix* is subject to considerable variety in size, shape, and in the length of its feet†; and of course it would be frivolous to found any distinction of species on these particulars. But an inspection of their figure shows *Aph. hystrix* to be a more hispid worm than the one now described; and there are other characters which seem to me sufficient to prove them distinct. I propose therefore to call the British species *Aph. borealis*; and the specific characters of the two species may be thus given :—

Aph. hystrix, *scales naked; proboscis with minute jaws; some bristles of the dorsal foot serrulate at their points; those of the ventral foot somewhat forked; inferior cirrus very short.*—Aud. and Milne-Edwards, Litt. de la France, ii. p. 70. pl. 1. fig. 1—9.

Aph. borealis, *scales naked; proboscis edentulous; all the bristles of the feet smooth; those of the ventral foot simple; inferior cirrus rather long.*

Plate X. Fig. 1. *Aph. borealis* of the natural size. 2. The same on the ventral aspect. 3. The anterior part magnified. 4. The same seen from below. 5. The proboscis laid open. 6. An outline of a foot. 7. The ventral branch of a foot more highly magnified. 8. Two spines. 9. Bristles of the superior fascicle. 10. A filiform bristle. 11. A bristle from the ventral branch. 12. Bristles from the inferior fascicle of the dorsal branch. 13. A portion of the skin of the belly magnified.

The *Nereides* in this collection were, 1. *Nereis margarita-*

* Cicero de Nat. Deor. lib. 2.

† Hist. Nat. du Litt. de la France, ii. p. 74.

cea, one of them measuring 7 inches in length, which exceeds considerably any specimen I had previously seen; 2. *Nephtys margaritacea*; 3. *Glycera alba* or Nereis alba of Muller; 4. Fragments of a *Psamathe*, probably the same as *P. fusca*, but greatly larger than my Berwickshire specimens; 5. *Phyllodoce lamelligera*; and Mr. Forbes mentioned to me that he had also met with 6. *Phyllodoce viridis*.

In other families there were specimens of *Cirrhatulus medusa* and of *Amphitrite alveolata*, and several of a marine *Lumbricus*, but so much injured and broken that I did not attempt to ascertain the species. Of the family *Lumbricidæ* there was another member, which first of all attracted my attention by the remarkable development of the anterior bristles that form, by their convergence, a large brush apparently terminating the head. This worm probably belongs to the genus Trophonia of Audouin and Milne-Edwards, but I know this genus only by the incidental and slight notice taken of it in their work on the Annelides errantes; and have seen no characters either of it or of its species.

Trophonia? Goodsirii.

Plate XI. fig. 1—10.

Desc. *Worm* from 3 to 4 inches long, as thick as a swan's quill, distinctly annulated, tapering insensibly backwards to an obtuse point, subcylindrical, but so flaccid after maceration in spirits that the sides almost fall together, of a uniform earthy brown colour or blueish underneath, rough with numerous granulations which are somewhat larger on the dorsal than on the plane ventral surface. The cuticle or outer skin is easily separable from the body, which then appears of a dull leaden blue colour, more or less iridescent. Front armed with a brush of long hair-like bristles. *Segments* between 50 and 60, homologous, narrower than broad, granulous, somewhat puckered and thickened on the sides, on which there are two distant bundles of non-retractile bristles, but no papillous feet. *First segment* very small, and as it were drawn within the second: *mouth* subterminal, circular, edentulous, and unfurnished with organs of any kind. The *second* segment is rather less than the third, and from its anterior edge there

originate, on each side, two brushes of long bristles that project forwards; similar but shorter brushes are borne by the *third* segment, and still shorter by the *fourth*, but still they are long enough to mix with those of the second to form that hairy brush which arms the front, and so remarkably characterizes the worm. The bristles of the other segments are not longer than the breadth of the body, and are either laid over the back or projected from the sides. These *long bristles* (fig. 6, 7.) all belong to the dorsal brush, which consists of seven or eight, unequal in length, setaceous, smooth, slender and flexible, and closely annulated like the antenna of a lobster or Gammarus; with them are intermixed a few much shorter acicular bristles that are not annulated (fig. 8.): the *bristles* of the *ventral* brush are short and also of two kinds,—one kind setaceous and slender (fig. 10.),—the other stout, straight until near the extremity, where it is bent into a sharp cutting point: there are four or five of them in each brush (fig. 9.). With a good magnifier we also discover that every one of the *granules* of the skin is tipt with a very short rather blunt spine. *Anus* terminal and simple.

From its softness and flaccidity, as well as from its structure, we may safely conclude that this worm burrows in the soil after the manner of the Arenicola, which it in fact resembles considerably. The brush of hairs on the anterior extremity will be in general protruded from the furrow, and is probably subservient to the capture of the prey. The hairs are, in all our specimens, soiled and infested with sordes and conferva-like filaments (fig. 6.), which, though they could not be removed with a brush, are undoubtedly extraneous; for the hairs are not equally and alike so disfigured; for while some were almost clean, others were greatly loaded with this foulness, and none of it was found on the bristles of the lower segments.

PLATE XI. Fig. 1. *Trophonia Goodsirii*, natural size. 2. The anterior segments from above; and 3. The same from below, magnified. 4. Three segments laid open by an incision through the ventral surface and spread out. 5. A portion of the skin highly magnified. 6. One of the front bristles. 7. A bristle from the dorsal brush of a segment from near the middle of the body. 8. Another bristle from the same. 9. A bristle of the ventral brush; and 10. One of the small ones that are associated with them.

I have dedicated the species to Mr. Forbes's companion, who is already well known to comparative anatomists by his ingenious researches into the development and structure of the teeth; and who promises to recommend himself to the gratitude of naturalists by an investigation of our native radiated animals.

The worm I am next to notice possesses a considerable degree of interest, for some of the peculiar characters of three families meet apparently in it, and it connects them more closely than any genus hitherto discovered. The head reminds us of the Echiurus,—a genus in the family *Lumbricidæ*; the position of the mouth is much the same as in Cirrhatulus, and there is some analogy between them in the structure of the feet, while the anus resembles that of Nerinne, which, as well as Cirrhatulus, belongs to the *Ariciadæ*; but then the form of the body and its annular structure is that of Arenicola; and notwithstanding some obvious discrepancies, this worm ought perhaps to be referred to the family of which Arenicola is the type, though there is no genus in it with which the species before us can be associated. I therefore propose to create a new genus in the family for its reception, to which the name *Travisia* may be given, in commemoration of Mr. Travis, an eminent surgeon in Scarborough, and one of those "learned and ingenious friends" to whose correspondence Mr. Pennant was much indebted in preparing his British Zoology.

Family Arenicolidæ.

1. *Arenicola.* Mouth terminal; branchiæ arbuscular.
2. *Travisia.* Mouth ventral; branchiæ a simple filament.

Travisia Forbesii.

Plate XI. Fig. 11—18.

In figure this annelide is something between that of the earth-worm and the leech: it is elliptical anteriorly, narrower and subcylindrical in the posterior half, of a uniform dull olive-green colour, smooth to the naked eye, distinctly annular. Both sides are so alike that it is not easy to say at first which is the dorsal and which the ventral; but the anterior segments are so far unlike the posterior ones, that, to render

the description more distinct, it may be advisable to consider it as divided into an anterior and a caudal half.

The anterior half consists of about 14 segments, increasing gradually in diameter till near the middle, when they begin again to decrease a little. The first or cephalic segment is very small, pellucid, triangular, sharp-pointed like a snout, and somewhat concave underneath: it is destitute of every kind of appendage. The second segment is rather broad, and like the succeeding, excepting that it is single and without any armature. The other segments consist each of two, or sometimes three narrow rings; and each of them is furnished, on each side, with a dorsal brush of bristles, a long filament, a circular pore, and a ventral brush of bristles, similar to the dorsal, but smaller. On the secondary or intermediate rings there are no bristles, but one, two, or even three pores. The mouth is perforated between the third and fourth segments on the ventral surface; it is circular, with thickened puckered lips, edentulous, and without a proboscis.

The anterior segments pass by a sort of gradation into the caudal ones, though it is not difficult to mark the distinction. They are less in diameter, but broader in the opposite direction, and thickened on the sides, where there are two short obtuse fleshy papillæ. From the base, and below the dorsal papilla, the soft filament or cirrus originates, which does not exceed half the length of the anterior filaments. Close to the cirrus there is a brush of bristles, but I could not discover a second brush. There are thirteen of these caudal segments with a very narrow one between each: the last but one is small and unarmed, and the anal one is terminated with six soft obtuse papillæ forming a sort of cupped circle round the vent.

The skin of the worm, under a magnifier, appears to be granulated on the dorsal, and punctured on the ventral surface. The bristles are slender, unequal, slightly curved, acicular, smooth, and unjointed: they vary in number in the segments, but scarcely exceed twenty in any single fascicle, and are never fewer than four or five. Those of the dorsal brush are longer than those of the ventral, but do not otherwise differ; and both brushes come from the skin, and not from a papil-

lous foot. There are no spines. The cirrus or branchial filament is soft and filiform.

It is necessary to observe that this description is drawn up from the examination of a single specimen, which had grown soft by maceration in the spirits, and was somewhat injured by the carriage. Thus the filaments or cirri of several segments were broken away; and I ought to mention that there were no traces of any on the third, fourth, and fifth segments. The specimen was rather more than an inch in length, but, from its structure, the worm is obviously capable of being elongated to a considerable extent.

Plate XI. Fig. 11. *Travisia Forbesii*, of the natural size. 12. The same, magnified. 13. The cephalic segments. 14. A side view of a segment from near the middle. 15. A view of a caudal segment on the dorsal aspect. 16. The same on the ventral aspect. 17. The anal segments. 18. A few bristles.

XLIV.—*Note on the Occurrence at various times of the Bottle-nosed Whale* (Hyperoodon Butzkopf, *Lacep.*) *on the coast of Ireland; and on its nearly simultaneous appearance on different parts of the British coast in the autumn of* 1839. By William Thompson, Esq., Vice-President of the Natural History Society of Belfast.

In Bell's 'British Quadrupeds,' &c. published in 1837, the latest work treating of our Cetacea, it is observed, with reference to the two individuals of this species recorded by Dale and Hunter, that "these are the documents upon which alone we have to depend as to the occurrence of the *Hyperoodon* on the British shores." The works of Jenyns* and Jardine† do not contain any reference to other British specimens. More recently Mr. Thompson of Hull has, in the Magazine of Natural History for 1838 (p. 221), described a whale of this species which was stranded near that town in 1837, and whose skeleton is preserved in the Hull Literary and Philosophical Society.

The first particular record known to me of the occurrence

* Manual of British Vertebrate Animals, 1835.
† Naturalist's Library, vol. on Whales, 1837.

of the *Hyperoodon* in Ireland, is contained in the Dublin Philosophical Journal for March 1825, where Dr. Jacob (now Professor of Anatomy and Physiology in the Royal College of Surgeons in Ireland) very fully and ably describes a specimen dissected by him; and at the same time, after a due examination of its anatomy, treats of the place the genus should occupy among the Cetacea*. The individual which formed the subject of the essay "was stranded at Killiney, a few miles from Dublin, in the month of September [1824?]." Its perfect skeleton is preserved in the museum of the College of Surgeons in Dublin. In Mr. Templeton's Catalogue of Irish Vertebrate Animals†, the *Hyperoodon* is mentioned as "occasionally" met with.

From Dr. Jacob I learned in November last, that within twenty-five years he has known four bottle-nosed whales to be stranded within a short distance of Dublin—of these, all, except the one particularly described by him, were taken at Howth, near the entrance of the bay: on one occasion, two of them occurred at the same time.

Early in the month of August 1836, two *Hyperoodons* were stranded at Dunany Point, near Dundalk. A friend who saw the specimens when quite recent, described them to me as bottle-nosed whales, and on my sending to him for the purpose of identification outlines of the individuals figured by Dale and Hunter, he stated that the form of Dale's figure represented them well. The larger of these animals was 17 feet in length and $14\frac{1}{2}$ in girth; the other was somewhat smaller. Having been stranded on the property of his relative, Lady Bellingham, their heads were fortunately reserved for my friend Dr. Bellingham of Dublin. I had lately an opportunity of examining both of these specimens, one of which is in the Museum of the School of Anatomy, Peter-street; the other in that of the Royal Dublin Society. In the latter collection is the head of a second *Hyperoodon*, which in all probability was

* The name of *Hyperoodon* is objected to by Dr. Jacob as expressing what the animal does not possess—teeth in the palate, this part having been as smooth as the rest of the mouth in the specimen he dissected. *Ceto-diodon* was proposed by Dr. Jacob as a generic name, and *Hunteri* was applied by him to the species. This elaborate memoir though published in 1825 is unnoticed in any of the above-cited works.

† Mag. Nat. Hist. vol. i. New Series.

obtained on the Irish coast, but I could not ascertain the locality whence it had been received: it is similar in size to the smaller of the Dundalk specimens, and a very few inches less than the larger, the measurements of which are as follow:

	ft.	in.
Length from occiput to end of snout	4	6
Breadth of cranium.....	2	4
Height of ditto.....	2	0

The crania of the four *Hyperoodons* preserved in Dublin are, I conceive, referrible to one species, and are similar to those represented in Cuvier's 'Ossemens Fossiles,' pl. 225. ed. 1834. F. Cuvier's 'Histoire Nat. des Cétacés,' pl. 9; and Bell's 'Brit. Quad.' &c. p. 496. From what has been already published on the subject any further remarks on these specimens seem to be unnecessary. As supplementary to what appears in Mr. Bell's work, it may be added with reference to a specific character about which there has been some obscurity, that in the individuals particularly described by Dr. Jacob and Mr. Thompson of Hull, two teeth were present in the lower jaw; but in neither instance were they apparent in the recent animal, but were detected only when the gum was cut into in the preparation of the skeleton.

Having heard on the 20th September last, that a whale had been captured at Ballyholme Bay, near Bangor (county Down), on the 16th, I immediately set out for the place accompanied by a scientific friend, Mr. Hyndman. A small portion only of the animal then remained on the beach, the head, tail, and entire skin with the blubber having been removed. This whale was seen on the evening of the 16th Sept. in shallow water not far from the shore, and a boat with the small complement of three "hands" gave chase. Fire-arms were discharged at it, but these apparently not having any effect, its assailants bound a rope to a pick-axe and drove this rude but successful substitute for a harpoon into the animal, and about the same time managed to throw a loop of rope round its body above the tail, and thus with some little difficulty brought it captive to the shore. Its length was stated to have been 24 feet, the breadth of tail 6, the girth at the thickest part perhaps from 18 to 20 feet; the weight was estimated at about 5 tons.

The entire upper surface was of a blackish-grey colour, the under parts somewhat paler. The stomach is said to have contained the remains of shells, and what was described to be like the "feet of fowls"—these I have little doubt were portions of the arms or feet of cuttle-fish* (*Sepiadæ*). Although it was late in the evening when this whale was brought ashore, its captors at once commenced taking off the blubber, so that unfortunately no person who would have felt a scientific interest in the spectacle, had the opportunity of seeing the animal in a perfect state. During the progress of cutting up on the day after its death, the body was still warm and smoking.

To the intelligent farmer whose property this whale became, I showed all the figures of *Cetaceæ* in Mr. Bell's work, when he at once, from the narrow elongated snout, and head arising abruptly from it, identified the specimen with the *Hyperoodon*, objecting only to the snout not being represented so long comparatively as in the real animal. To another respectable farmer who had got its head, I exhibited these figures, and he also immediately singled out the *Hyperoodon*, considering the figure of Dale's specimen as more characteristic of the general form of the animal than that of Hunter's; the tail of this latter however being the better liked. The gape or opening of the mouth was remarked to be thus ⌣ or "like the letter *f*" —teeth none—the snout shaped like a bottle: it was similarly described by our first informant. In a newspaper paragraph

* Dr. Jacob says of the *Hyperoodon* he dissected, that the oval cavity into which the œsophagus opened "contained a large quantity of the beaks of cuttle-fishes, perhaps two quarts." Again, in the Catalogue of the Museum of the Royal College of Surgeons in Ireland, p. 161, there appears—"Cuttle-fish bills found in the stomach of a *Balæna rostrata*." Apprehending that this rather referred to the *Hyperoodon* than the *Balæna*, I wrote to Dr. Jacob respecting it, and learned in reply that the "cuttle-bills" so mentioned were those taken from the former species by him—this is noticed merely to prevent error. In the specimen of *Balæna rostrata* dissected by Dr. Jacob, the remains of herrings only were detected (Dublin Phil. Journ. November 1825, p. 343). The Rev. Dr. Barclay remarks of the Round-headed Porpoise (*Delphinus melas*) that "its favourite food seems to be cuttle-fish, of which great quantities are generally found in the stomach."—Bell's Brit. Quad. 485. In this species my friend R. Ball, Esq. has likewise observed the remains of these cephalopods. In Mr. Hyndman's possession are the beaks of cuttle-fish taken from the stomach of a whale (but of what species I have not learned) captured on the coast of Waterford some years ago. The consumption of these animals by at least two species of our Cetaceæ would thus seem to be considerable.

respecting this whale, it was stated that "the blubber produced 140 gallons of oil, which were computed to be worth above 20*l.* sterling."

In connexion with the occurrence of this *Hyperoodon* on the coast of Down, a novel and highly interesting fact is to be recorded—that there evidently was a migration or simultaneous movement of these *Cetaceæ* towards the British shores during the last autumn, several individuals having within a very weeks been obtained in England and Scotland, as well as Ireland; but all upon a limited range of coast bounding the Irish sea and its vicinity. The first capture known to me is that of the individual already recorded. In the 'Northern Whig' published at Belfast on the 26th Sept. it was stated, that—"A bottle-nosed whale, 20 feet long, was last week left on the beach at Flimby near Cockermouth." In the 'Belfast News-letter' of Oct. 1, appeared the following notice—"A whale captured near Liverpool.—On Tuesday last, a whale was left by the receding tide on East Hoyle bank and speedily captured by the fishermen. Its length is 24 feet; its girth round the centre of the body 13 feet*." Although this is not called the bottle-nosed species, it seems to me a fair presumption so to consider the specimen, as its dimensions accord with those of the other individuals taken about the same time, and of which one was obtained on the coast of the adjacent county of Cumberland. In the 'Belfast Commercial Chronicle' of Oct. 21, was this paragraph, copied from the Stranraer Advertiser:—

"*Capture of Whales in Lochryan.*—On Tuesday morning last, 15th of October†, a very unusual appearance presented itself in Kirkcolm. Two monsters of the deep, of the bottle-

* In connexion with this paragraph it was observed—"On Friday two young whales were got in the Clyde, the one on the beach at Roseneath, the other above Dumbarton or West Ferry." Unfortunately no particulars are given that would lead to a knowledge of the species. About the same time it was mentioned in the newspapers, that a whale proceeding southwards had passed close to one of the packets plying between Holyhead and Dublin.

† About four weeks previous to this time, a friend informed me that upon two successive days a whale (which he saw) appeared off Ballantrae (Ayrshire), some miles north of Lochryan; on the second day it was about two miles to the south of where it was seen on the preceding, and was still advancing southwards.

nosed description of whale, had come round the Scaur and embayed themselves; the receding tide swept its treacherous waters from under them, and finding themselves grounded, their mighty exertions were truly terrific, yet unavailing for their extrication. Mr. Robertson of Clendry was the first who took notice of the errant strangers, and arming himself and retainers with pitchforks and knives, repaired to the scene of action, and commenced the terrible onslaught. The dying agonies of the mighty monsters were truly tremendous. Desperate from the repeated thrusts of the opponents, and from their inextricable position, their powerful tails were wrought with astonishing effect. The water (of which there was yet a quantity around them) was lashed into foam and agitation, the crested waves stretching to an incredible distance, while high in air the water ascended in one unbroken sheet. From their blow-holes the crimsoned water was sent in a jet, imposingly grand, to a great height. After similar and protracted writhings, with a kind of snort or roar, their fury subsided, and in a short time all was still. They were towed to the shore amidst the gaze of numerous and wonder-stricken spectators, a large number of whom arrived hourly to inspect them. A number of men was then employed to cut off the blubber, of which there were thirteen barrels, loading five carts. The dimensions of the largest fish was 24 feet 4 inches in length, and 16 feet at the thickest part in circumference; the smaller one about 16 feet long, and thick in proportion. The tail of the largest was $6\frac{1}{2}$ feet in breadth."

It is very probable that other paragraphs to the same effect may have appeared in the newspapers, especially as those here introduced I observed merely on a casual perusal of some of those published in a provincial town. It is rarely that such notices are of any service to the naturalist, but the very peculiar form of the head of the animal under consideration (whence it has received the name of *Bottle-nosed* Whale) taken in connexion with the dimensions stated, leaves no doubt in any instance here quoted that the *Hyperoodon* is alluded to. Were the size of the individual described about *one half* of what is reported, then would there be a doubt whether the captives might not have been the Bottle-nosed Dolphin

(*Delphinus Tursio*, Fabr.), a much smaller species, having the snout prolonged somewhat like that of the *Hyperoodon*, and which is occasionally taken on the British coast.

The three *Hyperoodons* recorded to have occurred on the English shores appeared singly. The two particularly described by M. Baussard* were taken in company at Honfleur, and considered a mother and her young—the one was 23, the other 12 feet in length. Of the seven individuals captured on the Irish coast, they on two occasions appeared in pairs; and in one of the three instances here copied from newspapers, two of these whales were secured at the same time. It would be interesting to know whether those which have so appeared were male and female—at all events it would seem that the species is not gregarious.

So very little of the history of the *Hyperoodon* is known, that it is hoped even the few particulars here recorded may prove an acceptable contribution.

XLV.—*New* Orchidaceæ. By Professor Lindley.

Habenaria (A. § 1. xx. *b.*) *setifera*; foliis ensiformibus carinatis erectis apice incurvis setiferis, caule foliato 1—2-floro, bracteis inflatis ovario longipedunculato brevioribus, petalis bipartitis: laciniâ anteriore lineari posterioris longitudine, labelli tripartiti laciniis linearibus carnosis intermediâ longiore, calcare pendulo clavato pedunculo subæquali.—*Mexico*, Ad Choapam, inter gramina, Junio. Hartweg.

A plant allied to *H. macroceras*, of which it has much the habit.

Platanthera (§ 1. *a.*) *limosa*; caule folioso, foliis ensiformibus erectis, racemo laxo multifloro, bracteis striatis acutis floribus brevioribus, petalis ovatis sepalisque obtusis, labello lineari convexo obtuso labello filiformi pendulo pluries breviore.—*Mexico*, In paludibus, Anganguco, juxta Asoleadero, Sept. Hartweg.

Platanthera (§ 1. *a.*) *volcanica*; caule folioso, foliis ensi-

* F. Cuv. Hist. de Cet. pp. 242, 249.

formibus erectis trinerviis, spicâ elongatâ cylindraceâ, bracteis herbaceis acuminatissimis floribus longioribus, petalis ovatis sepalisque obtusis, labello lanceolato obtuso medio subcalloso calcare filiformi triplò breviore, antherâ subhorizontali, rostello plano 3-lobo.—*Mexico*: Real del Monte, in agro volcanico prope Guajolote, Oct. Hartweg.

The stem of this plant is from 1 to 3 feet high, or even more. Its nearest affinity is with *P. leucostachya*. The sepals are herbaceous; the petals and lip purple.

Epidendrum *falcatum*; caule ramoso carnoso membranis laxis imbricatis vaginato, foliis solitariis falcatis canaliculatis acutis, fasciculis florum sessilibus: pedunculis elongatis, sepalis petalisque lineari-lanceolatis patentissimis, labelli tripartiti basi bituberculati laciniis lateralibus oblongis dimidiatis integris intermediâ lineari-lanceolatâ paulò longiore.—*Mexico*; Hacienda de S^{a} Ana prope Oaxacam, in rupibus et inter lapides, Maio. Hartweg.

A very fine species with large white flowers. Allied to *E. nocturnum*, but with a totally different habit.

Epidendrum (Amphiglottis) *cochlidium*; foliis distichis ovato-oblongis obtusis emarginatisque coriaceis, labelli laciniis laceris subæqualibus callo carnoso excavato trilobo æquali parùm majoribus.—In *Peruvia* Mathews (in hb. Hooker, 1868.). Flores verisimiliter flavi.

Epidendrum (Amphiglottis) *ellipticum* (Graham) *β. flavum*. Adest varietas "floribus pulchrè flavis" insignis, caule tripedali, *in herb. Mart.* in *Brasiliæ* campis editis Itacolumi, prov. Min. Ger. lecta; notâ nullâ a varietate roseâ quantùm video distinguenda.

Epidendrum (Amphiglottis) *Martianum*; foliis distichis angustis lanceolatis, caule apice ramoso squamis concavis obtusiusculis vaginato, racemis corymbosis, petalis linearibus obovatis obtusis sepalis multo angustioribus, labello cordato subrepando basi bituberculato axi elevatâ.—In *Brasiliæ* campestribus ad Villam Ricam, prov. Min. Ger. Martius. Caulis $1\frac{1}{2}$—2-pedalis. Flores pallide vi-

rides, extùs margine et dorso punctis rubris. Labellum convexum. *E. fuscato* affine.

Epidendrum (Amphiglottis) *setiferum*; foliis distichis lanceolatis acutis, caule simplici squamis lineari-lanceolatis acuminatis sub floribus foliaceis vaginato, racemo cernuo, bracteis longissimis setaceis, petalis linearibus obovatis obtusis sepalis angustioribus, labello cordato integerrimo reticulato acuto basi tritubereulato.—In *Brasilia*, Gomes; prov. Min. Ger. Martius.

Ornithocephalus *Myrticola*; racemo pendulo hispido, sepalis lateralibus petalisque rotundatis integerrimis reflexis ciliatis, labello cordato-lanceolato acuminato canaliculato callis baseos marginantibus distinctis integerrimis.—Citri odorem spirat. In myrtaceis *Brasiliæ*, prope Bom Jesus de Bananal, Maio, Descourtilz.

A very curious plant with short pendulous racemes of small white flowers. It has quite the habit of *Oncidium iridifolium*.

Ornithocephalus *grandiflorus*; racemo erecto stricto glabro, bracteis oblongis obtusis herbaceis, petalis labelloque cymbiformi saccato denticulatis: basi cristâ bilobâ transversâ carnosâ erosâ aucto, dinandrio marginato denticulato.—In *Brasiliæ* montibus Organ dictis, Gardner, 633.

A very fine species with large yellow flowers. The leaves are oblong, obtuse, obscurely veined, and apparently much thinner than is usual in this genus.

Ornithocephalus *apiculatus*; foliis racemo erecto denso multifloro multò brevioribus, petalis oblongis dentatis, labello ovato concavo basi sagittato integerrimo apiculo membranaceo acuto.—In *Peruvia*, Pavon.

A very small species, only 2 or 3 inches high, with flowers apparently deep yellow.

Ornithocephalus *ciliatus*; sepalis petalisque latioribus membranaceis rotundatis reflexis ciliato-fimbriatis, labello carnoso cordato canaliculato acuminato apice dilatato obtuso membranaceo, rachi hispidâ.—In *Demerara*, Loddiges.

This species is nearly related to *O. Myrticola*, from which it

differs in its fringed petals, and in the dilated rounded membranous apex of its fleshy lip.

Ornithocephalus *inflexus*; sepalis acutissimis erectis carinatis, petalis rotundatis serrulatis, labello oblongo acuto concavo apice inflexo: margine baseos utrinque calloso.—*Mexico*, Hartweg.

Catasetum *laminatum*; labello saccato apiculato basi fimbriato: axi lamellâ unicâ altâ basi bilobâ instructo, columnâ cirrhatâ.—*Mexico*, Hartweg.

A very fine species, remarkable for a deep plate running along the labellum, from base to apex.

Dichæa *squarrosa*; foliis linearibus squarroso-recurvis, floribus subterminalibus, labello cymbiformi sessili apiculato columnâ glabrâ anticè unidentatâ.—*Mexico*, Hartweg.

Flowers large for the genus, apparently white.

Arpophyllum *spicatum* (Llave); folio carinato arcuato, pedunculo spathâ breviore.—*Mexico*, Hartweg.

Flowers deep purple, arranged in a spike about 3 inches long.

Arpophyllum *giganteum* (Hartweg in litt.); folio ensiformi plano, pedunculo spathâ multò longiore.—*Mexico*, Hartweg.

This fine plant must be at least 3 feet high; its flowers are pale lilac, and disposed in a spike from 6 to 7 inches long.

Cyrtochilum *graminifolium*; foliis lineari-ensiformibus acutissimis erectis racemo subpaniculato brevioribus, labello obovato integerrimo basi 5-lamellato, columnæ alis parvis rotundatis.—*Mexico*, Hartweg.

This species is much like *C. maculatum*, but differs in the form of its lip, its very narrow leaves, and smaller flowers.

Spiranthes *ramentacea*; aphylla? vaginis caulis laxis membranaceis acuminatis, labelli limbo concavo ovato integerrimo obtuso, ungue et columnâ in medio pubescentibus.—*Mexico*; Prope Santa Barbara, regione calidâ, Aprili, Hartweg.

This very curious species has altogether the appearance of *Altensteinia* or of *Apaturia*.

EPIPACTIS *americana*; foliis inferioribus ovalibus superioribus lanceolatis, bracteis floribus longioribus, racemo laxo sursùm pubescente, hypochilio medio muricato, epichilio ovato acumine lato membranaceo.—*Mexico*; Juxta Rio del Salto cataractas, locis umbrosis, Aprili, Hartweg; *Nova Albion*, Douglas; *Texas*, Drummond.

An American *Epipactis* is a great novelty; this appears to be the only species found as yet on that continent. It ranges from the Columbia river as far as Mexico.

XLVI.—*Note on the Annelida.* By W. S. MACLEAY, M.A., F.L.S., &c.*

THESE animals differ from true *Annulosa* in being hermaphrodite, and in general red-blooded†. They are soft vermiform animals of an articulated structure, and which form the immediate connexion between such *Vertebrata* as *Amphioxus* and *Myxine*, and such *Annulosa* as *Porocephalus* and other white-blooded *Vermes*, which have the sexes distinct.

I divide the *Annelida* as follows:

ANNELIDA.

NORMAL GROUP.		
POLYPODA. Marine animals, having their body provided with distinct feet.	NEREIDINA.	Animals free, having a distinct head provided with either eyes or antennæ or both.
	SERPULINA.	Animals sedentary, and having no head, provided with eyes or antennæ.
ABERRANT GROUP.		
APODA. Body without feet or a distinct head.	LUMBRICINA.	Animals without eyes or antennæ. Body externally setigerous for locomotion. Articulation distinct.
	NEMERTINA.	Animals aquatic, without eyes or antennæ. Body not externally setigerous. Articulation indistinct.
	HIRUDINA.	Animals provided generally with eyes but not with antennæ. Body not externally setigerous. Articulation distinct.

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* From 'The Silurian System,' by R. I. Murchison, Esq., p. 699.

† Milne Edwards is said in the public journals to have discovered that

NEREIDINA, MacLeay.

These are the most perfect in their structure of all *Annelida*, as they possess numerous organs and have a distinct head, which is generally provided with eyes and antennæ. Some of them, after the manner of *Serpulina*, inhabit tubes, which tubes are membranaceous, and formed by a transudation from their body; but in general the *Nereidina* are naked, and they are always agile animals freely moving about in search of their prey. Aristotle calls them, "Σκολόπενδραι θαλάσσιαι παραπλήσιαι τῷ εἴδει ταῖς χερσαίαις," (Lib. ii. c. 121.); and it is true that they are wonderfully like Centipedes. The fossil impressions in the Llampeter Rocks, are too indistinct to enable us to determine very accurately the genera and species of *Nereidina* which there occur, more particularly as the generic characters in this group depend on such minute distinctions as are afforded by a study of the mouth, antennæ and eyes. I shall therefore consider the impressions fig. 1. and fig. 2. *Murchison, Sil. Sys.* to belong to the

Genus NEREITES. A genus which comes very near to Savigny's genus *Lycoris* in its external appearance, only the segments of the body are here perhaps more slender and in proportion longer than usual.

Spec. 1. *Nereites Cambrensis.* Murch. *n. s.*

The body of this species seems to have consisted of about 120 segments. The feet were half the length of a segment of the body, and the cirri of the feet were longer than such segment.—*ib.* Pl. 27. f. 1.

Spec. 2. *Nereites Sedgwickii.* Murch. *n. s.*

Body much more slender than that of *N. Cambrensis*, and apparently consisting of a greater number of segments. These segments have the feet attached to them apparently inconspicuous, although the cirri are very distinct. Pl. 27. f. 2.

N.B. The impression now under consideration was clearly

some *Annelida* are not provided with red blood; but the distinguished Savigny stated the same fact so long ago as the year 1823, for in his *Système des Annelides* he places *Clepsine* among his *Hirudinées.* Nay, even Cuvier, who first distinctly pointed out the group under the name of *vers à sang rouge*, has said that their blood is only generally red. Although hermaphrodites, many of them require a reciprocal coitus.

that of an animal, as will appear by the figure, where the worm has evidently, before coiling, with difficulty trailed itself along in the mud, in a way, which any one accustomed to collect these *Annelida* will at once recognise.

Genus MYRIANITES.

Body linear, very narrow, and formed of very numerous segments with indistinct feet and short cirri.

Spec. 1. *Myrianites MacLeaii.* Murch. *n. s.*—Pl. 27. f. 3.

N.B. The softness of the texture of the foregoing three species of *Annelida* and the perfection of the impression in fig. 1. make it very remarkable, that if articulated feet existed in the Trilobites, some vestiges of them, even although membranaceous, should not have come down to us more perfect than those figured by Goldfuss. (See Ann. Scienc. Nat. vol. xv. Pl. 2. f. 8. and pp. 665, 667 *ante.*)

SERPULINA, MacLeay.

These are sedentary animals without eyes or antennæ. They live in tubes which are either a natural transudation of their body, and are either membranaceous or calcareous, or their tubes are semifactitious, being then composed of an agglutination of particles of sand or other small substances. The calcareous nature of the tube in some *Serpulina* is very advantageous for their preservation, and has thus enabled us to see that such animals occurred frequently in the Upper Silurian Rocks.

Genus SERPULITES.

Spec. 1. *Serpulites longissimus.* Murch. *n. s.* Pl. 5. f. 1.

Very long, hardly diminishing in diameter, compressed, smooth, slightly tortuous, composed of numerous thin layers of shell containing much animal matter.

No part of this extraordinary fossil has been observed attached to other bodies; it forms large curves, sometimes almost circles, occasionally even a foot in diameter. The tube is so much compressed that its sides nearly touch, and that this is the effect of pressure is shown by the form it has assumed. Those parts which were nearly perpendicular to the direction of the compressing force have resisted pressure most powerfully, and fractures have taken place in longitudinal lines near

such parts. The quantity of animal matter in the laminæ gives them an opalescent appearance. In structure, this fossil resembles the *Serpula compressa of Min. Con.*, tab. 598. f. 3; but it does not diminish so rapidly. Width $\frac{1}{2}$ an inch.

NEMERTINA, MacLeay.

The *Nemertina* are white-blooded worms like some of the *Hirudina* or *Leeches*. In this group, however, the character of articulation becomes most indistinct. Rudolfi has placed *Gordius* along with *Nemertes* (Ent. Syst. 572.); and if *Gordius* goes into the group of *Nemertina*, it is possible that *Filaria* may also. *Nemertes Borlasii*, is a long black sea-worm, which is said to suck Testaceous *Mollusca*. The articulations of its body become visible when it is contracted. If the long vermiform impression in the Cambrian Rocks of Llampeter, Murch. Sil. Syst. Pl. 27. f. 4. belong to organic substances, it can only be referred to some animal between *Gordius* and *Nemertes*, although probably nearer the former genus. As yet, however, *Gordii* are only known to occur in fresh water, whereas this fossil production, if it belong to the animal kingdom, was evidently, like *Nemertes*, a native of the sea.

Genus NEMERTITES?

Animal marine, with the linear body, of a *Gordius* or *Filaria*.

Spec. 1. *Nemertites Ollivantii.* Murch. *n. s.* Pl. 27. f. 4.

XLVII.—*Notes on the Excitability and Movement of the Leaves in the Species of* Oxalis. By Professor J. DE BRIGNOLI DE BRUNHOFF of Modena, and Prof. MORREN of Liège.

IN the Bulletin of the Royal Academy of Brussels for last July, an extract is given by M. Morren, of a letter received by him from Prof. de Brignoli of Modena, of the 23rd of May 1839, containing some interesting details relative to the excitability and spontaneous movement of the leaves of *Oxalis stricta*, which had been accidentally observed by two of his pupils, one of whom had casually, whilst engaged in conversation, been striking them with a small cane among the plants that grew wild under the trees in the public garden.

"*After a little while,*" he observes, "they perceived that one of these plants had changed the position of its leaves, and they at once suspected that it was an irritable plant which I had never mentioned in my lectures. I was in the botanic garden, which is contiguous to the public garden, at the time; they came and told me of this fact, which was not less new to me than to them. I went with them to the spot, and found that the plant was the *Oxalis stricta*. This is not mentioned in the list of species designated by authors as *sensitive*. I immediately repeated the experiment upon other individuals and obtained the same effect; but *it must be teased a long while, as its movements are much slower than those of the Mimosa pigra*. I suspect that if plants were observed with the requisite care, the phænomenon of irritability would not be so rare as is supposed. The irritability of the *Oxalis sensitiva* is already known. I have made experiments upon all those cultivated in our botanic garden, but I did not succeed in causing the position of the leaves to change. I believe that heat is the principal agent in this phænomenon, because even the *Hedysarum gyrans* slackens in its movements in autumn and during winter in hothouses. I should think that all the species of *Oxalis* are susceptible of contraction when irritated; but as most of them are natives of the Cape of Good Hope, it is possible that they show no effects from concussion in our climate, whose greatest heat never equals that of Africa. In the environs of Modena we have neither the *Oxalis acetosella* nor *Oxalis corniculata*, I have not therefore been able to make experiments upon them."

M. Morren in addition gives an account of some new observations which this communication had led him to make, and which proved to be in every respect confirmatory of the views of M. De Brignoli.

"The *Oxalis sensitiva* mentioned here by M. De Brignoli, and originally from China, was indeed named by M. DeCandolle from this fact Biophytum (*Biophytum sensitivum*); that is to say, *plant alive*; its leaves are pinnate like those of Sensitive plants. The East Indian *Averrhoa bilimbi* is another of the *Oxalideæ* in which the leaves are likewise excitable and mobile. The *Averrhoa carambola* has its petioles mobile, as

Bruce has shown*. These approximations prove that the movement of the leaves of the true *Oxalides* may in fact extend to a multitude of species, since this genus is one of the most numerous†.

During the great heats of the month of June, when the thermometer was at + 35° (R.) in the sun, the excitability and movement of the leaves were very evident in our three indigenous species of *Oxalis*: *Oxalis acetosella*, *Oxalis stricta*, and *Oxalis corniculata*. When the sun darts his rays in the middle of the day directly on the leaves of these plants, their three obcordate leaflets are level, horizontal, and so placed that the margins which are directed towards the point of the heart, or towards the very short partial petiole, nearly touch one another; so that then there is, so to say, no space between the leaflets. This is the position of repose. Now if we strike the common petiole with light but repeated blows, or if we agitate by the same means the entire plant, we see, after the space of a minute,—less if it be very hot, more if it be cool,—three phænomena take place.

1. The leaflets fold themselves up along their midrib just like the moveable limb of the *Dionea muscipula*, in such a manner that their two halves approach each other by their upper surface; the movement therefore in this case is from below upwards, and it is a folding together.

2. Each lobe of the leaflet bends inwards, so that outwardly and on its lower surface it presents a convexity more or less decided. This is a movement of incurvation.

3. Each partial petiole, although very short, bends itself from above downwards, so as to cause the leaflets to hang downwards, which then nearly touch each other by their

* Phil. Trans. vol. lxxv. p. 356. An Account of the sensitive qualities of the tree *Averrhoa carambola*.

† M. Virey, in a paper entitled, "Quelques considérations nouvelles sur l'acidité dans les plantes irritables," (Journal de Pharmacie, Paris, 1839, No. V. 25e année, Mai, p. 289,) has fallen into three mistakes in what he says of the irritability of the *Biophytum* and of the *Averrhoæ*. In the first place he confounds the two genera in making *Biophyta* of the *Averrhoa bilimbi* and *Averrhoa carambola*, which is not the case. In the next place, the *Oxalis sensitiva* being the same plant as the *Biophytum sensitivum* of DeCandolle, it is by no means the stamina which are excitable, but the leaves, as all authors say. Lastly, M. Virey has taken the *Oxalis sensitiva* for a plant distinct from the *Biophytum*.

lower surface around the common petiole which forms the axis. This last movement is similar to that which takes place in the evening at the time of the sleep of the plant, and which has caused these leaves to be called *dependent* (*folia dependentia*).

Of our three indigenous species, *stricta* and *corniculata* showed me these movements with the highest degree of energy, *Oxalis acetosella* has them less strong, but perhaps may have them as evidently when in flower, a time at which I have not observed it.

Every kind of exciting action provokes the same changes, as the wind, and especially a slight compression of the middle of the leaf, or of the place where the three partial petioles meet, between the thumb and fore finger.

In the botanic garden of the University of Liège I also observed two species with three folioles: *Oxalis purpurea* (W.), and *Oxalis carnosa* (Mol.). The first, when placed in a hothouse, showed the phænomena of excitability in the highest degree. The three folioles, without considerably bending back their lobes by the movement of incurvation already mentioned, curved downwards so as to touch one another two and two by the half of their limb, by placing their inferior surface one against the other.

Oxalis carnosa is more sluggish. The old leaves were motionless; the young ones, especially those which clothe the upper part of the stalk, exhibit nevertheless the same excitability, but the movement of incurvation is also less evident in it.

In a sixth trifoliate species, *Oxalis tortuosa*, the leaflets were no longer entire enough to enable me to ascertain if it were equally excitable.

*Oxalis Deppei**, furnished with four leaflets, evinces an excitability much more decided than the other species mentioned

* The *Oxalis Deppei* brought from Mexico to England in 1827, and figured by Mr. Loddiges in his 'Botanical Cabinet,' No. 1500, is the same species as that which has been described and figured by our learned colleague M. Lejeune in the Bulletin of the Academy, vol. ii. p. 334, 1835, by the name of *Oxalis zonata*. Known throughout England by its older name, I have thought it right to continue it. It is not from the Cape of Good Hope, but from Mexico.

above. In its ordinary state, the leaflets, all quite open, quite flat, spreading out upon the same plane, nearly touch at their margins, beginning from the reddish zone, which then seems to form a continuous circle on a deeply divided leaf. But if you have just given the petiole some gentle fillips, in a quarter or half a minute, when the sun shines upon the plant, you see the leaflets fold up along their midrib, from the base to the apex, then the two lobes curve inwards, and lastly the partial petiole bend from above downwards, so as to cause the leaflets to hang down. Two or three minutes after the fillips the plant seems to be asleep.

A leaf teratologically developed with five leaflets exhibited the same fact. It is unquestionably the species in which these movements can be best observed.

These were the only species which were at my command. In all of them the movement takes place without a shock, without agitation, but little by little, insensibly; it can, however, be ascertained all the better, as between a leaf the leaflets of which are horizontal, and another where they are vertical, the difference at once strikes the eye.

Our indigenous species are too small for observing the organs of this mobility well, but *Oxalis Deppei* is well calculated for observation and anatomy.

As in all plants moveable from excitation, the organs of motion reside in the apparatus itself which moves. Now here the apparatus consists of: 1. The blade itself of the leaf, an organ of incurvation; 2. The large midrib; 3. The partial petiole; the former being an organ for folding back, the latter an organ of incurvation.

Now the blade of the leaf is composed, above, of a cuticle with pinenchymatous cells, that is to say tabular-shaped (Meyen); beneath, of a cuticle with merenchymatous cells, swollen up, like bladders, with numerous small linear stomata between all the raised cells, so that one amongst them is often surrounded by six stomata; in the middle by a double diachyma, whose upper plane is formed of prismatic or ovoidal cells placed perpendicularly, and of such a size that upon the length of a single tabuliform cell of the upper cuticle (*derme*) there are six utriculi of the diachyma. The plane of the dia-

chyma is formed of ovoidal cells, placed transversely, and of such a development that two of them are equal in diameter to a merenchymatous cell of the inferior cuticle which is equal to three or four fifths of a tabular cell of the superior cuticle.

It follows from this structure that the cells of the inferior mesophyllum are double the size of those of the upper mesophyllum. The diachyma is moreover very rich in chlorophyllum and in round clusters of crystals, occupying the axis of the cells.

It seems to me evident that analogy with the other plants which are moveable by excitation, should lead us to place the cause of the incurvation of the blade in the inferior mesophyllum, the cells of which by turgescence elongate the inferior pagina of the leaf, and thus cause the upper pagina or the mesophyllum to fold upwards. The cellular tissue is here also the essential organ of movement, and each cell a body turgescent by excitability.

The midrib is very large in this plant; it is three or four times larger than the secondary nerves, and it extends straight and rigid from the basis of the leaflet to its apex. It is transparent and juicy. This nerve reminded me of the structure which I discovered in former dissections in the *Dionæa muscipula*.

Its cuticle is formed of little cells as high as they are wide, nearly cubical, with very strong parietes. Four or five correspond in width to the diameter of a single infrajacent cell. Such a structure itself enables this cuticle to follow all the dilatations that its interior mass can undergo. Directly within this cuticle there occurs a cellular plane greatly developed, formed of large cells, irregularly merenchymatous, with strong parietes, and leaving between them passages, the section of which is a triangle. There is little chromule, but intracellular fluid in abundance. Each cell is the double of those of a more interior cellular plane, and the quadruple or the quintuple of those of the external cuticle. This plane of great cells has them four or five in a row. Then come towards the upper part of the midrib some chromuliferous cells, which immediately surround a channeled plane of vessels, a channel,

the hollow of which is directed upwards, and which is filled with little cells and sap vessels.

This structure reminds us of that of the petiole of the *Mimosa pudica*. The distention of the great cells of the lower plane of the midrib must force the two half blades of the leaf to approach each other; and this enlargement, produced by excitability and allowed by the intercellular passages, thus becomes the proximate cause of the folding up of the two lobes of the leaflet of *Oxalis Deppei* all along the nervure. There is the same mechanism and a very analogous structure in the *Dionæa muscipula*.

There is no pulvinus at the base of the leaflets of the *Oxalis* as in the Mimosæ, but there is a peculiar organization in this part which answers the purpose of this organ. If we observe attentively how the leaflet is articulated to the petiole on the under side, we find that the midrib terminates in a crescent, the concave of which faces the petiole. The petiole in its turn ends in another crescent, the concave of which faces the leaflet; so that the partial petiole, which is so short as not to exceed a millimetre and a half, is terminated by two opposite crescent-shaped articulations, the convexities of which face each other. Thus much for the under part of the leaf.

As for the upper part, the two margins of the leaflet which converge at the base of the leaflet to form the point of the heart, become imperceptibly thicker and unite to form a kind of crescent-shaped bridle, whose concave is turned towards the leaflet. The common petiole receives in its turn the partial petiole by a crescent-shaped articulation, but which, in this instance, has its concave turned towards the leaflet, that is to say, it is a crescent parallel to the first. Between them spreads a red cuticle, which is strongly plaited crosswise.

The transverse section of this organ gives that of a depressed cylinder formed of a strongly resisting cuticle, consisting of ovoidal cells lying flatwise, the parietes of which are of the thickest. Then comes a fully developed layer of cellular tissue with cells plainly merenchymatous, forming at least a dozen rows. Each cell has a central mass of chromule. There are fewer rows of cells (from 8 to 9) towards the upper part of the partial petiole. In the centre of this, but a little higher

than the geometric centre, are the air vessels (tracheæ) below, and the sap vessels above, surrounded by smaller and more fully coloured cells.

This organization is fundamentally that of the pulvinus of *Mimosa pudica*. When the merenchymatous cells of the cortical part of the lower zone are distended or turgescent, the leaflets are horizontal; when their turgescence stops and that of the cells of the upper zone predominates, the leaflets droop, as in the natural sleep of this *Oxalis*, and as takes place after it has been subjected to disturbance.

At any rate, the excitability of the cellular planes and of each cell in particular, and the distention which is the manifestation of it, must be admitted to account for the different positions which the leaves of the *Oxalis* take when they are struck.

The movement of the leaves of the *Oxalis*, although slower than that of the sensitive plants, is also not on that account less remarkable; it is even so much the more interesting to us, as, taking place in our indigenous plants, we can the better observe it; the physiological study of our national species hence obtains a new attraction, and the discovery of M. De Brignoli and his pupils has led in its turn to the discovery of an analogy of structure between the leaves of the Oxalideæ and those of the Mimosæ; an analogy which could hardly have been expected, but which is fully proved by direct observation.

The moveableness of *Oxalis* is the more singular, as M. De Candolle has not been able to modify the sleep of these plants, either by means of darkness or light, whence he concluded that the movements of sleep and awakening were connected with a periodical disposition of motion inherent in the plant*. We see, however, that a simple blow makes the *leaflets when awake* take the posture of *sleeping leaflets*.

M. Virey, in his 'Considérations nouvelles sur l'acidité dans les plantes irritables†,' has made evident by the recapitulation of the species in which the movement of any organ has been observed, that most of them were acid; this is indeed a curious analogy to demonstrate, but which proves nothing, for we cannot see what connexion there should be between a thing

* Physiologie, vol. ii. p. 861.

† Journal de Pharmacie, 1839, May, p. 289.

which is *acid* and a thing which *moves*. In relation to this M. Virey says that he knows no blue (alkaline) flowers in which there is any movement. We will name to him a blue flower, *Goldfussia anisophylla*, in which the style is one of the most mobile*. On the subject of these excitable plants, M. Virey has quoted our observations on *Stylidium graminifolium*†, but he makes us say things quite contrary to what we have written. Thus, we have nowhere said that the gynandric column of the Stylidieæ was articulated at its base by two opposite or antagonist fibres or muscles. Never should we have allowed ourselves to look upon vegetable fibres as muscles; we said (at pp. 15, 16, 17, and 18 of the memoir quoted) that these fibres exist all along the column, right and left. We never said that the column was irritable at its base, for it is not so; it is irritable at its *elbow*, and we have figured it five times: never did we say that we had found fecule in these muscles, as M. Virey asserts; quite otherwise; we wrote (p. 18) that the fibres had no influence on the movement, since when they were cut, the movement still took place. What is in our memoir is this: our idea is very clear; it is the feculiferous portion of the column which moves, and the same thing takes place in all the species of the genus *Stylidium*. This is an irrefragable fact; whether it agree or not with received theories, signifies little; in the natural sciences facts go before all things, and it is by them alone that we can attain to truth.

XLVIII.—*An attempt to ascertain the Fauna of Shropshire and North Wales.* By T. C. Eyton, Esq., F.L.S.

[Continued from vol. iii. p. 29.]

Additions to Vertebrata.

Vespertilio Nattereri, Kahl. (Reddish Grey Bat.) One specimen is in my possession, taken at Eyton.

Sorex araneus, Linn. Since the publication of the former portion of this series of papers, the discovery of the Rev. L. Jenyns, that this

* Morren, Recherches sur le Mouvement et l'Anatomie du Style du *Goldfussia anisophylla*, 4to. Brux. 1839, avec 2 pl.—Mem. de l'Acad. t. xii.

† Morren, Recherches sur le Mouvement et l'Anatomie du *Stylidium graminifolium*, Brux. in 4to, 1838, Mem. de l'Acad. t. xi.

species does not coincide with that so called on the continent, has been made known to the world; the name therefore which has been applied to it must be here adopted in the place of that before given; viz. for *S. araneus* read *S. rusticus*, Jen.

Sorex tetragonurus, Durer., Jen. (Square-tailed Shrew.) I have lately captured one specimen of this shrew in the marshy meadows bordering the river Tearne between Longdon and Allscot; its length from the tip of the snout to the root of the tail is 3 inches.

Arvicola pratensis, Bail. (Bank Vole.) Several times taken near Eyton.

Sula Bassana, Linn. (Gannet.) A specimen has lately been brought to me alive, caught during a high wind quite exhausted: it became so tame after a few days that it would take fish from the hand.

Invertebrata.

Land and Freshwater Mollusca.

Arion ater, Fer. Common.

Limax cinereus, Linn. Common.

Limax agrestis, Linn. Common under stones and logs of wood in autumn.

Vitrina pellucida, Mull. Common.

Succinea, Drap. *Succinea amphibia*, Turton, Manual, and *S. amphibia*, Drap., are two distinct shells; but *S. oblonga*, Turt., is *S. amphibia*, Drap. *Helix peregra*, Mont., is not either of these, but appears to be a true *Succinea*, although quoted by Turton as a synonym to *Limneus pereger*, but is the shell figured by Pennant under the name of *Helix putris*. With *S. amphibia*, Turt., I am unacquainted. The synonyms of the British species of the genus which I have had an opportunity of examining will therefore stand thus:—

Succinea amphibia, Drap. *S. oblonga*, Turt. *Helix putris*, Mont. Not uncommon about Eyton.

Succinea peregra. *Helix peregra*, Mont. *Helix putris*, Penn. Common; adhering to water plants.

Helix arbustorum, Linn. Common.

Helix aspersa, Gmel. Common in many localities, particularly on the walls of Beaumaris Castle, also near Rhoscolyn on Holyhead Island.

Helix nemoralis, Linn. Innumerable varieties of this common shell occur.

Helix hortensis, Linn. Occasionally occurs at Eyton.

Helix rufescens, Mont. Found on most sand hills near the sea.

Helix hispida, Mont. *H. sericea*, Drap. Common.

Helix lucida, Drap. Common.

Helix radiata, Mont. *H. rotundata*, Mull., Drap. Common.

Helix ericetorum, Linn. At Rhoscolyn and Towyn Merioneth: common on stones and walls on the sea shore.

Bulimus fasciatus, Mont. *B. acutus*, Mull. Common on most sandy shores above high water mark, and where there is some slight vegetation.

Pupa Secale, Drap. Very common at Eyton in the autumn, adhering to the under side of logs of wood and stones.

Cyclostoma obtusum, Drap. Common on the Weald moors, adhering to water plants.

Planorbis carinatus, Drap. Common in ditches on the Weald moors.

Planorbis vortex, Mull. Common in the same locality as the last.

Planorbis contortus, Turt. Also common on the Weald Moors.

Planorbis nitidus, Mull. Not so common as the foregoing species, but found in the same locality. The *Planorbis nitidus* of Muller appears to be the *P. complanata* of Drap.; *P. nitidus* of Drap. is probably the *P. contortus* of Turton and Linnæus.

Planorbis marginatus, Drap. Common at Eyton.

Limneus magnalis, Linn. Once taken at Eyton.

Limneus palustris, Linn. and Drap. Common. I also find a variety of this species not quite so robust, and never growing to so large a size as the true *palustris*.

Limneus elongatus, Drap. Once only taken near Watford in a peaty ditch.

Limneus auricularius, Linn., Drap. Common.

Anchylus fluviatilis, Mull. Common: attached to stones in most streams in Shropshire.

Anchylus lacustris, Mull. Twice taken in a mountain stream near Capel Curig.

Paludina impura, Lamk. Common.

Paludina similis, Jeff. *P. viridis*, Turt. Common on the Weald Moors.

Anodon cygneus, Lamk. Common in pools and in the Shrewsbury canal.

Anodon anatinus, Lamk. Also common in the same localities with the last; the remaining species of this genus are exceedingly doubtful.

Mysca Pictorum, Turt. Common.

Unio Ratana, Lamk. Occasionally taken at Watford.

Cyclas cornea, Linn. Common.

Cyclas calyculata, Drap. The only locality I know for this shell in the district is in a marl pit near Hutton Grange.

Pisidium obtusale, Pf. Common on the Weald Moors.

Pisidium pusillum, Jen. I have at different times taken two or three specimens of this shell on the Weald Moors.

Pisidium nitidum, Jen. Not very uncommon on the Weald Moors.

Pisidium ammeum, Mull. Taken in the same locality with the last.

XLIX.—*On the production of Isinglass from Indian Fishes.* By Dr. Cantor, Corresponding Member of the Zoological Society*.

In the December Number, 1838, of Parbury's Oriental Herald appears a letter 'On the Suleah Fish of Bengal, and the Isinglass it affords': the description of this fish I shall quote in the words of the anonymous writer. "The Suleah Fish," he observes, "when at its full size, runs about four feet in length, and is *squaliform*, resembling the Shark species in appearance, but exhibiting a more delicate structure than the latter. The meat of this fish is exceedingly coarse, and is converted by the natives, when salted and spiced, into 'burtah,' a piquant relish, well known at the breakfast-tables of Bengal. The bladder of the *Suleah* may be considered the most valuable part of it, which, when exposed to the sun and suffered to dry, becomes purely pellucid, and so hard that it will repel the edge of a sharp knife when applied to it. These bladders vary from half a pound to three quarters of a pound avoirdupois in weight, when perfectly dry. . . . The *Suleah* Fish abounds in Channel Creek, off Saugor, and in the ostia or mouths of all the rivers which intersect the Sunderbuns, and are exceedingly plentiful at certain seasons."

Conceiving the great importance of the discovery of isinglass being a product of India, I was naturally anxious to examine the source, arising from a branch of natural history to which in particular I have devoted my attention; but from the general nature of the description, I was obliged to defer my desire of identifying the fish till some future opportunity should enable me to do so. Quite unexpectedly, however, a few days ago, the last overland despatch brought me a letter from my valued friend Mr. McClelland, a Corresponding Member of this Society, an extract of which, bearing upon the point in question, I lose no time in laying before the Society:—'. . . . I have now to mention what is of far greater importance in another

* Read before the Zoological Society, July 23, 1839.

point of view, namely, that the Suleah Fish described in a recent number of Parbury's Oriental Herald is the *Polynemus Sele* of Hamilton. I have examined that species, and found an individual of two pounds weight to yield sixty-five grains of pure isinglass, an article which here sells at sixteen rupees (1*l.* 12*s.*) per lb. Refer to your dissections of *Polynemi*; mark those with large air-vessels to be isinglass, requiring no other preparation than merely removing the vascular membrane that covers them, washing with lime-water, and drying in the sun. You know the size these fishes attain, and the number in which they abound in the Sunderbuns; you also know the method of taking them, and can therefore state to what extent isinglass may be obtained in India. I have sent a paper on the subject to the Journal of the Asiatic Society*, which I will send you by the next overland despatch.'

Perceiving by this that the subject has been taken up by a naturalist of Mr. McClelland's rank, and that we ere long may expect his observations embodied in a paper from his hand, I think it sufficient to confine myself to a few general remarks upon those species of *Polynemus* which have come under my actual examination while I was attached as surgeon to the Hon. Company's survey of the sea-face of the Gangetic Delta.

The species best known is the *Polynemus risua*, Hamilton; *Pol. longifilis*, Cuvier; the Tupsee or Mango Fish of the Anglo-Indians; this inhabits the Bay of Bengal and the estuaries of the Ganges, but enters the mouths of the rivers, even higher up than Calcutta, during the breeding-season (April and May), when the fish is considered in its highest perfection, and is greedily sought as a great delicacy. This species is the smallest, for its length seldom exceeds eight or nine inches, and one and a half to two inches in depth. *Polynemus aureus* and *Topsui*, Hamilton, are species closely allied to this.

Polynemus sele, Hamilton, *P. plebeius*, Broussonnais, *P. lineatus*, Lacépède, is the Suleah Fish mentioned in Parbury's Oriental Herald, the same which Mr. McClelland submitted to examination. This species, as well as another closely allied to *P. quadrifilis*, Cuvier, which I have dissected, figured, and described, under the name of *P. Salliah* (*Saccolih*), appears equally plentiful, in shoals, all the year round in the estuaries of the Ganges, and is appreciated by Europeans and natives for its excellent flavour. Both species attain a size from three to four feet in length, and eight to ten inches in depth.

* See the following article.

In a paper which I had the honour of communicating to the Royal Asiatic Society*, the genus *Polynemus*, among others, was pointed out by me as forming an article of food fit for curing, and easily procurable in almost any quantity: by the discovery that it produces isinglass, it has attained an additional interest; and I have no doubt the manufacture of this article will, when entrusted to judicious hands, form another valuable article of exportation from India.

L.—*On Isinglass in* Polynemus sele, *Buch., a species which is very common in the Estuaries of the Ganges.* By J. McClelland, Esq., Assistant Surgeon†.

There are nine species of *Polynemi*, or Paradise fishes, enumerated by authors, and although they are all pretty well described, I am not aware of any more valuable property being known regarding them than their excellence as an article of food, of which we have a familiar instance at this season in the *Pol. paradiseus*, or Mango-fish, *Tupsi Muchi* of the Bengalese.

Buchanan has five species in his work on Gangetic Fishes, but three of these are small, and probably varieties only of the *Tupsi*; two of them, however, are of great size, and so common in the estuary of the Hoogly, that I have seen numerous hackeries, or bullock carts, conveying them to the Calcutta bazar, during the cold season. They are not confined to the estuary of the Hoogly, but probably extend to all the estuaries of the Ganges, as Buchanan says they do; and we know that Dr. Russell also describes two large species in his work, long since published, on the fishes of the Madras Coast.

The very valuable production, *Isinglass*, having been recently found to be yielded by one of the fishes of the Hoogly by a writer in Parbury's Oriental Herald, it became an interesting object to determine the systematic name of the fish affording an article so valuable, and to learn as much as possible regarding its habits. Having procured a specimen of this fish from the bazar, I was surprised to find it to be a *Polynemus*, or Paradise fish, although the writer alluded to described it as resembling a Shark. My surprise was not that a person unacquainted with fishes should compare it to a Shark, or to anything else, but that a nearly allied species to the Mango-fish should contain a natatory vessel of such size and value,

* Published in the Journal of the Royal Asiastic Society of Great Britain and Ireland, No. ix., August 1838, p. 165.

† From the Journal of the Asiatic Society of Bengal, No. 87, p. 203.

while that organ is quite absent in the Mango-fish itself, though a general character of nearly all others.

I had come to the determination never to describe single or detached species of fish; but as the object of this paper is to elucidate the commercial side of a question already before the public, I shall not pretend to offer any remarks on the scientific part of the subject, which is indeed beyond my province, as my observations have hitherto been confined to the fresh water species of India.

The species affording the Isinglass is the *Polynemus sele*, Buch.; *Sele*, or *Sulea*, of the Bengalese, described, but not figured, in the Gangetic Fishes; but if Buchanan's drawings had not been placed under a bushel since 1815, probably this useful discovery would have been sooner made, and better understood by the writer in Parbury's Oriental Herald, to whom we are indebted for it.

The figure [given in the Journal of the Asiatic Society of Bengal,] from Buchanan's unpublished collection at the Botanic Garden, conveys an excellent representation, about half-size, of a specimen from which I obtained 66 grains of Isinglass: but as the writer in Parbury's Oriental Herald states that from half a pound to three quarters of a pound is obtained from each fish, we may suppose either that *P. sele* attains a much greater size than 24 pounds, the limit given to it by Buchanan, or, that the Isinglass is also afforded by a far larger species, namely *Polynemus teria*, Buch. or *Teria bhangan* of the Bengalese, *Maga jellee* of Russell, which Buchanan was informed sometimes equals three hundred and twenty pounds avoirdupois, and which I frequently have seen of an uniform size, that must have been from fifty to a hundred pounds at least, loading whole cavalcades of hackeries at once on their way to the Calcutta bazar, as I have already stated, during the cold season, when they would consequently seem to be very common.

Although the sound, or natatory vessel is the part of the fish that would afford the principal inducement to form fisheries, one of the obligations that speculators should be obliged to enter into with the Government is, to cure all parts of such fishes as might be taken for their sound. Considering the scarcity of fish in many parts of India, and the great, I may say unlimited demand for it in some parts of the country even when badly preserved, as well as the excellence of the flesh of all the *Polynemi*, the curing of these fishes might prove no less profitable to the parties themselves, than it would unquestionably be to the country. I was happy to find the attention of the Royal Asiatic Society directed to the subject of curing fishes in

India by Dr. Cantor, (vide Proceedings, 21st April, 1838) but a something was then wanting to be known in order to give a direct inducement to the undertaking*. I therefore regard the discovery of the *Ichthyocolla* of commerce in one of the larger *Polynemi* of India as a circumstance eminently calculated to direct attention to a promising and almost unlooked for source of enterprise. We first of all require to know whether more *Polynemi* than one afford it, and to be fully acquainted with the habits and the methods already employed for taking such as do. *Polynemus sele,* Buch. is the species I examined and found to contain it; but this species is supposed to be a variety only of *Polynemus lineatus,* which is very common on all the shores to the eastward; it therefore becomes a question of some importance to determine whether *P. lineatus* yields the same valuable article, and if it be really common to the eastward; if so, it seems strange that the Chinese should send for it to the Hoogly. Next, do the *Pol. Emoi* and *Pol. plebeius,* supposed by Buchanan to correspond with his *Sele,* contain the same valuable substance? and do either of Russell's species, namely, the *Maga booshee* and *Maga jellee,* (Indian Fishes, 183, 184,) yield it? These are questions easily determined along our coasts by merely opening such fish as correspond with the one figured, and ascertaining whether they contain an air vessel or not, and whether that vessel if present be large or small. Mergui, Batavia, Singapore, Tranquebar, Madras, and

* Should Dr. Cantor still be in London, I would recommend those who may be interested in the important question of Isinglass to consult him, as no one is so competent to afford information regarding the fish by which that article is yielded in India. He will, I am confident, on a re-examination of his notes regarding the *Polynemi,* readily distinguish those with large sounds, and be able to afford more valuable information regarding their habits, and the quantities in which they are procurable, than could be expected from any one who had not devoted his thoughts to the subject, during a survey of the place in which these fishes occur. I am not sure that the species of *Polynemus* Dr. Cantor particularly refers to in his paper as the *Salliah,* or *Saccolih,* is not the very fish that affords Isinglass; if so, it appears to be considered by Dr. Cantor as a new species, and his notes will probably afford all that it is essential to know regarding its habits. Thus, as Sir J. E. Smith somewhere observed, "the naturalist who describes a new species, however trifling it may seem, knows not what benefit that species may yet confer on mankind."

In an interesting account of Kurachee by Lieut. Carloss, read at the last anniversary Meeting of the Bombay Geographical Society, cod sounds and sharks' fins are mentioned among the exports from that place, and fishing is said to be carried on to a considerable extent along the coast of Sinde. As however the Cod, *Morrhua vulgaris,* Cuv., is quite unknown in the Indian Seas, the species from which the sounds alluded to by Lieut. Carloss are taken are no doubt *Polynemi,* the larger species of which are sometimes called by the English, Rock-Cod. It will be curious to learn if the Chinese have monopolised this trade on the coast of Sinde as well as in the Hoogly.

Bombay are points at which observations might be made. This quesmay be so easily ascertained, that it is hardly worth forming a conjecture about it; but if any of the species common to the coasts of the Eastern seas possessed so valuable a property, the chances are that it would have been long since discovered. It is therefore probable that the large gelatine sound will be found to be peculiar to *Pol. sele*, and perhaps *Pol. teria*,* Buch. both of which seem to resort chiefly to the Gangetic estuaries at certain seasons, particularly during the North-east monsoon, when it is easy to imagine that the shelter afforded in those estuaries at that season, might account for many peculiarities which their ichthyology appears to present, compared with that of open coasts. It is during the cold season that the two gigantic fishes above mentioned appear to be caught in most abundance, a circumstance the more favourable to any improved operations that might be resorted to with a view to convert them to useful purposes. Whether both contain the same valuable substance, I am unable to say, having as yet only examined *P. sele*.

GEN.—POLYNEMUS.

Two fins on the back, with long filaments attached to the sides in front of the pectoral fins. Opercula covered with scales; preoperculum serrated behind. Example. The common Mango-fish of Bengal.

YIELDING ISINGLASS.

P. Sele, Buch. Plate—

Sele, or *Sulea* of the Bengalese.

Five filaments, the first reaching from the front of the pectorals to midway between those fins and the anal, the other filaments progressively shorter; no streaks on the sides, lateral line deflected on the lower lobe of the caudal fin. The fin rays are as follows:—first dorsal seven, second dorsal fourteen, pectorals thirteen in each, ventrals each six, anal twelve or thirteen, caudal twenty (?) The teeth are very fine, continuous below round the edges of the jaws, but interrupted at the anterior part of the upper jaw, behind which a small detached group of palatine teeth are placed on the vomer.

The liver consists of an elongated left lobe and a short right one, under which the gall bladder is situated. The stomach is a short muscular cul-de-sac, both orifices of which being placed at the anterior extremity, from which numerous small *cæcæ* are given off, the intestine extends straight to the vent; in all these respects it corresponds nearly with *P. paradiseus*. The air vessel, which is quite absent

* *P. quadrifilis*, Cuv. *P. tetradactylus*, &c. and probably refer to the same.

in the latter, and on which the peculiar value of this species seems to depend, is a large spindle-shaped organ about half the length of the fish, thick in the middle and tapering toward the extremities, where it ends in front by two, and behind by a single tendinous cord; similar small tendinous attachments, about twenty-two in number, connect it on either side to the upper and lateral parts of the abdominal cavity. This organ, which is called the sound, is to be removed, opened, and stript of a thin vascular membrane which covers it both within and without, washed perhaps with lime water and exposed to the sun, when it will soon become dry and hard; it may require some further preparation to deprive it of its fishy smell, after which it may be drawn into shreds for the purpose of rendering it the more easily soluble. The fish which I examined weighed about two pounds and yielded about sixty-five grains of Isinglass, not quite pure, but containing about 10 per cent. of albuminous matter, owing perhaps to the individual from which it was taken being young and out of season, and not above a tenth part of the ordinary size of the species. But the solution after having been strained appeared to be equal to that of the best Isinglass, which costs in Calcutta from twelve to sixteen rupees a pound. As the subject thus seemed to be of consequence, I gave a portion of the substance in question to Dr. O'Shaughnessy for its chemical examination.

Calcutta, 3rd May, 1839.

LI.—*A Supplement to the Synopsis of the Fishes of Madeira* in the Second Volume of the Transactions of the Zoological Society.* By the Rev. R. T. Lowe.

Fam. Percidæ.

Genus Callanthias.

Gen. char.—Head scaly, except the short muzzle before the eyes; teeth as in *Anthias*, Bl.; preopercle perfectly entire; opercle with two flat adpressed spines; lateral line high up, near the back, and ending at the end of the dorsal fin, which is even or continuous; branchiostegous membrane with six rays.

Callanthias paradisæus. A most elegant little fish; in general habit and colouring resembling *Anthias sacer*, Bl., but without the produced third spine of the dorsal fin. Its analogies are singularly complicated, but its affinities are truly Percidous. By Bloch it might

* Read before the Zoological Society, May 28, 1839.

have been arranged either in *Bodianus* or *Cephalopholis*, Bl., but it is really inadmissible into any well-defined or constituted modern genus. It is almost as rare as beautiful.

Fam. Berycidæ.

Genus Beryx, Cuv.

Beryx decadactylus, Cuv. *B. corpore ovali, lato, profundo, altitudine longitudinem capitis superante; dorso elevato, arcuato, gibbo; ventre prominente: basi pinnæ dorsalis elongato, pinnis pectoralibus haud breviore: oculis maximis: operculi angusti carina obscura: osse humerali angusto, margine posteriore recto, verticali.*

D. 4 + 18 — 20; Vs. 1 + 10; &c.

B. decadactylus, Cuv. and Val., Hist. III. 222.

B. splendens, nob. quoad icon. Tab. III. in Cam. Phil. Trans., Vol. VI. Part 1; haud textus.

When I published *B. splendens* as a new species in the Cambridge Transactions, I was unacquainted with the present fish, though it is scarcely perhaps less common than the former. I consequently did not discover till long after, that the figure intended for my *B. splendens* had been inadvertently taken by Miss Young from an individual of *B. decadactylus*, Cuv., of which it offers the more obvious peculiarities. The true *B. splendens*, therefore, yet remains unfigured, and till an opportunity presents of supplying this deficiency in the "Fishes of Madeira," I subjoin its true specific characters, contrasted with those of *B. decadactylus*.

B. splendens. *B. corpore oblongo, altitudine longitudinem capitis haud æquante: dorso recto: basi pinnæ dorsalis brevi, pinnis pectoralibus breviore: oculis magnis; operculi lati carina prominente: osse humerali dilatato, margine posteriore arcuato, obliquo.*

D. 4 + 13 — 15; V. 1 + 10 — 13 (1 + 11 fere); &c.

B. splendens, nob. Proceed. Zool. Soc. 1833. 1. 142. Cam. Phil. Trans. VI. 1. 197; excl. icon.—Syn. Mad. Fishes in Trans. Zool. Soc. Vol. ii. p. 174.

Trachichthys pretiosus, nob.

Hoplostethus mediterraneus, Cuv. and Val. IV. 496. t. 97. bis. Rariss.

This fish is unquestionably congeneric, if it is not even still more closely allied with *Trachichthys australis* of Shaw. Hence the above adoption of the older generic appellation, affording opportunity for the substitution of a less restrictive specific title; better suited to a fish: proved by the occurrence of two individuals in these Atlantic seas not to be peculiarly Mediterranean.

To the Sub-Percidous family *Berycidæ* belongs also *Polymixia*;

nob. Cam. Phil. Trans. IV. 1. 198. t. IV.—Syn. Mad. Fish. pp. 178, 179.

Fam. Triglidæ.

Trigla lineata, L. Cuv. and Val. Hist. IV. 34.; Yarrell, Brit. Fish. 1. 46. Rariss.

A single individual only has occurred.

Fam. Sparidæ.

Pagellus rostratus, nob.—Syn. Mad. Fish. 177.

Reference to the excellently characteristic figures of Rondelet and Salviani has satisfied me that this is merely *Pagellus erythrinus*, Cuv. and Val.

Fam. Chætodontidæ.

Pimelepterus Boscii, Lac.—"*Cheiroco*" or "*Xarroco.*"—Cuv. and Val. VII. 258. t. 187. Rariss.

Fam. Scombridæ.

Thynnus Albacora.—"*Atum Albacora.*"—*T. corpore elongato, postice attenuato: pinna anali secundaque dorsali antice longe falcato-productis: pectoralibus ad medium secundæ dorsalis attingentibus: ore oculisque parvis.*

Tunny, Penn. Brit. Zool. Ed. 1. iii. 266. No. 133. t. 52. excl. syn. An L'Auxide de Sloane, Scomber Sloanei, Cuv. and Val. Hist. VIII. 148; i. e. Albacore, Sloane, Hist. of Jam. 1. t. 1. f. p. 28? Sat. vulg.

The length of the narrow produced fore-part of the second dorsal fin varies from one-sixth to one-fourth part of the whole length of the fish; that of the pectoral fins is from one-fifth to one-fourth part of the same, and their tips reach to the middle of the second dorsal fin. Thus, in this latter point it is intermediate between the common Tunny (*T. vulgaris*, L.) and the following new species (*T. obesus*, nob.); approaching most the latter.

Pennant's figure is at least a tolerable representation of this very distinct species, agreeing with it in its main points of difference from the true *T. vulgaris*, L. It may be hoped that the attention of British Naturalists will be directed to this point. The proper season for the Albacora in Madeira is September and October.

Thynnus obesus.—"*Atum Patudo.*"—*T. corpore abbreviato: obeso: pinnis acutis; pectoralibus ad finem secundæ dorsalis attingentibus: oculis magnis.*

Vulgaris.

This fish is constantly distinguished by the fishermen from the common Tunny or "*Atum Rabilha*" (*T. vulgaris*, L.) by the larger

eye, and shorter thickset figure. The pectoral fins vary from one-fourth to nearly one-sixth part of the whole length, their points reaching to the end of the second dorsal fin. In *T. vulgaris*, L. the tips of the pectoral fins reach only to the end of the first, or to the beginning of the second dorsal fin.

T. obesus is in greatest abundance earlier in the summer than *T. Albacora*. In size it ranges next below *T. vulgaris*, L., not however attaining above half the extreme size of that species; nor much exceeding the full size of *T. Albacora*.

Thynnus Alalonga, Cuv. and Val.—"*Atum Avoador.*"—Cuv. and Val. Hist. VIII. 120. t. 215.

Orcynus Alalonga, Risso, iii. 419. Vulgaris.

No difficulty can occur in the recognition of this species, from the great length of the pectoral fins, which are one-third part of the whole length, and reach to the end of the anal fin, or to the first spurious finlet behind it. Its proper season is said to be January.

Thyrsites acanthoderma.—"*Escolar.*"

Aplurus simplex, Syn. Mad. Fish. 180.

This is the fish called in my Synopsis *Aplurus simplex*. It is a true *Thyrsites*, Cuv. in every respect, except the structure of the skin, a peculiarity which seems insufficient, in the absence of all other characters, to warrant its generic separation.*

Prometheus atlanticus, nob.—"*Coelho.*"

This also is again here mentioned only for the sake of remarking, that further observations have gone far to prove the Maderan fish to be specifically distinct from both *Gempylus Prometheus* and *G. Solandri* of MM. Cuvier and Valenciennes, whose synonyms should therefore be expunged.

Gen. Aphanopus, nob.

Gen. Char.—Form as in *Lepidopus*, elongate, much compressed, like a sword-blade, naked, but with a short keel on each side, towards the tail.

Muzzle and teeth as in *Lepidopus* (Gouan), but the palatines unarmed.

Dorsal fins two, nearly equal. Anal fin as in *Lepidopus*, but with a strong sharp spine instead of a scale before it, a little behind the vent. No trace or rudiment of ventral fins.

Aphanopus carbo.—"*Espada preta.*" Rariss.

Of this most curious new genus a single individual only has yet

* By an error in the punctuation, some descriptive observations at the bottom of page 180 of my synopsis (Trans. Zool. Soc., vol. ii.), relating to this fish, have been converted into a specific character.

occurred. The whole fish is of a dark coffee colour, approaching to black, and has in form so close a general resemblance to *Lepidopus argyreus*, Cuv., that it might well be taken hastily for a mere variety of that fish.

Tetragonurus atlanticus, nob.

Differs from *T. Cuvieri*, Cuv. and Val., XI. 172. *t.* 318. chiefly in the longer head, much larger eye (nearly twice as large in proportion to the whole length), greater width between the eyes, teeth twice as numerous, in the upper jaw; thicker body, longer pectoral fins, higher (twice as high) first dorsal fin, and inequality of its spines. Having, however, seen only a single individual, I forbear to characterize it more distinctly; especially since of *T. Cuvieri* so few examples have as yet occurred; and that even MM. Cuvier and Valenciennes appear to have taken their figure from one which was imperfect in the caudal fin at least. The first dorsal fin is described by MM. Cuvier and Valenciennes as having fifteen spines; but twenty-one are figured in the plate.

The following is the fin-formula of *T. Cuvieri*, according to Risso; and MM. Cuv. and Val.:

"1st. D. 18; 2nd. D. 1, 12; A. 1, 11; P. 16; V. 1, 5; C. 36."—Risso Hist.

"1st. D. $\left\{\begin{matrix}15 \text{ in text,}\\21 \text{ in fig.}\end{matrix}\right\}$ 2nd. D. 1 + 13; A. 12; P?; V?; C?; B. M. 5."—Cuv. and Val. Hist.

That of *T. atlanticus*, nob. is

1st. D. 15; 2nd. D. 11; A. 11.; P. 16; V. 1 + 5; C. $\frac{7+\text{VIII.}}{7+\text{VII.}}$; B. M. 5.

The true affinities of this fish are certainly rather to be sought among the Mackerels (*e. g. Thyrsites*) than the Mullets. Its relation to the *Mugilidæ* is, indeed, one merely of a faint analogy.

Xiphias gladius, L.—"*Peixe Agulha.*"

The ordinary Sword-fish of Madeira is truly the common *Xiphias gladius*, L.

I have heard, however, of "another sort, with a bayonet or spit-like beak," called "Peto," which may perhaps have been a *Histiophorus* or *Tetrapturus*.

Seriola dubia. Rariss.

A single individual only has occurred, which I am unable to identify with any of the species enumerated by MM. Cuv. and Val. The second dorsal fin is produced in front into a point; five-eighths the depth of the body beneath. The sides of the tail are sufficiently distinctly keeled; and there is no temporal band. In the first of

these characters it comes nearest *S. Rivoliana* or *S. falcata* Cuv. and Val.; differing, however, from both, principally in the points in which they are said to agree with *S. Dumerilii*, Cuv. and Val. With *S. Lalandi*, Cuv. and Val., it agrees in the two latter points above-mentioned; but differs in the produced second dorsal and anal fins; *S. Lalandi* appearing from MM. Cuvier and Valenciennes' description not to disagree in this respect with *S. Dumerilii*, Cuv. and Val. The individual described measured two feet and a half long.

Lampris lauta. For "Vertebris 69" and "Vert. 49," in the specific character and following formula of the *Lampris lauta*, p. 183. Of the Synopsis of Fish Mad. (vol. ii. Trans. Zool. Soc.), read, Vertebris 45; and in the seventh line of the next page, for "six vertebræ more," read "two vertebræ more."

Fam. Coryphænidæ.

Coryphæna hippurus, Cuv. and Val.? "*Dourado macho.*"—Syn. Fish Mad. 183.

This fish agrees with *C. hippuroïdes*, Raf., according to the brief account transcribed by MM. Cuv. and Val., in having a row of larger dusky spots along the ridge of the back on each side at the base of the dorsal fin, which is itself immaculate, whilst the anal fin is also somewhat high and pointed in front. In these three points it is at variance with MM. Cuvier and Valenciennes' elaborate description of their *C. hippurus*, L. The individual described, however, by these consummate Ichthyologists was a male; whilst the only three which I have been able to examine closely, proved on dissection to be females, though commonly supposed by the Maderan fisherman to be the male of *C. equisetis*, L. Hence the Maderan fish, whether identical or not with the obscure and doubtful *C. hippuroïdes, Raf.*, is for the present better referred to *C. hippurus*, L. Sufficient ground appears for the suspicion that the above differences may be only sexual. But were it otherwise, they would alone scarcely warrant its specific discrimination.

Coryphæna Nortoniana.—"*Delfim.*"

This is a deeper fish than the preceding, in proportion to its length; with the front much steeper and bluffer; indeed, nearly vertical; the Dorsal fin beginning also somewhat forwarder. In the fin-formulæ, and number of the vertebræ (31), the two agree; and I have seen too few individuals at present to decide whether they really are distinct, or only so in sex. But for its spotted body, I should be greatly tempted to refer it to the imperfectly known *C. imperialis, Raf.* (See Cuv. and Val., Hist. 9, 286.) In this uncertainty as to

both rank and synonyms, less ultimate confusion will result from a distinct specific name, applied provisionally, than from a doubtful reference. It is therefore called after the Honourable C. E. C. Norton, to whose able pencil I was first indebted for a knowledge of the fish. Two other supposed individuals have since occurred, of which, however, one was unfortunately neglected, and the other had been two much injured by a blow, beating in the interparietal crest, to be fully satisfactory. This last individual, taken November 22nd 1838, was apparently a male; but I could not satisfy myself completely even on this point, and infer it only from my inability to discover any trace of the ovaria.

Coryphæna equisetis, L. 1, 447.—"Dourada," "*D. femea*," or "*D. amarella*."—*C. equisetis*, Cuv. and Val., 9, 297, *t.* 267.

This may at once be distinguished from the foregoing species by its unspotted body, marked only by a few scattered, clear, but extremely minute black specks, very different from the diffused, pale, dusky, larger, spots of the preceding. The pectoral fins are also very short, the dorsal fin with fewer rays (53–55), the number of vertebræ greater (33), the form deeper and less elongated than even in the first species here recorded. It also is a smaller fish. Being our commonest species, I have seen numerous examples, but none exceeding two feet in length. The average length is very uniformly from twenty to twenty-two or twenty-three inches.

This fish, which is the commonest of the "Dourados" of Madeira, differs from *C. equisetis*, L., as described by MM. Cuv. and Val., under the name of *C. equisetis*, only in the head being rather longer than high, instead of higher than long, in the dorsal fin being lower in its highest part, and also lower *before* than *at* its hinder end; and lastly in the profile being oblique from the beginning, whilst in *C. equisetis*, Cuv. and Val., "il monte d'abord verticalement sur le tiers à peu près de son contour." The first three discrepancies might well be merely due to slightly different modes of measurement. The latter is less easily accountable; for in this Maderan fish at least, of which I am well acquainted with both sexes, I find nothing to confirm M. Dussumier's observation, that a greater height of the interparietal crest is characteristic of the male in *Coryphæna*. See Cuv. and Val. 12, Pref. p. vii.

Pompilus Rondeletii, Will. 215, *t.* O. 1, *f.* 6.

Centrolophus pompilus, Yarr. 1, 158.

——————— *pompilus*, Cuv. and Val. 9, 334, *t.* 269.

——————— *morio* (Lacep.) Ib. 342. Rariss.

Two examples have occurred during the writing of this paper;

the first was uniformly blackish, without spots or marks, thus answering to *Centrolophus Morio* of Lacepède: the second individual was smaller, and was marked precisely as in MM. Cuvier and Valenciennes' figure (t. 269) of *C. pompilus*.

I have no hesitation in uniting both these fishes, with their respective synonyms, under the name long since applied by Willoughby to designate the species; although by him employed especially in reference to the second state or variety abovementioned, which also was the variety originally described by Rondeletius.

Pompilus Bennettii.

Leirus Bennettii, nob. in Cam. Trans. VI. 1, 199, *t.* V.—Syn. Mad. Fish, p. 179.

Centrolophus ovalis, Cuv. and Val. IX. 346.

——————— *crassus*. Ib. 348.

The genus *Leirus* proves identical with *Centrolophus*, Lac., which in its turn, if not intolerable in itself (see Cuv. and Val. IX. 331.), must yield precedence to the prior claims of *Pompilus*, Rond. The species described by the Ichthyologist of Montpellier, (*Centrolophus pompilus*, Auct.) ought, on the other hand, as long ago by Willoughby, to be called *Pompilus Rondeletii*.

Brama Raii, Bl. "*Freira.*"—Syn. Mad. Fish, p. 179.

The true affinities of this fish are most assuredly Scombridal, or to speak more strictly, Coryphænidal.

It was in reconsidering those of *Brama*, and in reaching this conclusion, that I was first led to detect the true affinities and synonyms of *Leirus*. It was not till convinced of the necessity of placing *Brama* next to *Pompilus* (*Centrolophus*, Lac.), that I discovered *Leirus Bennettii* to be a genuine species of this last-named genus.

So valuable are these studies of affinities; and thus do even errors often lead to valuable truth. I was not wrong, however, in associating *Leirus Bennettii* with *Brama*; but in not referring sooner it, or rather both, to the neighbourhood of *Pompilus*.

Fam. Zenidæ.

Zeus Faber.

Fam. Mugilidæ.

Mugil maderensis. "*Tainha de moda.*"

This is the fish published, in the former part of this list, under the name and with the synonyms of *M. Chelo*, Cuv. Comparing it, however, more closely with the description of *M. Chelo* in the eleventh volume of MM. Cuvier and Valenciennes' Histoire, I find the following principal discrepancies in the Maderan fish:

1. The produced scaly appendages at the base of the first dorsal fin extend considerably beyond the base of the fourth spine.

2. The maxillary is but very slightly S-like.

3. The upper lip is by no means peculiarly thick and fleshy, but rather the contrary.

4. It is a shallower, less deep fish in proportion to its length.

5. The tongue is altogether smooth, without any "asperités" whatever, at the edges or anterior end of the "arête," which cannot be called "très-aigue."

6. The palate also is entirely smooth, not papillose near the vomer.

7. A conspicuous bright metallic brassy spot on the opercula, as in *M. auratus*, Cuv. and Val.

It differs, however, essentially from this last-named species, and from *M. breviceps*, Cuv. and Val., in the exposure of the ends of the maxillary.

Fam. Gobidæ.

Having considerably extended my list of species, as well as rectified some errors in the nomenclature of others, I subjoin a complete enumeration of the Maderan species of this family hitherto discovered.

Blennius gattorugine, Will. Cuv. and Val. IX. 200. Will. Ichth. 132. t. H. 2. f. 2.—Yarr. 1, 226. Rariss.

A single individual only has occurred.

Blennius palmicornis, Cuv. and Val. XI. 214. t. 320. Syn. Mad. Fish 185. Vulgaris.

Blennius Artedii, Cuv. and Val. XI. 231. —— *inæqualis* nob. Synops. Mad. Fish 185. haud Cuv. et Val. Rarior.

This is the little fish which, being formerly known to me only by a sketch, I had erroneously supposed to be referrible to *B. inæqualis*, Cuv. and Val. On better acquaintance it however proves their *B. Artedii*; and is indeed a most distinct and well-marked little species, scarcely exceeding two inches in length, and at once characterized by its active lively habits, its light tawny brown or yellowish olive colour, sprinkled all over with numerous minute white specks or dots, and the hollow, triangle-shaped, ciliate, occipital crest.

Blennius parvicornis, Cuv. and Val. XI. 257. Syn. Mad. Fish 185. Rariss.

Of this, as formerly of *B. Artedii*, I have no means of judging, except from some notes and a drawing taken by Miss Young, July 10th, 1835, during my absence from the island. My friend Mr. Yarrell has, however, examined the individual from which these were taken; and on his accuracy I rely entirely for the correctness of the

above name or reference. I had before supposed it to be undescribed, calling it *B. strigatus*.

Pholis lævis, Flem. Cuv. and Val. XI. 269. Yarr. 1, 230. Syn. Mad. Fish 185. Rarior.

I cannot help suspecting that MM. Cuvier and Valenciennes' Maderan specimen at least, discovered by my friend Henry Richardson, Esq., of Aber Hirnant, North Wales, of *Blennius trigloides*, Cuv. and Val. XI. 228, is really nothing but this state or variety of *Pholis lævis*, which differs from the ordinary European fish only in having five or six distinct dark blotches or "demi-bands" along the back. I have hitherto met with no other fish beside the present answering at all to their description of *B. trigloides*; whilst this state of *Pholis lævis*, although somewhat rare, is by no means so uncommon as to have been likely to escape Mr. Richardson's unwearied assiduity.

Salarias atlanticus, Cuv. and Val. XI. 321. Syn. Mad. Fish 185. Vulgaris.

Tripterygion nasus, Riss. Cuv. and Val. XI. 409. Syn. Mad. Fish 185. Rariss.

Gobius niger, *β*. nob.

———, L. Syn. Mad. Fish 185.

Gobius Maderensis, Cuv. and Val. XII. 55. Rarior.

I believe this to be a mere variety or state of the common European *G. niger*, Cuv. and Val., analogous to the above-mentioned Maderan state of *Pholis lævis*, Flem.

Gobius ephippiatus, *G. fuscus, maculatus et punctatus: capite nuchaque nudis, hac sulcata: pinnarum pectoralium dorsaliumque radiis haud productis: squamis magnis.*

D. 1ma. 6; D. 2da. 12; A. 11; P. 19; V. 5; C. $\frac{5 \text{ v. } 6}{5 \text{ v. } 6} + \text{XV}$; B. M. 5. Rariss.

Of a nearly uniform brown colour, a little paler on the belly, with a row of darker rich brown patches along the sides, and above these numerous scattered smaller spots. Head spotted. The spots on the head and fore part of the body are ocellate, or surrounded by a ferruginous or yellow ring. The eyes are scarcely a semidiameter apart. The ventral fins are united, but by a very low membrane in front. Length of the only individual which has hitherto occurred, five inches. It appears sufficiently distinct from all the described European species by its naked head and nape.

Fam. Lophidæ.

Cheironectes bicornis. *C. hispidus, setis furcatis, nudus sex-appendiculatus, pallide ruber, punctulis fuscis conspurcatus:*

fronte super oculos bicorni; cornu anteriore distincto, recurvo; posteriore gibboso-cristiformi; filamento intermedio inconspicuo: brachiis pectoralibus ventralibusque exsertis.

D. 12; A. 7; P. 10; V. 5; C. $\frac{1+I}{1+I}$ + V.

A single individual only has occurred of this pretty little species, which in the foregoing characters appears distinct enough from all enumerated by MM. Cuv. and Val.; approaching, perhaps, nearest to *Ch. furcipilis, pardalis,* or *coccineus.* It was only one and three-fourths of an inch long, and seven-eighths of an inch deep. The whole fish is strongly scabrous to the touch.

Fam. Labridæ.

Crenilabrus caninus, nob. Synops. 186.

A most remarkable variety of this fish has the preopercle perfectly entire; invalidating thus completely the generic character. This state of the species appears permanent, and independent of age or size; whilst it is wholly unaccompanied by other marks of difference or indications of disease. It is rare comparatively with the normal form.

Crenilabrus luscus, nob. in Syn. Mad. Fish 187; nec Yarrellii nec Linnæi.

This also proves distinct from Mr. Couch's Scale-rayed Wrasse (*Acantholabrus Couchii,* Cuv. and Val. 13. 248), to which, as figured by Yarrell for the *Labrus luscus,* L. (a true *Labrus,* according to Valenciennes,) I had formerly referred it. A still nearer ally appears, however, to be *Acantholabrus Palloni,* Cuv. and Val. 13. 243 (*Crenilabrus exoletus,* Risso, haud *Labrus exoletus,* L.). From this it differs in the extension up between each of the spines of the dorsal and anal fins of generally four of the large scales into a curious distinct and moveable imbricated appendage; in the large dark spot or patch on the hinder end of the spiny portion of the dorsal fin; in having two dark spots on each side at the base of the caudal fin, one on the dorsal, and another fainter on the ventral line; and lastly in the general colour. In the first and last of these four points, it agrees better with *Acantholabrus Couchii,* Val. (*Crenilabrus luscus,* Yarr., Brit. Fish. 1. 300); but it differs in the other two, is only half the size, and whilst the dorsal and the anal fins have severally one spine less, the dorsal has one soft ray more.

Labrus reticulatus.

This fish cannot be at present safely referred to the Ballan Wrasse of British Authors (*Labrus maculatus,* Bl.), Yarr. 1. 275; although

in size and form of body, no less than in the peculiar lowness of the spiny portion of the dorsal fin, and abrupt production of the soft part of the same, and of the anal fin, as well as in the number of the rays of all the fins, there is a strong agreement. It will, I think, however, ultimately prove merely a dark variety of that species. The colour is peculiarly sombre; being a dark brown, approaching on the back almost to black; the whole beautifully reticulated with dark chesnut-brown lines, forming a border to each scale, and leaving the centre pale. The preoperculum was scaly. A single individual occurred in March 1838, and measured sixteen inches in length. Its fin-formula was,

D. 19 + 11; A. 3 + 9; P. 14; V. 1 + 5; C. $\frac{4+\overline{I+VI.}}{3+I+V.}$; B. M. 5.

This individual has been deposited in the Society's collection.

Julis melanura. *J. oblongus, postice nigrescens: capite superne dorsoque olivaceo-fuscis: lateribus perpendiculate strigatis; strigis posterioribus nigricantibus: pinnæ dorsalis antice altiores rudiis tribus primordialibus longioribus, operculique angulo lato truncato, basique primarum pectoralium cæruleo-nigrescente notatis: pinna dorsali analique fasciatis, basi nudis; caudali rotundato nigricante: squamis parvis: dente solitario majore ad canthum oris utrinque, antrorsum porrecto.*

D. 9 + 12; A. 3 + 12; P. 14 v. 15; V. 1 + 5; C. $\frac{4+VI.}{4+VI.}$; M. B. 6; Vert^{æ}. 25.

Julis speciosa, nob. in Syn. Mad. Fish 186; haud Rissoi.

———————, Cuv. and Val., Hist. 13. 375; quoad tantum exempla *Canariensia*, et forsan quidem *Maderensia*.

On re-examination and a close comparison of this fish with MM. Cuvier and Valenciennes' description of the true Mediterranean *J. speciosa*, of Risso, I find that it is properly distinct; although a Canarian individual at least of it has been referred by Valenciennes, as the Maderan fish was formerly by me, to Risso's species. It differs chiefly in the elevation of the three first rays of the dorsal fin, the spot on which is small, not large; in the deep blackness of the caudal fin and hinder part of the tail or body; and, lastly, in being of considerably larger size (8–10 inches in length) than the true Mediterranean *J. speciosa*, Riss. Not having met at present with any other fishes in Madeira which agree so nearly as *J. melanura* with that species, I cannot help suspecting that in M. Valenciennes' Maderan specimens of his *J. speciosa* may exist the principal peculiarities which he has expressly noted in Mr. Webb's Canarian example, and which are precisely those of *Julis melanura*.

Acantholabrus imbricatus. *A. pinna dorsali analique basi squamosis; squamis subquaternis, bractearum modo imbricatis, inter spinas assurgentibus: dorsalis parte spinosa postice unimaculato: cauda utrinque bimaculata: squamis magnis.*

D. 20 + 9; A. 5 + 8; P. 15; V. 1 + 5; C. $\frac{3\text{ v. }4}{3\text{ v. }4}$ + III; M. B. 5.

Fam. Fistularidæ.

Centriscus gracilis. *C. corpore gracili, angusto, elliptico-oblongo, supra fusco, lateribus argenteis: rostro producto, elongato: pinnæ primæ dorsalis, inter oculos pinnamque caudalem mediæ, spina secunda mediocri, breviore, pinnam caudalem nequaquam attingente.*

1ma D. 4 v. 5; 2da D. 11; A. 17; V. 1 + 4; P. 15; C. $\frac{7 + \text{IV}}{7 + \text{V}}$.

Rarior.

In its shape and colour this is very obviously different from the common red Snipefish (*C. Scolopax*, L.). But I have not been able to assure myself that the above differences are not sexual. They are not certainly dependent upon size. The depth averages from one-fifth to one-sixth and a half of the whole length, instead of one-fourth of the same. In two individuals of the same length within one quarter of an inch, the depth of the larger (*C. Scolopax*, L.) was very nearly double that of the smaller (*C. gracilis*, nob.) and the 2nd spine of the 1st dorsal fin was respectively in each one-fourth and one-seventh of the whole length of the fish.

Fam. Esocidæ.

Belone gracilis, nob.—"*Catuta.*"

Early in March last year (1838) a fisherman brought alive in sea-water two fishes, which, in their slenderness, and the upper jaw being only half the length of the lower, differed obviously from the common *B. vulgaris*. Measuring, however, seven or eight inches only in length, it seemed questionable, in the absence of equal-sized individuals of *B. vulgaris* for comparison, whether they might not be the young of that species. My friends, however, the Rev. L. Jenyns and Mr. Yarrell, have examined these two individuals, and the latter warrants me in stating, on their joint authority, that these two fishes are "not, in their opinion, *B. vulgaris*," being "much more slender for the same or equal length."

Scomberesox Saurus, Cuv.

The Portuguese name "*Delphine*" (rectius "*Delfim*",) is erroneously appended to this fish. Another individual has been lately brought to me with the name of "*Almeirão*," but the species is far

too rare to have obtained any permanent and genuine appellation in Madeira.

Fam. Salmonidæ.

Scopelus maderensis.

A small dark mulberry-coloured fish, which might easily be taken for the fry or young of *Pomatomus telescopus*, Risso. The dark vinous-coloured ground is concealed by very large deciduous platina-like scales. The only individual which has yet occurred was three inches long. It approaches very near to *Sc. Humboldti*, Risso, Hist. iii. 467. (supposed to be identical with Pennant's *Argentine*, Yar. 11. 94.), and has the row of longer silver dots, or pits, extending forwards from the root of the caudal fin along the ventral line: but it disagrees remarkably with the generic characters assigned to *Scopelus* by Cuvier, R. An. 2nd Ed. ii. 314, in having both the palatines and tongue aculeate with teeth.

The fin-formula in the Madeiran fish was

1st, D. 3 + 10; 2nd, D. 1 club- or feather-shaped;

A. 2 + 12; P. 13; V. 1 + 7; C. $\frac{7 + \overline{\text{I} + \text{IX}}}{6 + \overline{\text{I} + \text{VIII}}}$.

Gen. Alysia.

Corpus subelongatum, compressum; dorso postice ventreque spinoso-serratis. *Rostrum* brevissimum, ore rictuque magnis, hoc pone oculos diducto. *Dentes* minuti, tenues; in maxilla inferiore, Vomere, et Palatinis scobinati. *Lingua* postice lateribus subaculeolata.

Squamæ magnæ, haud deciduæ, scabræ; squamis lineæ lateralis latissimis, maximis, scutellatis, s. per totam longitudinem loricato-imbricatis.

Pinnæ ventrales sub apice pinnarum pectoralium sitæ. *Dorsales* duæ; prima inter Ventrales et Analem posita; 2da ad finem analis, rudimentali. *Pinna caudalis* minima, furcata.

Alysia loricata.

The spinoso-serrate ventral and hinder part of the dorsal lines, together with the peculiar scales of the lateral line, appear to forbid the blending of this interesting little fish with the Cuvierian genus *Aulopus*, as defined in the R. Anim., Ed. 2. ii. 315, though they have many characters in common. The Maderan fish is no less rare than elegant. It scarcely exceeds two inches in length. The back is a deep blue; the sides bright silvery or platina; and a row of dead-silver dots or pits extends along the ventral line, as in the *Scopelus* above described. The fin-formula is

1st, D. 2 + 10; 2nd, D. rudimentary; A. 2 + 21 (+ 8 detached depressed points or spines); P. 15 or 16; V. 1 + 5; C. $\frac{4 + \overline{\text{I} + \text{IX}}}{3 + \overline{\text{I} + \text{VIII}}}$.

Fam. Gadidæ.

Macrourus atlanticus.—"*Praga*" or "*Lagartixa do mar.*"—*M. fusco-cinereus, dorso vinoso, gutturis umbilico pinnisque ventralibus atris: squamis areolato-scaberrimis, echinalatis, ecarinatis, inermibus: oculis maximis.*

M. rupestris, nob. in Synops. Mad. Fish, p. 190, nec Bl. nec Cuv. et omiss. syn. *Lepidoleprus cœlorhynchus*, Risso.

On further examination, this most singular fish appears to be quite distinct from *M. rupestris*, Bl. t. 177; and therefore, according to Cuvier (R. Anim. 2nd Ed. ii. 337, note,) from *Lepidoleprus cœlorhynchus*, Risso, through which indeed alone I had referred it to the northern fish described by Bloch. But besides the points included in the specific character, the first ray of the first dorsal fin is neither serrate nor stronger than the rest. The diameter of the eye is one twelfth or one thirteenth part of the whole length, which scarcely exceeds one foot.

Fam. Pleuronectidæ.

Rhombus cristatus. *R. corpore oblongo-elliptico: oculis approximatis: dentibus tenuibus pectinatis; in maxilla superiore uniseriatis; in inferiore anguste scobinatis: pinnæ dorsalis dimidii anterioris radiis apice liberis; primordialibus* (2^{do} 6^{m}.) *productis, elongatis: latere* (*sinistro*) *fusco, immaculato: squamis* (*haud deciduis*) *magnis, margine scabris.*

D. 92; A. 75; V. 6; P. 1 + 9; C. $\frac{3 + \text{VI}}{3 + \text{V}}$. Rariss.

The Whiff of British authors (*R. megastoma*, Yarr. 2. 251) appears the nearest ally of this apparently new species. Indeed, except for Mr. Yarrell's more detailed account, I should have scarcely perhaps scrupled referring it to "La Cardine ou Calimande" of Cuvier's R. Anim. 2. 341, of which he says, "ses premiers rayons sont libres"; of course meaning of the dorsal fin. Nothing is, however, discernible of this in either Mr. Yarrell's figure or description of "The Whiff"; nor even, if correct, does it express sufficiently the peculiarity of this part in the Maderan fish. The only individual which has yet occurred was five and a quarter inches long.

Fam. Cyclopteridæ.

43. Lepadogaster zebrinus.—"*Chupa sangue.*" *L. fusco-nigrescens, lateribus postice strigis obliquis, nuchaque fasciis diver-*

gentibus saturatioribus maculisque binis cæruleis pyriformibus pictis: naribus biciliatis: pinnis dorsalibus analibusque caudali adnatis.

D. 17 v. 16; A. 10 v. 9; P. 15 v. 16; V^{s}. 4; C $\frac{7}{8}$ + X. Haud rara.

In the double nasal cilia, and connexion of the caudal with the dorsal and anal fins, this little fish agrees with *L. cornubicus* (Flem.), Yarr. 2. 264. The structure of the sucking disk is also similar to the representation of the same part in that species, and not to that of the "*bimaculated Sucker*," at p. 268. In this particular it perfectly agrees also with the former species indicated in my Synopsis, p. 190; which is, however, perfectly distinct specifically, having neither a nasal cilium nor the caudal fin united with the dorsal and anal fins. Of this last-mentioned species no second example has yet occurred. The present (*L. zebrinus*) is not by any means uncommon. It varies considerably in intensity of colour, and in the distinctness of the darker stripes upon the nape and flanks. The nasal cilia are of the general dark brown or blackish tint.

Fam. Echeneidæ.

SS. *Cauda lunata.*

Echeneis Remora, L. Syst. Ed. 12.—"*Pegador.*" *E. tota cinereo-fuliginosa, nigrescens: laminis disci* xvii. *v.* xviii.*; pinnis pectoralibus brevibus, ovatis, integris, apice rotundatis: lingua lævi.*

D. 23; A. 23; P. 26; V. 1 + 5; C. $\frac{3\text{ v. }4 + \text{VIII}}{3\text{ v. }4 + \text{VII}}$; M. B. 9. Rarior.

Echeneis pallida. *E. tota pallide cinerea, fuligineo hinc et hinc subnebulata: laminis* xix.*; pinnis pectoralibus brevibus, latis, apice rotundatis, subtruncatis, tenuiter crenulatis: lingua medio scobinata.*

D. 24; A. 22; P. 27; V. 1 + 5; C. $\frac{3\text{ v. }4 + \text{VIII}}{3\text{ v. }4 + \text{VII}}$; M. B. 9. Rariss.

SS. Cauda integra, S. truncata.

Echeneis jacobæa.—*E. tota cinereo-fuliginosa, nigrescens: laminis* xix.*: pinnis pectoralibus brevibus, latis, pectinato-rotundatis crenatis: ventre sulcato: lingua scabra.*

D. 24; A. 24; P. 21; V. 1 + 5; C. $\frac{3 + \text{VII}}{3 + \text{VIII}}$; M. B. 8. Rariss.

Echeneis vittata.—*E. purpureo-nigrescens, pallido variegata, fasciaque nigra longitudinali laterali, antice utrinque albo marginata: pinnis pectoralibus ovatis, acutiusculis, integris; pinnæ dorsalis analisque antice caudalisque marginibus albis: laminis* xxiv.*: lingua scabra: oculis magnis: corpore elongato, postice valde attenuato, gracili.*

D. 39; A. 39; P. 22; V. 1 + 5; C. $\frac{1 + \text{VIII}}{1 + \text{VII}}$. Rariss.

The nearest ally of this very distinct species appears to be *E. lunata*. Bancr. in Zool. Journ. V. 413. t. 18. But this, besides other differences, has a lunate tail.

Echeneis brachyptera. (Echeneis ——— ? Syn. p. 191.) *E. cinereo-fuliginosa, nigrescens; pinnis dorsalibus analibusque antice albo submarginatis: laminis* xvi.*: pinnis pectoralibus brevibus, latis, truncatis, integris: lingua medio scobinata.*

D. 28; A. 24; P. 26; V. 1 + 5; C. $\frac{3\text{ v. }4 + \text{VII}}{3\text{ v. }4 + \text{VII}}$; M. B. 8.

This is the first of the two species indicated by me in the former part of this List or Synopsis. Of the second sort, there mentioned as having been seen by Miss Young, and which I have there doubtfully referred to *E. naucrates*, L., no fresh example has occurred. I should now be much inclined to consider it identical with *E. vittata*; but Miss Young affirms that it was "certainly plain-coloured."

Fam. Muræniдæ.

Sphagebranchus serpens.

S. serpa, Risso, Hist. Nat. iii. 195. No. 81.

A single individual only has occurred, precisely answering to the description above referred to. It measured eleven inches in length. I could not detect the slightest rudiment of pectoral fins.

Fam. Gymnodontidæ.

Tetrodon capistratus. *T. pusillus, oblongiusculus lævissimus; dorso iliisque inermibus, nudis; ventre adpresso-spinelloso: dorso fusco; lateribus ochraceo-fulvis, fusco longitudinaliter bifasciatis, capiteque utrinque cæruleo punctatis, iliis oblique lituratis, rostroque subproducto gulave semi-capistrato: pinna caudali utrinque nigro-limbata.*

D. 9; A. 8; P. 16; C. $\frac{2}{2\text{ v. }3}$ + VIII. Rariss.

A most elegantly-coloured little species, which I cannot refer with certainty to any already described. Only two individuals have hitherto occurred. The first was little more than two inches long; the second nearly twice as large.

The *Orthagoriscus* of Madeira, called by the fishermen, "*Peixe Porco*," or "Bouto," I forbear at present to designate further, not having seen a sufficient number of individuals to determine its characters. The caudal fin is produced into a short point in the middle, not truncate, as in all the figures to which I have access of the European Sun-fishes.

Fam. Squalidæ.

Carcharius falcipinnis. "*Faqueita.*" *C. corpore supra griseo-cinereo, subabbreviato, medio crassiore s. altiore, utrinque attenuato: rostro brevi, lato, depresso, apice obtuso: oculis rotundatis: pinna dorsali prima alta, triangulari, subantica s. supra medium pinnarum pectoralium posita: pinnis pectoralibus falcatis, angustis, elongatis, apice obtusis: pinna dorsali secunda analique oppositis: ventralibusque parvis.* Rariss.

An *Squalus ustus*, Dum.?

It is perhaps only for want of better materials for comparison that I have been unable to refer this Shark precisely to the above-indicated or to some other described species. It is about three feet long, and the female differs in nothing from the male. The teeth are precisely similar to those of the "*Tintureira*" (*C. glaucus*, Cuv.).

The "*Marraxo*" proves to be, as I suspected, *Lamna cornubica*, Cuv., adult, or of large size.

Gen. Acanthidium.

Corpus gracile, elongatum. *Spiracula* magna. *Pinnæ dorsales* duæ, antice spiniferæ; secunda majore postica, caudæ approximata. *Pinna analis* nulla. *Pinnæ ventrales*, subposticæ s. secunda dorsalis subanteriores.

Dentes utriusque maxillæ dispares, parvi: superioris laniarii, plano-triangulares, tenues, acuminati; acumine recto; basi utrinque denticulo aucto; antice triseriati, lateribus biseriati: inferioris incisorii, acumine utrinque a medio oblique deflexo, uni- vel bi-seriati. *Cauda* oblique oblonga, apice truncata.

This new genus appears exactly intermediate between the established genera of Cuvier, *Spinax* and *Centrina*: agreeing with the former in its elongated form, and with the latter in the teeth.

The ventral fins are placed more backward than in *Spinax*, but rather forwarder than in *Centrina*, i. e. neither halfway between the two dorsal fins, nor opposite the second dorsal fin, but just before the second dorsal fin, which begins exactly opposite the termination of their base. The tail or caudal fin resembles that of *Spinax*, rather than of *Centrina*, and the spines of *both* the dorsal fins are reflexed as in *Spinax*, forming the fore-edge of each fin. The pectoral fins are abruptly truncate. The second dorsal fin is greatly larger than the first; in which it differs equally from *Spinax* and *Centrina*. The teeth are not arranged quincuncially, but behind each other in rows.

Two species have occurred, both of which have hitherto been confounded with *Centrina*.

Acanthidium pusillum. "*Gata negra.*" *A. totum atrum, pusillum: rostro crassiusculo: dentibus inferioribus uniseriatis: spiraculis oculo remotiusculis.*

Centrina? nigra, nob. olim in Proceed. Zool. Soc. 1833, p. 144*. Syn. Mad. Fish in Trans. Zool. Soc. p. 194. Rariss.

Four individuals of this curious little shark have now occurred, agreeing equally in the foregoing characters and in their dimensions, varying in length only from eleven to twelve inches. The second dorsal fin is somewhat forwarder or more distant from the origin of the tail than in the next species.

The condition of the teeth, and constancy of size, both indicate an adult fish; and a comparison of the present species with the fœtal and adult state of the following, in these two points alone demonstrates *Acanthidium pusillum* to be no stage of *A. calceus*.

Acanthidium calceus. "*Sapata.*" *A. purpureo-fuscum, subtus pallidius: rostro plano-depresso: dentibus inferioribus biseriatis: spiraculis oculo, pinnaque dorsali secunda caudæ approximatis.*

Centrina Salviani, Syn. Mad. Fish in Trans. Zool. Soc. p. 194: nec aliorum. Rarior.

This shark very much resembles in its general aspect *Scymnus nicæensis*, Risso, the "*Gata*" of Madeira: but is at once distinguished by the spines in front of the two dorsal fins, which, as in *A. pusillum*, are both recurved, and ought, had I attended to the excellent figures copied by Willoughby from Salviana of *Centrina nigra*, Cuv., instead of allowing myself to be deceived by a miserable figure of Lacepède's, alone to have preserved me from the blunder of referring to that species for the present shark, the usual size of which exceeds by a few inches only three feet.

Fam. Raiidæ.

Raia oxyrhynchus, Will., Ichth. p. 71.—"*Raia.*"

Sharp-nosed Ray, Penn., Ed. 1. iii. 83. No. 31. Yarr., Brit. Fish. ii. 424.

Two male individuals only have occurred: the largest, measuring three feet in width from wing to wing, was furnished on the back with patches of strong hooked spines or prickles, much as in the figure in the British Fishes; but the second example, scarcely two

* A serious erratum has been caused here by the transposition of a sentence. The paragraph referred to should stand thus: "It (*Centrina? nigra*) is intermediate in characters between *Centrina*, Cuv., and *Acanthias*, Risso, having the teeth of the former genus as well as the backward position of the second dorsal (*rectius* ventral) fin, and the form of body of the latter."

feet wide, although decidedly a male, was devoid of these appendages. The colour of the upper surface was a pale, dull, yellowish, or ashy-grey, obscurely mottled or dappled with a few scattered distant paler whitish spots.

Trygon altavela.—"*Andorinha do mar.*" *T. corpore rhomboideo, duplo latiore quam longo, alis expansis, cauda perbrevi.*

Pastinaca marina altera πτερυπλατεῖα, Altavela Neapoli dicta *Columnæ*. Will., Hist. 65. Tab. C. 1. f. 3. (Copied from F. Columna.)—Rariss.

A single female individual only has occurred, measuring five feet and a half from tip to tip of wings.

LII.—*Information respecting Botanical Travellers.*

Extracts from a Journal of the Mission which visited Bootan, in 1837-38, *under Captain* R. Boileau Pemberton. By W. Griffith, Esq. Madras Medical Establishment*.

The Mission left Gowahatti on the 21st December, and proceeded a few miles down the Burrumpootur to Ameengoung, where it halted.

On the following day it proceeded to Hayoo, a distance of thirteen miles. The road, for the most part, passed through extensive grassy plains, diversified here and there with low rather barren hills, and varied in many places by cultivation, especially of *sursoo*. One river was forded, and several villages passed.

Hayoo is a picturesque place, and one of considerable local note; it boasts of a large establishment of priests, with their usual companions, dancing girls, whose qualifications are celebrated throughout all Lower Assam. The village is a large one, and situated close to some low hills; it has the usual Bengal appearance, the houses being surrounded by trees, such as betel palms, peepul, banyan, and caoutchouc. To Nolbharee we found the distance to be nearly seventeen miles. The country throughout the first part of the march was uncultivated, and entirely occupied by the usual coarse grasses; the remainder was one sheet of paddy cultivation, interrupted only by topes of bamboos, in which the villagers are entirely concealed; we found these very abundant, but small: betel palms continued very frequent, and each garden or enclosure was surrounded by a small species of screw pine, well adapted for making fences.

Four or five streams were crossed, of which two were not fordable: jheels were very abundant, and well stocked with water fowl

* From the Journal of the Asiatic Society of Bengal, No. 87, p. 208.

and waders. At this place there is a small bungalow for the accommodation of the civil officer during his annual visit; it is situated close to a rather broad but shallow river. There is likewise a bund road.

We proceeded from this place to Dum-Dumma, which is on the Bootan boundary, and is distant ten miles from Nolbharee. We continued through a very open country, but generally less cultivated than that about Nolbharee; villages continued numerous as far as Dum-Dumma.

December 31*st*. We left for Hazareegoung, an Assamese village within the Bootan boundary.

We passed through a much less cultivated country, the face of which was overrun with coarse grassy vegetation. No attempts appeared to be made to keep the paths clean, and the farther we penetrated within the boundary, the more marked were the effects of bad government. We crossed a small and rapid stream, with a pebbly bed, the first indication of approaching the Hills we had as yet met with.

We left on January 2d for Ghoorgoung, a small village eight miles from Hazareegoung; similar high plains and grassy tracts, almost unvaried by any cultivation, were crossed; a short distance from the village we crossed the Mutanga, a river of some size and great violence during the rains, but in January reduced to a dry bouldery bed. There is no cultivation about Ghoorgoung, which is close to the Hills, between which and the village there is a gentle slope covered with fine sward.

We entered the Hills on the 3d, and marched to Dewangari, a distance of eight miles. On starting we proceeded to the Durunga Nuddee, which makes its exit from the Hills about one mile to the west of Ghoorgoung, and then entered the Hills by ascending its bed, and we continued doing so for some time, until in fact we came to the foot of the steep ascent that led us to Dewangari. The road was a good deal obstructed by boulders, but the torrent contains at this season very little water.

The mountains forming the sides of the ravine are very steep, in many cases precipitous, but not of any great height. They are generally well-wooded, but never to such a degree as occurs on most other portions of the mountainous barriers of Assam. At the height of about 1000 feet we passed a choky, occupied by a few Booteas, and this was the only sign of habitation that occurred.

Dewangari, the temples of which are visible from the plains of Assam, is situated on a ridge, elevated about 2100 feet above the

level of the sea, and 1950 above that of the plains. The village extends some distance along the ridge, as well as a little way down its northern face. The centre of the ridge is kept as a sort of arena for manly exercises; about this space there occur some picturesque simool trees, and a few fig trees, among which is the banyan.

During our long stay at this place we had many opportunities of forming acquaintance with the Soobah, as well as with the immediately adjoining part of his district. We found this almost uncultivated, and overrun with jungle. No large paths were seen to point out that there are many villages near Dewangari; in fact the only two which bear marks of frequent communication, are that by which we ascended, and one which runs eastward to a picturesque village about half a mile distant, and which also leads to the plains.

The Soobah we found to be a gentlemanly unassuming man; he received us in a very friendly manner and with some state; the room was decently ornamented, and set off in particular by some well-executed Chinese religious figures, the chief of which we were told represented the Dhurma Rajah, whose presence even as a carved block was supposed to give infallibility. We were besides regaled with blasts of music. His house was the most picturesque one that I saw, and had some resemblance, particularly at a distance, to the representations of some Swiss cottages. It was comparatively small, but as he was of inferior rank, his house was of inferior size.

The population of the place must be considerable; it was during our stay much increased by the Kampa people, who were assembling here prior to proceeding to Hazoo. Most of the inhabitants are pure Booteas; many of them were fine specimens of human build, certainly the finest I saw in Bootan: they were, strange to say, in all cases civil and obliging. Cattle were tolerably abundant, and principally of that species known in Assam by the name of *Mithans*; they were taken tolerable care of, and picketed in the village at night: some, and particularly the bulls, were very fine, and very gentle. Ponies and mules were not uncommon, but not of extraordinary merits. Pigs and fowls were abundant. The chief communication with the plains is carried on by their Assamese subjects, who are almost entirely Kucharees: they bring up rice and putrid dried fish, and return with bundles of manjistha.

On the 23rd, after taking a farewell of the Soobah, who gave us the Dhurma's blessing, and as usual decorated us with scarfs, we left for Rydang, the halting-house between Dewangari and Khegumpa, and distant eight miles from the former place. We reached it late in the evening, as we did not start until after noon. We first de-

scended to the Deo-Nuddee, which is 800 or 900 feet below the village, and which runs at the bottom of the ravine, of which the Dewangari ridge forms the southern side, and we continued ascending its bed, almost entirely throughout the march. The river is of moderate size, scarcely fordable however in the rains; it abounds with the fish known to the Assamese by the name of Bookhar, and which are found throughout the mountain streams of the boundaries of the province.

24th. Left for Khegumpa. The march was almost entirely an uninterrupted ascent, at least until we had reached 7000 feet, so that the actual height ascended amounted nearly to 5000 feet. It commenced at first over sparingly wooded grassy hills, until an elevation of about 4000 feet was attained, when the vegetation began to change; rhododendrons, and some other plants of the same natural family making their appearance. Having reached the elevation of 7000 feet by steep and rugged paths, we continued along ridges well clothed with trees, literally covered with pendulous mosses and lichens, the whole vegetation being extra-tropical. At one time we wound round a huge eminence, the bluff and bare head of which towered several hundred feet above us, by a narrow rocky path or ledge overhanging deep precipices; and thence we proceeded nearly at the same level along beautiful paths, through fine oak woods, until we reached Khegumpa; the distance to which, although only eleven miles, took us the whole day to perform.

This march was a beautiful, as well as an interesting one, owing to the changes that occurred in the vegetation. It was likewise so varied, that although at a most unfavourable season of the year, I gathered no fewer than 130 species in flower or fruit. Rhododendrons of other species than that previously mentioned, oaks, chesnuts, maples, violets, primroses, &c. &c. occurred. We did not pass any villages, nor did we meet with any signs of habitation, excepting a few pilgrims proceeding to Hazoo.

Khegumpa itself is a small village on an exposed site; it does not contain more than twelve houses, and the only large one, which as usual belonged to a Sam Gooroo, appeared to be in a ruinous state. The elevation is nearly 7000 feet. The whole place bore a wintery aspect, the vegetation being entirely northern, and almost all the trees having lost their leaves. The cold was considerable, although the thermometer did not fall below 46°. The scarlet tree rhododendron was common, and the first fir tree occurred in the form of a solitary specimen of *Pinus excelsa*. In the small gardens attached to some of the houses I remarked vestiges of the cultivation of tobacco

and Probosa*. In the valleys however surrounding this place there seemed to be a good deal of cultivation, of what nature distance prevented me from ascertaining.

25th. Left for Sasee. We commenced by descending gradually until we had passed through a forest of oaks, resembling much our well-known English oak; then the descent became steep, and continued so for some time; we then commenced winding round spurs clothed with humid and sub-tropical vegetation; continuing at the same elevation we subsequently came on dry open ridges, covered with rhododendrons. The descent recommenced on our reaching a small temple, about which the long-leaved fir was plentiful, and continued without interruption until we reached a small torrent. Crossing this, we again ascended slightly to descend to the Dimree river, one of considerable size, but fordable. The ascent recommenced immediately, and continued uninterruptedly at first through tropical vegetation, then through open rhododendron and fir woods, until we came close upon Sasee, to which place we descended very slightly. This march occupied us the whole day. After leaving the neighbourhood of Khegumpa we saw no signs of cultivation; the country, except in some places, was arid; coarse grasses, long-leaved firs, and rhododendrons forming the predominating vegetation. We halted at Sasee, which is a ruined village, until the 28th. The little cultivation that exists about it is of barley, buckwheat, and hemp.

28th. We commenced our march by descending steeply and uninterruptedly to the bed of the Geeri, a small torrent, along which we found the vegetation to be tropical; ascending thence about 5000 feet, we descended again to the torrent, up the bed of which we proceeded for perhaps a mile; the ascent then again commenced, and continued until we reached Bulphai. The path was generally narrow, running over the flank of a mountain whose surface was much decomposed; it was of such a nature that a slip of any sort would in many places have precipitated one several hundred feet. The face of the country was very barren, the trees consisting chiefly of firs and rhododendrons, both generally in a stunted state. The vegetation was not interesting until we came on a level with Bulphai, when we came on oaks and some other very northern plants. We were well accommodated in this village, which is a very small one, situated in a somewhat sheltered place, and elevated to 6800 feet above the sea. The surrounding mountains are very barren on their southern faces, while on the northern, or sheltered side, very fine

* *Eleusine coracana.*

oak woods occur. The houses were of a better order than those at Sasee, and altogether superior to those of Khegumpa. They are covered in with split bamboos, which are secured by rattans, a precaution rendered necessary by the great violence of the winds, which at this season blow from the south or south-east. Bulphai is a bitterly cold place in the winter, and there is scarcely any mode of escaping from its searching winds. The vegetation is altogether northern, the woods consisting principally of a picturesque oak, scarcely ever found under an elevation of 6000 feet. There is one small patch of cultivation, thinly occupied by abortive turnips or radishes, and miserable barley. It was at this place that we first heard the very peculiar crow of true Bootan cocks, most of which are afflicted with enormous corns.

On the 31st we resumed our journey, ascending at first a ridge to the N.E. of Bulphai, until we reached a pagoda, the elevation of which proved to be nearly 8000 feet; and still above this rose to the height of about 10,000 feet a bold rounded summit, covered with brown and low grass. Skirting this at about the same level as the pagoda, we came on open downs, on which small dells, tenanted by well-defined oak woods, were scattered. After crossing these downs, which were of inconsiderable extent, we began to descend, and continued doing so until we came to Roongdoong. About a third of the way down we passed a village containing about twenty houses, with the usual appendage of Sam Gooroo's residence; and still lower we came upon a picturesque temple, over which a beautiful weeping cypress hung its branches. We likewise passed below this a large temple raised on a square terrace basement. From this the descent is very steep, until a small stream is reached, from which we ascended very slightly to the castle of Roongdoong, in the loftiest part of which we took up our quarters. From the time that we descended after crossing the downs, the country had rather an improved aspect, some cultivation being visible here and there. We met a good many Kampas, pilgrims, and one chowry-tailed cow, laden with rock salt, which appears to be the most frequent burden.

[To be continued.]

Mr. Schomburgk's recent Expedition in Guiana.

[Continued from p. 328.]

When marching early in a morning over the savannahs, and on approaching an Indian settlement, we frequently observed on the small sandy footpath a number of marks, which a hasty observer would

have pronounced to be the prints of dogs' feet. The Indian is better acquainted with them; they are a sure proof that a pack of Carasissi paid the preceding night a visit to the hen-roost at the next Molocca or Indian village; and on entering it, the long faces of the squaws, and their vociferous gesticulations, spoke volumes of the depredations which these night robbers had committed among the feathered stock.

The Carasissi or Savannah dog, as it is called by the colonists, is the only animal allied to the dogs found in Guiana. It does not attain the size of the fox, but is of a stronger make than that animal, and has a shorter tail and more obtuse muzzle. In the form of the head and position of the eyes, it approaches more nearly to the dogs, and, in fact, appears to be intermediate between them and the foxes; and while these refuse to mix together, the Carasissi is much sought after by the Indians to make a cross breed with their dogs. There are few of these animals in the neighbourhood of the sea-coast, or in the cultivated part of Guiana; but on the savannahs they are found hunting in large packs. They pursue their prey principally by the eye, but in thick woods they follow it by the scent. During our expedition up the river Berbice, some of our hunters met with a pack of Carasissis; and they succeeded in securing one alive, but not having tied it sufficiently it gnawed its ropes and escaped. While we sojourned in Pirara, one was shot in the act of committing depredations among the poultry. It measured 2 feet 2 inches from the snout to the insertion of the tail, the latter being $10\frac{3}{4}$ inches in length. The breast and belly were of a dusky white, the other parts of a deep buff colour, with the exception of the muzzle and the ears, which were dark, approaching almost to black. The tail was not so bushy as that of the fox, nor was it so long. They carry their ears erect.

They vie in cunning and art with the European fox, and the depredations which they commit on the hen-roosts are considerable. Their favourite haunts are thickets near open savannahs, and if a pack succeed in entering the village and in surprising the Indians' poultry, few escape, as they completely surround the roosting-place, and generally carry off their spoil before the inhabitants have any idea of their presence. I have been assured by the Indians that they soon run down deer, and pursue their game under full cry. They destroy in other ways large quantities of game.

I bought in the commencement of November a young one, which I considered about three weeks old. Its fur was darker than that of the adult; we fed it on boiled yams, ripe plantains, meat, and fish.

It appeared chiefly fond of plantains, and would follow those who fed and nursed it like a dog. When incensed it growled like a puppy, but when in pain or tired of walking it would raise its voice to a harsh grating tone. They seldom lose, even when domesticated, their depredatory habits, and those Indians who raise them for the sake of procuring a cross breed with the dog, are obliged to keep them tied, as otherwise they would kill all the fowls and parrots*. It is called by the Macusis MAIKANG, in Warrau WARITYOU.

The variety which has sprung from the breed between the Indian domestic dog and the Carasissi more resembles the dog, its body is however longer in proportion to its size, and its ears are pricked up. Their progeny become prolific. They are hardy, and many of them prove excellent hunters; they are therefore very much prized by the Indians, who pay great attention to their training.†

These extensive savannahs are likewise the favourite haunt of the Brown Coati (*Nasua fusca*) of the colonists, or Quasy and Kibihi of the natives of Guiana. They measure about 18 inches, and the tail, which is nearly the same length, is always carried erect. It is brown, brightening to a rust colour on the belly and breast; the tail brown, with rings of black; the snout long and moveable; the canine teeth strong and hooked; legs short, the hind a little longer than the fore ones; the feet long; it walks always upon its heels like the bears, frequently standing upon its hind legs.

They live in large societies, and know how to defend themselves bravely if attacked by dogs; indeed they fall often *en masse* upon them and kill the assailants. They are excellent climbers; and in

* The Carasissi is Desmarest's *Canis cancrivorus*, of which he gives the following description, communicated to me since writing the above by Mr. Waterhouse:

Canis cancrivorus, Desmarest.

"Pélage cendré et varié de noir en dessus, parties inférieures d'un blanc-jaunâtre; oreilles brunes; côtés du cou derrière les oreilles, fauves; tarses et bout de la queue noirâtres.

	Pieds.	Pouces.
Longueur du corps	2	4
Longueur de la queue	0	11

Il fait sa proie des Agoutis et des Paca, &c. et il mange aussi des fruits, tels que ceux du bois rouge. Il va par petites troupes de dix ou sept individues.

Patrie. La Guyane Française."

† A good dog of that description which is trained to hunt deer, tapir, wild hogs, paca or laba, &c. generally fetches a price of from ten to twelve pounds sterling: the dogs imported from Europe suffer much from the effects of the climate, and some kinds, as greyhounds, foxhounds, spaniels, pointers, cockerels, &c. seldom thrive. Terriers and bull-dogs appear to accustom themselves earlier to the climate.

descending a tree they always come down head foremost. Their food consists of insects, fruits, roots and such small prey as they are able to secure. They are destructive to young birds, and expert in digging after large beetles, for which their claws, which are very strong, are admirably adapted. They do not burrow in the ground for a residence.

A friend of mine in Berbice possessed a brown Coati which was domesticated. In its disposition it was extremely mild, and very fond of being caressed; it was sometimes induced to play, although it evidently preferred passing the greater part of the day asleep, rolling itself up in a lump. When receiving its food it sat apparently with great ease on its hinder legs, and thrusting its nails into the food, it carried it in this position with both its paws to the mouth. It possessed the peculiarity of gnawing on its own tail, which organ bore the marks of this strange propensity. Its smell was strong and disagreeable, and would have deterred many from keeping such an animal in their house.

Although it seemed generally to derive great pleasure from being stroked down the back, when it received these caresses from its master it would turn over, and return with its paws these caresses or thrust its long muzzle under the sleeve, uttering at the same time a soft and gentle cry. If a cat or a dog approached it, the soft cry would change to a shrill sound.

While travelling over the savannahs we have frequently met them at broad daylight, and I recollect once a chase ensued that was highly characteristic. The instant poor Quasy perceived itself pursued it made for the high grass, where no doubt it would have been able to hide itself, if its tail, which it carried erect, did not point out its situation. We found the single dog in our company unable to contend with it, the Indians assisted therefore to dislodge it from the retreat which the high grass partially afforded. The Coati now made for the open savannah, the Indians following the harassed animal shouting, the dog barking: it chose a path embarrassed with thorns and briars, and took to the swampy ground below the stately Mauritius palms; but this was of no avail, its pursuers not being deterred; like a hare it doubled back to the spot grown over with high grass, where it vainly sought for protection. Its strength being exhausted, it was soon seized by its long tail by one of the Indians; but even here it defended itself with desperate obstinacy; the Indian was obliged to loose his hold, and a new scuffle arose: wherever it turned it met an enemy; beaten with bows and long poles, fired at with arrows,

rows, worried by the dog, it at last expired; but I have seldom seen such tenacity of life evinced as in this small animal.

Naturalists differ whether *Nasua fusca* and *rufa* are distinct in species or mere variations in colour. I must confess that I have seen every variety of shade in the brown species, and a change in the colour of the fur takes place at the setting in of the rainy season in May, when they are generally darker. Nevertheless the Indians have told me of a black species, which they say is to be found in the land of the Waccawai Indians, who inhabit the banks of the Mazarung. I have never had the fortune to meet with it; however I possess the following note from Mr. Vieth, who, as already observed, accompanied me during my late expeditions:—

"I have seen only one specimen, which was brought by Macusis, who came from the Essequibo by land over to the Demerara river. It was a size larger than the largest brown coati I have seen, and of a shining black, with the exception of the tail, which was ringed with white. In its habits and proportions it resembled exactly the brown coati."

The geographical range of the *Nasua fusca* extends over Guiana, and is to be met with as well at the coast regions as at the plains of the interior; and since we know that it inhabits Brazil likewise, its distribution appears of great extent.

Although the Racoon is not an animal which inhabits the savannahs*, its relation to the preceding genus induces me to give now the few particulars which I know about its habits. It frequents the sea coast, and is generally found in the neighbourhood of inhabited spots, where it is destructive to poultry. It is about 2 feet long and 9 inches high; the head is large, snout full and thick, the ears of a moderate length; the nose is rather short, and more pointed than that of a fox; indeed its head reminds me of that of the hyæna. The fore feet are shorter than the hinder, the five claws sharp, strong, and with them and its teeth, which resemble those of a dog, it makes a vigorous resistance or attacks its prey with success. Its hair is long and shaggy, but very short upon the legs from the knee downwards; the colour of its fur is a light brown, the legs black, the tail thick, tapering towards a point and marked with black rings.

Among the favourite haunts of these animals are the thickets of Curida bushes (*Avicennia tomentosa*), which extend along the sea coast, where they feed upon crabs which they are expert in killing,

* It appears entirely local to the sea coast; the Macusi Indians do not know the animal. The Warrans from the Corentyn call it Oghia.

first tearing off their claws or nippers; and being thus disabled from doing harm, the crab dog or racoon uses its sharp teeth to break the shell. In their native state they sleep by day, and issue at dusk in search of food; birds, insects, roots, and vegetables, nothing comes amiss; and as they possess a particular fondness for sweets, I have been told by practical planters that the injury which they do to sugar plantations is very considerable.

They take their food with both paws like the squirrel, and are fond of dipping it in water. I have noted with astonishment that they drink as well by lapping like the dog as by sucking. I have had several in a domesticated state, all of which possessed this peculiarity.

They are very active; their sharp claws enable them to climb trees with great agility, and to leap with security from branch to branch. When on the ground they move forward by bounding, and in an oblique direction; nevertheless they are swift enough, and rarely fall a prey to their pursuers.

They are easily domesticated when taken young, and are then harmless and amusing, but our endeavours to accustom two adults which we had secured to a domesticated state proved entirely vain. We were obliged to keep them chained; they refused apparently to eat or drink, and died the first two weeks after we had entrapped them.

I have been told of a second species, but neither Mr. Vieth nor myself have ever met with it, nor have I been able to ascertain in what its distinguishing characters consist.

[To be continued.]

BIBLIOGRAPHICAL NOTICES.

Études de Micromammalogie. Revue des Musaraignes, des Rats et des Campagnols, suivie d'un Index méthodique des Mammifères d'Europe. Par Edm. De Selys-Longchamps, Membre de plusieurs Sociétés savantes. Paris, 1839. 8vo. pp. 165. pls. 3.

We deem it very desirable that this little work should be brought under the notice of our readers, as well on account of its intrinsic merits, as on that of its relating to certain groups which have recently attracted much attention in this country. It is also one of that class of books written exclusively for the benefit of the *working* naturalists, which of all others, in our opinion, tend most to the ad-

vancement of zoology. Its author is already known to the public by a small brochure published a few years back on the *Arvicolæ* of the neighbourhood of Liége*. In the work now under review, he has revised and described all the known species belonging to the three genera of *Sorex*, *Mus*, and *Arvicola* inhabiting Europe; and he has taken great pains in the investigation of their synonyms, and in the endeavour to fix their respective characters with certainty and precision, besides giving ample notices of all that had been observed respecting their habits and places of abode. As these genera belong to, or almost form in themselves, three distinct families of *Mammalia*, and two out of the three belong even to different orders, it is clear that they could not be collected into one group, established upon their mutual affinities, and offering any characters by which they might be distinguished in common from the rest of the class. It is this circumstance which has led M. De Selys-Longchamps to adopt as a title to his work the term 'Études de Micromammalogie;' indicating simply the study of the *Cheiroptera*, *Insectivora*, and *Rodentia*, or the three orders of *Mammalia* embracing the smallest species in the class, and none of which exceed a moderate size: and he disclaims all idea of attaching any further importance to this term, or of wishing it to be accepted rigorously, as implying a distinct branch of Mammalogy. With regard to the particular genera selected for illustration in this work, it is observed that they are those least understood and most numerous in species; and that the greater part of the other *Rodentia* may be found in the works of Pallas, Desmarest, Fred. Cuvier, and De Blainville. We much regret, however, that the *Cheiroptera* are not included, owing, it is alleged, to the author's not having been able to see himself all the described species, which he considers indispensable to enable him to proceed with his task surely. The reason is a good one; and it may serve to impress us with a sense of the caution which he has used in endeavouring to elucidate those groups, monographs of which are now submitted to the public.

That he might profit from what has been accomplished by others on the same subject, M. De Selys-Longchamps has visited a large number of museums in France, Italy, Switzerland, and Germany. He has also been in correspondence with all the principal naturalists whose names have been associated with any of the groups here treated of. With many of them he has effected an interchange of specimens; and by these means he has been enabled to identify such

* Essai Monographique sur les Campagnols des Environs de Liége. Liége, 1836. 8vo, pp. 15. 4 planches coloriées.

species as had been described from time to time, to compare them with each other, and to determine which were to be considered as *true* species, and which as varieties.

In the arrangement of the *Soricidæ*, which form the first division of his work, M. De Selys-Longchamps has for the most part followed Wagler, having only altered the value of the groups established by that author. Thus he considers the entire family as divisible into the two genera of *Sorex* and *Crocidura*. In the former he includes *Sorex* and *Crossopus* of Wagler, here considered only as subgenera, from their having many characters in common, in the ears, in the colouring of the teeth, and in the fur and tail, and from the number of the small lateral incisors not being esteemed a sufficient ground to warrant a generic separation. The genus *Crocidura* comprises the two subgenera of *Pachyura* and *Crocidura*, the former of which is established here for the first time, for the reception of the *Sorex Etrusca* of Savi, together with those foreign species having one more lateral incisor above than the true *Crociduræ* as restricted by our author. It may be useful to those naturalists who are more familiar with Duvernoy's arrangement of this family than Wagler's, to state that the subgenus *Sorex* of this work answers to *Amphisorex* of Duvernoy's last memoir, *Crossopus* to *Hydrosorex* of the same author, and *Crocidura* to *Sorex*; the characters of which it is not necessary to repeat here, as they have been already brought under the notice of the English reader in a former number of this Magazine*. The relative value, however, of these groups will be made more clear when exhibited in the following manner; and it may be desirable to annex to each the included species.

Gen. 1. SOREX, Lin.

Subgen. 1. Sorex, *Wagl.*	Subgen. 2. Crossopus, *Wagl.*
Sp. 1. *tetragonurus*, Herm.	Sp. 4. *fodiens*, Pall.
2. *pygmæus*, Laxm.	5. *ciliatus*, Sow.
3. *alpinus*, Schinz.	

Gen. 2. CROCIDURA, Wagl.

Subgen. 1. Pachyura, *De Selys.*	Subgen. 2. Crocidura, *Wagl.*
Sp. 1. *Etrusca*, Bonap.	Sp. 2. *Aranea*, De Selys.
(*Sorex Etr.* Savi.)	(*Sor. Aran.* Auct.)
	3. *Leucodon*, Wagl.

* Ann. of Nat. Hist. vol. i. pp. 422 and 424.

The species here indicated are nearly identical with those adopted by Nathusius*; and it is satisfactory to find two authors, who appear to have bestowed equal pains upon the subject, agree in their estimation of what are to be considered good species in a group, which, almost as much as any that can be mentioned, abounds in spurious ones. M. De Selys-Longchamps has announced the fact that there are more than eighteen names to choose out of for the common water-shrew; and Nathusius has annexed nearly two-thirds that number of synonyms to the *S. tetragonurus*! The only respects in which the list of species in this work differs from that of Nathusius, are the adoption of the *S. alpinus* of Schinz, which Nathusius does not appear to have personally examined, and the *S. ciliatus* of Sowerby. With regard to this last, however, it is justly observed, that there are many specimens apparently so intermediate between it and *S. fodiens*, that the two may yet prove to be varieties of one species, as Nathusius seems to have considered them.

As for the species described for the first time by Mr. Jenyns in former numbers of this Magazine, M. De Selys-Longchamps, not having seen them before the publication of his work, has placed them in an Appendix, in which he has presented in a tabular form the distinguishing characters of *S. tetragonurus*, *S. rusticus*, and *S. castaneus*, as Mr. Jenyns has stated them. At the same time he observes that those of the *S. rusticus* appear very marked, and apply well to a small shrew found by himself in one instance in the province of Liége, and which he had previously considered as a young *S. tetragonurus*. He has made a similar observation with respect to the *S. labiosus* of Jenyns, the characters of which he briefly notices, adding that it agrees well with an individual seen by him at Francfort-on-Main, obtained by Dr. Cretschmar; though, without an opportunity of inspecting recent individuals, he does not venture to introduce it as an authentic species. Since the publication of his book, M. De Selys-Longchamps has visited this country, when Mr. Jenyns's species were submitted to his examination. He still declined offering any decided opinion about the *S. labiosus* and the *S. castaneus*; but he expressed himself quite satisfied, that the small shrew found in Ireland, considered by Mr. Jenyns as a variety of his *S. rusticus*, was perfectly distinct from the *S. tetragonurus*†.

* Wiegmann's Archiv für Naturgeschichte, 1838, p. 45.

† The name of *Hibernicus* will hardly be appropriate for this species, as it has been found in several parts of England also; but if it be proved, as Mr. Jenyns suspects will eventually be the case, to be not specifically distinct from the shrew which he originally called *rusticus*, it may be retained under this last name, without having recourse to any new one. Mr. Jenyns will, before long, probably offer some remarks on this point.

The second portion of M. De Selys-Longchamps' work treats of the European species of *Mus*, L., which are all retained under one genus, admitting, however, of two sectional divisions as follows:

I. *Omnivorous; ears oblong, naked:* containing six species, viz. *M. decumanus*, Pall.; *M. Alexandrinus*, Geoff.; *M. Rattus*, Lin.; *M. Musculus*, Lin.; *M. Islandicus*, Thienem.; *M. sylvaticus*, Lin.

II. *Granivorous; ears rounded, hairy:* containing two species, viz. *M. agrarius*, Pall., and *M. minutus*, Pall. The former of these is stated to be at the limits of the two groups, having the general form of *M. sylvaticus*, with the ears of the second group.

To the above, another section is prefixed, containing what he terms *Rats échimoides*, or those species the fur of which is mixed up with sharp prickly hairs, as in the genus *Echimys*. This group, however, is entirely exotic, inhabiting the intertropical countries of Asia and Africa.

It is not pretended that these divisions are capable of such strict definition as to be applied rigorously, but it is thought that they are sufficiently natural, taking them in the whole, without going into details.

With regard to the species of this genus, the author observes, that they have been much less confused than those of *Arvicola* and *Sorex*, if exception be made of the *M. minutus* (the Harvest Mouse of English authors), the synonymy of which we think he has sufficiently cleared up. As for the others, it is principally in relation to their habitats and their diagnostic characters that he has found any occasion for making new remarks. The *M. Alexandrinus*, first described by Geoffroy St. Hilaire in the great work on Egypt, is here considered to be the same as the *M. Tectorum* of Savi and the Prince of Musignano, although regarded as distinct by the two authors just mentioned. M. De Selys-Longchamps has pointed out the insufficiency of those characters which have been resorted to as grounds for separating them. The *M. Hibernicus* of Thompson, he has noticed in an appendix along with two Sicilian species discovered and described by Rafinesque, the *M. frugivorus* and the *M. Dichrurus*, concerning none of which he offers any opinion, as they have not fallen under his own observation. At the same time, in reference to the first, he states, that if the colour of the fur is constant, and especially if the difference in the length of the ears between it and the *M. Rattus* is not caused by the way in which the animal is prepared, he should be tempted to admit it as a species. In another place he suggests, whether it may not be a hybrid between the *M. Rattus* and the *M. decumanus*. He adds, however, that this is not likely.

The genus *Arvicola*, which forms the subject of the third mono-

graph in this work, is a more extensive group than either of the two already treated of. It consists of eleven European species, of which no less than four appear to have been first discovered or described by M. De Selys-Longchamps himself. They are all arranged under two sections, each of which is further divided into two others.

I. The first section consists of those species which have the *external ears shorter than the fur, often almost none at all: eyes very small.*

This section comprises the two subordinate groups of (1.) *Campagnols aquatiques* (Hemiotomys, De Selys,) including *A. amphibius*, Lacep.; *A. monticola*, De Selys; *A. destructor*, Savi, and *A. terrestris*, Savi: and (2.) *Campagnols Lemmings* (Microtus, De Selys,) including the *A. fulvus* of Desmarest, and the *A. Savii* of De Selys.

II. The second section consists of those species which have the *external ears as long as the fur and well developed; eyes varying, often prominent.*

This section is subdivided into the two groups of (1.) *Campagnols proprement dits* (Arvicola,) including the *A. subterraneus*, De Selys; *A. arvalis*, Lacep.; *A. socialis*, Desm.; *A. duodecim-costatus*, De Selys: and (2.) *Campagnols murins* (Myodes, De Selys), which last group is instituted for the reception of the *A. rubidus*, De Selys (the *A. riparia* of Yarrell), which is stated, on the authority of Nathusius, to have the molar teeth with fangs in the adult state, a character wherein it differs from all the other species of the genus.

M. De Selys-Longchamps states that the genus *Mynomes* of Rafinesque forms a third section characterized by its scaly tail. It is not his intention, however, to raise any of these sections to the rank of a genus or a subgenus. He observes that they all pass into each other by insensible differences in the length of the tail and ears; and in regard to the character derived from the fangs of the teeth, that it probably exists more or less in other species. And in imposing Latin names on these groups, taken from among the synonyms of the genus, his only object has been to give foreigners an idea of the different names which he has used in French.

It has been already stated that four of the above species were first discovered or described by M. De Selys-Longchamps himself. These are the *A. monticola*, the *A. Savii*, the *A. subterraneus*, and the *A. duodecim-costatus*; and it may be useful to repeat here their respective characters, as they are probably not much known to the naturalists of this country, although three of these species have already appeared in the 'Revue Zoologique,' and the fourth has been de-

scribed as well as figured in the author's brochure on the *Arvicolæ* of Liége. They are as follows :

1. A. monticola. *Size of the A. amphibius. Tail pale ash, a little shorter than half the length of the body : fur yellowish grey, mixt with pale yellowish at the sides, whitish ash beneath and on the feet.* (13 *pairs of ribs* ?)

Inhabits the Pyrenees.

2. A. Savii. *Size of the A. arvalis. External ears a little hairy, much shorter than the fur : tail a little shorter than one-third of the body ; of two colours, brownish above, whitish beneath : fur brown-grey above, ash colour beneath : feet pale ash.* (14 *pairs of ribs.*)

Inhabits Tuscany, Lombardy, and probably all Italy.

3. A. subterraneus. *Size a little larger than that of the A. arvalis. Ears a little shorter, of the length of the fur, nearly naked ; eyes very small : tail one third the length of the body, of two colours, blackish above, white beneath : fur blackish grey above, ash-colour or whitish on the abdomen only : feet deep ash.* (13 *pairs of ribs.*)

Inhabits Belgium, French Flanders, and the environs of Paris, but no other parts of Europe, unless it be the *Mus agrestis* of Linné, in which case it is found also in Sweden*.

4. A. duodecim-costatus. *Size of the A. arvalis. Tail a little longer than one third of the body. Twelve pairs of ribs : six lumbar vertebræ. Fur* ? . . .

Inhabits the South of France and the frontiers of Switzerland, but supposed to be very rare. No skin of it exists, and only the osteology of it is known. The 12 pairs of ribs distinguish it from every other species excepting the *A. socialis*, and from this it may be known by its longer tail, and by having 6 instead of 5 lumbar vertebræ.

The *A. destructor* is a species found in Italy, which appears to have been recognised by M. De Selys-Longchamps and M. Savi nearly about the same time. It was originally described by the former in the 'Revue Zoologique,' under the name of *A. Musignani*, but this name is exchanged here for *destructor* out of courtesy to M. Savi, who had previously thus designated it. It is closely allied to the *A. amphibius*, from which it may be known by a difference in the fur, which much resembles that of the *Mus decumanus*, and by the nearly uniform whitish-ash colour of the under parts. But its great peculiarity resides in the form of the cranium, which is said to be quite different from that of its congeners. This part is represented,

* This species was first characterized by M. Baillon in 1834, under the name of *Lemmus pratensis*, but it had been discovered by M. De Selys-Longchamps as long previously as 1831.

along with the crania of several other species of *Arvicolæ*, in three plates which accompany the present work.

The *A. terrestris* is the *A. argentoratensis* of Desmarest and Lesson. It is not the *A. terrestris* of the 'Fauna Italica,' this last being the same as the *A. destructor* mentioned above.

To each of the three monographs in this work is annexed a tabular arrangement of the dimensions of all the species contained in the respective genera. And in the case of the *Arvicolæ*, there are added two other tables; one exhibiting the relative characters of the crania in the different species, the other the number of the ribs and vertebræ.

The work concludes with a complete list of all the *Mammalia* hitherto discovered in Europe, amounting to 188 species, exclusively of those which have been introduced by man, and which are only domesticated.

We have dwelt the longer on this work in the hope that it may stimulate naturalists to making further researches in our own country. Notwithstanding the labours of M. De Selys-Longchamps, and the pains which he has taken in the monographs above noticed, we are satisfied that the subject is not yet exhausted. There are several species in the three genera of *Sorex*, *Mus*, and *Arvicola* which require further investigation, and doubtless some which remain yet to be discovered. The British Shrews are not entirely cleared up. We have also more than once had submitted to our examination specimens of a mouse from the tops of the Irish mountains, closely allied to the *M. sylvaticus*, but apparently offering some differences: unfortunately they were not in a sufficiently good state of preservation to allow of any decided opinion respecting them. We may further add that it appears doubtful whether we have not in our museums two species of *Arvicola* confounded under the name of *A. agrestis* or *arvalis*, one of which is the true *A. arvalis* of M. De Selys-Longchamps, but the other so far distinct as not to have been immediately recognised by this naturalist when specimens were submitted to his view during his recent visit to this country. Ireland again seems to possess a species of this genus which it is likely will be found different from all those hitherto recorded as natives of Great Britain. But further remarks on some of these points will probably be brought under the notice of our readers before long.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

February 26, 1839.—The Rev. F. W. Hope, in the Chair.

Mr. Fraser exhibited a new species of *Corythaix*, which he proceeded to characterize as follows :

CORYTHAIX MACRORHYNCHUS. *Cor. rostro prægrandi aurantiaco, ad basin sanguineo ; capite, cristâ, collo pectoreque viridibus ; cristâ ad apicem albâ, et purpureo notatâ ; lineâ albâ infra oculos excurrente ; dorso alisque metallicè purpureis ; primariis sanguineis nigro marginatis ; caudâ supernè metallicè viridi ; femoribus caudâque subtùs nigris ; tarsis nigris.*

Long. tot. 14 poll. ; *rostri*, $1\frac{1}{4}$; *alæ*, 6 ; *caudæ*, 6 ; *tarsi*, $1\frac{1}{4}$.

Hab. ——?

This species of Corythaix lived for some time in the Society's Menagerie, having been purchased from a dealer who was unacquainted with its locality.

Compared with the known species of the genus, it approaches most nearly to the *Corythaix Persa* of authors, but from this it may readily be distinguished by its smaller size ; and the form, comparatively large size, and colouring of the beak. The colouring of the plumage also differs in some respects : like *C. Persa*, the head, neck, and breast are green, but the feathers on these parts are of a deeper hue than in that species ; the feathers of the crest, instead of being simply tipped with white, having a white transverse line near the apex, but *at* the apex they are purple-black. Minute black feathers encircle the eye, and a white stripe extends from beneath the eye on to the ear. The beak is much arched above, and somewhat inflated at the base ; the nostrils are very large, and not hidden, as in *C. Persa*, by the decumbent feathers, these extending only to the posterior angle of the nostril. The upper mandible is of a bright yellow colour, excepting all that portion which lies below and behind the nostrils, which is of a brilliant red colour ; the lower mandible is of the same red tint, but tipped with yellow. Both mandibles present simple sharp-cutting edges, in this respect exhibiting a different structure from that observable in the allied species, *C. Persa* and *C. Buffonii*, in which the mandibles have their cutting edges serrated. The back and upper surface of the wings are of a deep purple-blue tint, exhibiting in certain parts greenish reflections. The primaries (with the exception of the first quill) and the secondaries (with the exception of the three or four innermost quills) are red, margined with black ; the shafts of these feathers are also black. The outer primary is black, and the two or three following feathers are broadly margined externally with the same colour. All the wing feathers are black at the base ; on the outermost feathers the

black colouring occupies but little space, but in each successive feather it increases in extent. The feathers of the tail are of a very dark green colour above, inclining to black; beneath they are black, but exhibit indistinct purple reflections. The rump, upper and under tail coverts, thighs, and vent are black, obscurely tinted with purple or green in parts. The tarsi are black. The eyes are hazel, and the naked, or almost naked, space around the eye, is of a crimson colour; not carunculated, as in *C. Buffonii* and *C. leucotis*.

A highly-interesting and valuable series of specimens of the Paper Nautilus (*Argonauta Argo*), consisting of the animals and their shells of various sizes, of ova in various stages of development, and of fractured shells in different stages of reparation, were exhibited and commented on by Professor Owen, to whom they had been transmitted for that purpose by Madame Jeanette Power. Mr. Owen stated that these specimens formed part of a large collection, illustrative of the natural history of the Argonaut, and bearing especially on the long-debated question of the right of the Cephalopod inhabiting the Argonaut shell to be considered as the true fabricator of that shell.

This collection was formed by Madame Power in Sicily in the year 1838, during which period she was engaged in repeating her experiments and observations on the Argonaut, having then full cognizance of the nature of the little parasite (*Hectocotylus*, Cuv.), which had misled her in regard to the development of the Argonaut in a previous suite of experiments described by her in the Transactions of the Giænian Academy for 1836.

As this mistake had been somewhat illogically dwelt on, to depreciate the value of other observations detailed in Madame Power's Memoir, Mr. Owen observed, that it was highly satisfactory to find that the most important of the statements in that memoir had been subsequently repeated and confirmed by an able French malacologist, M. Sander Rang.

The collection of Argonauts,—Cephalopods and shells,—preserved in spirits, included twenty specimens, at different periods of growth, the smallest having a shell weighing not more than one grain and a half, the remainder increasing, by small gradations, to the common-sized mature individual.

The inductions, which the present collection of Argonauts of different ages and sizes legitimately sustained, were in exact accordance with Madame Power's belief that the Cephalopod was the true constructor of the shell, while no contradictory inference had been, or could be, deduced from an examination of the specimens themselves.

With reference to the second suite of specimens, viz. the ova of the Argonaut in different stages of development, Mr. Owen entered into a detailed account of the new and interesting facts which they revealed. In the ova most advanced, the distinction of head and body was established; the pigment of the eyes, the ink in the ink-bladder, the pigmental spots on the skin, were distinctly developed; the siphon, the beak,—which was colourless and almost transparent,—and the arms were also discernible by a low microscopic power; the arms were short and simple; the secreting membranes of the shell were not developed, and of the shell itself there was no trace.

Mr. Owen then recapitulated as follows, the evidence, which, independently of any preconceived theory or statement, could be deduced from the admirable collection of *Argonauta Argo* due to the labours of the accomplished lady who had contributed so materially to the elucidation of a problem which had divided the zoological world from the time of Aristotle.

1st. The Cephalopod of the Argonaut constantly maintains the same relative position in its shell.

2nd. The young Cephalopod manifests the same concordance between the form of its body and that of the shell, and the same perfect adaptation of the one to the other, as do the young of other testaceous Mollusks.

3rd. The young Cephalopod entirely fills the cavity of its shell: the fundus of the sac begins to be withdrawn from the apex of the shell only when the ovarium begins to enlarge under the sexual stimulus.

4th. The shell of the Argonaut corresponds in size with that of its inhabitant, whatever be the differences in the latter in that respect. ("The observations of Poli, of Prevost, and myself, on a series of *Argonauta rufa*, before cited, are to the same effect.")

5th. The shell of the Argonaut possesses all the requisite flexibility and elasticity which the mechanism of respiration and locomotion in the inhabitant requires: it is also permeable to light.

6th. The Cephalopod inhabiting the Argonaut repairs the fractures of its shell with a material having the same chemical composition as the original shell, and differing in mechanical properties only in being a little more opake.

7th. The repairing material is laid on from without the shell, as it should be according to the theory of the function of the membranous arms as calcifying organs.

8th. When the embryo of the Argonaut has reached an advanced stage of development *in ovo*, neither the membranous arms nor shell are developed.

9th. The shell of the Argonaut does not present any distinctly defined nucleus.

Mr. Owen finally proceeded to consider the validity of the best and latest arguments advanced in favour of the parasitism of the Cephalopod of the Argonaut.

Finally, Mr. Owen proceeded to state in detail the points which still remained to be elucidated in the natural history of this most interesting Mollusk. Among other experiments he suggested that the young Argonaut should be deprived of one of the velated arms, and preserved in a marine vivarium, with the view to determine the influence which such mutilation might have on the future growth of the shell: but in proposing further experiments, and while admitting that the period of the first formation of the shell yet remained to be determined, Mr. Owen stated that he regarded the facts already ascertained to be decisive in proof that the Cephalopod of the Argonaut was the true fabricator of its shell.

March 12 The notice of M. Temminck's letter, and the second part of Dr. Cantor's paper, read this day, have been inserted above, pp. 273. 341.

April 9, 1839.—The Rev. F. W. Hope, in the Chair.

A collection of beautifully finished drawings of Tasmanian Fishes was exhibited to the Members present, these drawings having been sent to the Society by Dr. Lhotsky for that purpose. In a letter accompanying these drawings, Dr. Lhotsky stated that they had all been executed, under his own superintendence, from fresh specimens.

A new species of Hamster was exhibited by Mr. Waterhouse, and characterized as follows:

Cricetus auratus. *Cri. aureo-fuscescens, subtùs albidus: pilis mollissimis, suprà ad basin plumbeis, subtùs ad basin cinereis: auribus mediocribus, rotundis: caudâ brevissimâ pilis albis obsitâ.*

	unc.	lin.
Longitudo ab apice rostri ad caudæ basin ..	7	6
——— *caudæ*	0	5
——— ab apice rostri ad basin auris	1	6
——— *tarsi digitorumque*.....	0	10
——— *auris*.....	0	7

Hab. Aleppo.

"This species is less than the common Hamster (*Cricetus vulgaris*), and is remarkable for its deep golden yellow colouring. The fur is moderately long and very soft, and has a silk-like gloss: the deep golden yellow colouring extends over the upper parts and sides of the head and body, and also over the outer side of the limbs: on the back, the hairs are brownish at the tip, hence in this part the fur assumes a deeper hue than on the sides of the body: the sides

of the muzzle, throat, and under parts of the body are white, but faintly tinted with yellow: on the back, and sides of the body, all the hairs are of a deep gray or lead colour at the base; and on the under parts of the body, the hairs are indistinctly tinted with gray at the base. The feet and tail are white. The ears are of moderate size, furnished externally with deep golden-coloured hairs, and internally with whitish hairs. The moustaches consist of black and white hairs intermixed.

"The skull, when compared with that of *Cricetus vulgaris*, differs in not having the anterior root of the zygomatic arch produced anteriorly in the form of a thin plate, which in that animal, as in the Rats, serves to protect an opening which is connected with the nasal cavity: the facial portion of the skull is proportionately longer and narrower: in size there is much difference, the skull of *Cricetus auratus* being one inch and six lines in length, and ten lines in breadth, measuring from the outer side of the zygomatic arches."

April 23, 1839.—William H. Lloyd, Esq., in the Chair.

A letter was read from Dr. Weissenborn, dated Weimar, February 19, 1839. It accompanied a female specimen of the Hamster (*Cricetus vulgaris*), which he begged to present to the Society, and related to some longitudinal, naked (or nearly naked) marks which are observable on the hips of that animal.

These marks, Dr. Weissenborn states, are found in every Hamster, though usually hidden by the long fur which surrounds them, and the common opinion of the furriers (who have to cut them out and to repiece the skin) is, that they arise from friction. Being situated over the hip-bones, and therefore more exposed than other parts, the hair is worn whilst the animal is moving in its burrow. This is the opinion also of the earlier authors, but "is, however, erroneous, as remarked already by Dr. Sulzer, in his valuable monograph on this species, published at Gotha in 1774. These spots are visible the very moment the hair begins to grow, in the naked young, and they are the very places where the growth of the hair becomes first apparent. At this early stage of the animal's life, they appear on the inner side of the skin, when viewed by transmitted or reflected light, as two dark spots. When all the hair is developed the case is reversed, and these spots appear paler than the rest of the skin. Dr. Sulzer confesses himself to be quite ignorant of the part which these peculiar spots act in the œconomy of the animal, and no subsequent author has explained the subject. I imagine no person, after Sulzer, has turned his attention seriously to it, but it is to be wondered that he was not more successful, being

an accurate and clever observer. The reason why the Hamster is furnished with these spots appears to me very far from being mysterious, and had the cause not been mistaken for the effect, I think anybody might have hit upon the idea, that nature had made the short, stiff, and closely adpressed hairs, to grow upon these spots of the Hamster's body, *which are most exposed to friction*, and at the same time contiguous to bone, that the hair and the skin might be competent to stand the wear and tear to which they necessarily are subjected in the narrow burrow of an animal, which is very brisk in its movements; and no doubt the skin, which gives rise to a different kind of hair, is of a different structure from the rest; and as this hair is more stiff, the skin which it covers is probably more callous.

"In the present state of the science of physiology, it may be impossible to state with sufficient precision the conditions on which the peculiar structure of the skin and hair, in these particular spots, depends. The relation in which the latter stand to the hip-bones by peculiar tissues may perhaps help to explain the circumstance, as the neighbourhood of, and connexion with, bony structures, have an evident influence on the nature of the skin and its productions."

Mr. Waterhouse remarked, that the description which Dr. Weissenborn had given of the peculiar spots on the hips of the Hamster, caused him to suspect that they were glands, analogous to those observable in the Shrews, and might help the animals to distinguish each other in their dark burrows.

Mr. Waterhouse exhibited two specimens of a species of Lark from China, which had recently died in the Society's Menagerie, having been presented to the Society by J. R. Reeves, Esq. It was characterized as follows:

ALAUDA SINENSIS. *Al. suprà rufo-fusca, subtùs alba, fasciâ latâ pectorali nigrâ; lineâ sordidè albâ ab oculis, ad occiput extensâ; fronte, nuchâ, et humeris castaneis; remigibus primariis nigris, marginibus externis angustè fuscescenti-albis, remige primo illo externè marginato; caudâ nigrâ, rectrice utrinque externâ albâ, ad basin nigro lavatâ, proximâ utrinque albo-marginatâ; rectricibus intermediis duabus fuscescentibus.*

Long. tot. 8 *unc.*; *rostri*, $\frac{3}{4}$; *alæ*, 5; *caudæ*, $3\frac{1}{4}$; *tarsi*, 10 lin.
Hab. apud Sinam.

The Chinese Lark very much resembles, and is nearly allied to, the *Alanda Calandra* of authors, but differs in the following particulars. The beak is more compressed, and the upper mandible has two longitudinal grooves on each side, the upper one of which gives a keel-like edge to the culmen; the tail is proportionately longer, the tarsi are shorter; the feet are smaller, and the hinder claws, in-

stead of being bent downwards, are slightly recurved*. In the colouring there are also points of distinction: in lieu of the dull brown tint on the top of the head and back, the present species possesses rich rufous brown feathers. In one specimen the body is yellowish white beneath, but in the other it is pure white.

Mr. Waterhouse then proceeded to make some observations upon a series of skulls of Rodents which were upon the table. These skulls belonged chiefly to species of the various genera contained in the families *Chinchillidæ* (consisting of the genera *Chinchilla*, *Lagotis*, and *Lagostomus*), and *Caviidæ*—composed of the genera *Cavia*, *Kerodon*, *Dolichotis*, and *Hydrochærus*. Numerous points of resemblance between these two families were dwelt upon, more particularly in the structure of the teeth, the form of the palate, the contracted glenoid cavity, the form of the lower jaw, and direction of the lower pair of incisors. The *Caviidæ*, however, possess certain characters, independent of those observable in the form of the teeth, which renders it easy to distinguish them from the *Chinchillidæ*. He alluded especially to the shortness of the condyloid process of the lower jaw, the forward position of the coronoid process, the peculiar projecting ridge on the outer side of the horizontal ramus, and the form of the descending ramus or angle of the jaw; this projects considerably beyond the line of the coronoid process, whereas in the *Chinchillidæ* it terminates in a line with the posterior portion of the coronoid process, or projects but slightly beyond that line.

Among the *Chinchillidæ*, the *Lagostomus trichodactylus*, observes Mr. Waterhouse, approaches most nearly to the Cavies, the angle of the lower jaw being less acute and the coronoid process more forward than in the other species.

In the imperfect state of the palate, the narrowness of the anterior and posterior sphenoids, the form of the occipital condyles, the form of the articular portion of the lower jaw, and the almost horizontal direction of the incisors of the lower jaw of the Chinchillas and Cavies, Mr. Waterhouse stated he had found characters which induced him to place those animals next before the *Leporidæ*.

May 14. Mr. Cunningham's account of the Apteryx, and Mr. Hope's Monograph of Euchlora, have been inserted above, pp. 312. 342.

May 28.—William Ogilby, Esq. in the Chair.

A paper from the Rev. R. T. Lowe was read, entitled "A Supplement to the Synopsis of the Fishes of Madeira," inserted above, p. 405.

* "This difference in the form of the claw cannot be depended on, as the birds have been for some time in confinement; they *may* originally have been straight, but I think they never could have been curved downwards."

June 11.—William Yarrell, Esq., Vice-President, in the Chair.

Mr. Bucknell exhibited his *Eccaleobion*, or machine for hatching eggs; and having broken eggs in every stage of incubation, explained the nature and incidents of the process. Mr. Bucknell stated that the period of incubation in the common fowl, which was, on an average, 21 days, sometimes varied from 18 to 24 days, and that he attributed this variation to the mode of keeping, and previous treatment, by which the embryo was injured, either from the heat of the weather, exposure to variety of temperature, jolting in carriage, &c. The young bird was occasionally known to emit a faint chirp even so long as 24 hours before being excluded; and he believed that if this noise was heard on the 18th day the chickens would probably appear on the 19th. From this and other circumstances, such as the common mode of preparing eggs by varnishing, &c., the porosity of the shell, and other similar causes, he concluded that the small globule of air constantly found in eggs, and which he had observed to increase according to the age of the egg, was produced by the air penetrating the substance of the shell and its lining membrane.

The average number of malformations, according to Mr. Bucknell's experience, was not more than five in a thousand; though in Egypt, it was stated, that malformations were extremely common in the artificial process of incubation. He attributed this circumstance to an excess of heat, and generally found it to affect the toes and extremities; sometimes also the muscles of the neck.

A general conversation afterwards took place on this subject, during which much interesting and valuable information was extracted, with regard to the period and circumstances of the incubation.

A letter from H. Cuming, Esq., Corr. Memb., dated Manilla, November 18, 1837, was read. This letter stated that Mr. Cuming had forwarded a collection containing 395 birds and 12 quadrupeds, from the southern part of the Island of Luzon.

Mr. Cuming states that quadrupeds are scarce in the Philippine Islands, and that he has been able to procure all the species known excepting three, two of which are Deer, and the third is a species of Buffalo, of small size, with straight and sharply-pointed horns. This last animal Mr. Ogilby stated was most probably the *Anoa depressicornis*.

Mr. Ogilby exhibited the skull of an Elk from Nova Scotia, brought over by Dr. Cox, and remarkable for its great size as compared with the dimensions of the horns.

Mr. Ogilby also called the attention of the meeting to a collection of skins from Sierra Leone, exhibited by Mr. Garnett. Among others were three of the Chimpanzee, apparently adult, but too much mutilated to admit of obtaining the dimensions; two of *Colobus ursinus*, one of which had the tail of a rusty white colour, instead of the pure white which generally characterizes the species; and one of a species of Cat, which Mr. Ogilby believed to be undescribed, and for which he proposed the name of

Felis Servalina. *F. suprà fulva, maculis nigris, minutis, copiosissimis; subtùs albida; caudâ brevissimâ.*

"This species appears to be about the size of the common Serval, but differs from that animal in having a shorter tail, and in the very numerous and minute black spots which are scattered over the shoulders, back, and flanks. It is only on the thighs and arms that the spots become large and distinct; there they are less numerous, and resemble those of *Felis Serval*. The head and fore part of shoulders are entirely free from spots; the median line of the back is of a deeper fawn than the rest of the body, the minute spots having a particular tendency to run into lines; the belly is of a dirty white colour, with large brown blotches, and the tail does not exceed the length of the same organ in the lynxes. This character is alone sufficient to distinguish the present species from all the other African cats with which I am acquainted. The mutilated condition of the skin unfortunately prevents me from describing the characters of the ears, legs, feet, and under parts of the body."

	Ft.	In.
Length of the skin from the muzzle to the root of the tail	2	10
Length of the tail	0	8

As regards the species of *Colobus*, Mr. Ogilby observed, that from information communicated by M. Temminck, he was now convinced that it was identical with the *Colobus polycomos* of Pennant.

Mr. P. Buckley Williams exhibited various specimens of White-Bait (*Clupea alba*, Yarrell,) from the Dovey and some other rivers of North Wales, and stated that the common belief, that this was confined to the Thames, was now proved to be erroneous, not only from the facts now stated, but likewise from their abundance in the river Forth of Scotland, as shown by Dr. Parnell.

June 25, 1839.—Dr. Bostock in the Chair.

Dr. Richardson read his account of an interesting collection of Fish formed at Port Arthur in Van Diemen's Land, by T. J. Lempriere, Esq., Deputy Assistant Commissary General, by directions

from His Excellency Sir John Franklin, K.C.B., Lieutenant Governor, and now deposited in the museum of the Royal Naval Hospital at Haslar. The collection contains about thirty species, and the paper, which embraces only a part, gives detailed descriptions and anatomical notices of these, several of them being also illustrated by very elaborate drawings, executed by Mr. Charles M. Curtis with his wonted fidelity. The following species are included in the present paper, the others being reserved for a future communication.

1. Serranus Rasor. *Ser. maxillis valdè squamosis, apicibus radiorum pectoralium fasciculatis, compressis, lanceolatis ; pinnis omnibus præter ventrales squamosis ; radiis aculeatis pinnæ dorsi subæqualibus ; fasciâ oculum cingenti cæruleâ per lineam lateralem productâ.*

Radii :—Br. 7—7 ; P. 13 ; V. 1, 5 ; D. 10, 21 ; A. 3, 9 ; C. $15\frac{1}{4}$.

The *Serranus Rasor*, or *Tasmanian barber*, is a beautiful fish belonging to that group of *Serrani* which was named *Anthias* by Bloch, none of which had previously been described as inhabitants of the Australian seas. It agrees with the barber-fish of the Caribbean seas in having no elongated dorsal rays, and may be distinguished readily from all the known *Serrani* by the peculiar form of its pectoral rays, whose numerous branchlets are so graduated and closely approximated as to give a flat lanceolate shape to the tip of each ray. The general colour of the fish is reddish brown, with umber-brown spots, a dark patch beneath the end of the pectorals, a bright blue stripe crossing the anterior suborbitar, encircling the eye, and running along the lateral line to the caudal fin. There are also thirteen or fourteen narrower blue streaks on the lower part of the flanks and tail. The fins are lake-red, and are all, except the ventrals, more or less scaly.

2. Centropristis Salar. *Cent. operculo suboperculoque squamosis ; interoperculo seminudo ; preoperculo subdenticulato ; pinnis dorsi anique in fossis receptis.*

Radii :—Br. 7—7 ; P. 16 ; D. 9, 16 ; V. 1, 5 ; A. 3, 10 ; C. $17\frac{3}{3}$.

This species is known locally as the salmon, and differs from *C. truttaceus*, as described in the *Histoire des Poissons*, in the distribution of the scales on the gill-covers, and in some other minute particulars. *Truttaceus* is said to have the interoperculum and suboperculum entirely naked, and only a few scales on the operculum itself (“*quelques écailles sur sa surface*”). In *C. salar* there are five rows of pretty large scales on the operculum, one row on the suboperculum, covering surfaces of both these bones, and a row of smaller scales on the interoperculum, clothing its upper half only.

As these scales are very easily detached, and the gill-plates remain hard and silvery, after they are removed with the epidermis, it must be difficult to distinguish an injured specimen from *truttaceus*; whose description in other respects exactly accords with *salar*, except that the latter has the suborbitar very faintly denticulated, and two rays fewer in the soft dorsal.

3. Aplodactylus arctidens. *Aplo. dentibus oris tricuspidatis, superioribus in serie octuplici, inferioribus in serie quintuplici dispositis; cæcis pylori quatuor.*

Radii:—Br. 6—6; P. 9 *et* 6; V. 1, 5; D. 16—1, 17; A. 3, 8; C. $16\frac{5}{5}$.

This species differs from *A. punctatus* of the Chilian seas (the only species previously known) in its dentition, but resembles it so much in external form, colours, and markings, as well as in anatomical structure, that it cannot be placed in a separate genus. In the *Histoire des Poissons* the teeth of *dentatus* are described as follows: "*Les dents sont disposées sur trois rangées à la machoire supérieure et sur deux à l'inférieure: elles sont aplaties et ont leur bords arrondis et dentelés en petits festons; elles sont très-semblables à celles des crénidens, on en compte quatorze de chaque côté à la máchoire supérieure et treize a l'inférieure. Derrière ces rangées antérieures il y a des petites dents grenues sur une bande étroite à chaque máchoire.*" In the Van Diemen's Land fish, the teeth stand in eight or nine crowded ranks in the upper jaw, and in five or six in the lower one, those of the interior rows being very much smaller in all their dimensions, but otherwise shaped exactly like the teeth of the exterior rows, which resemble those of *punctatus*. Their points show three small lobes, the middle lobe being largest and most prominent. The species further differs from *punctatus* in having four cæca, but its food appears to be similar, the intestines having been found filled with large fragments of sea weed, apparently *Ulva umbilicalis*.

4 and 5. Two new species of gurnard were then mentioned as the first of the genus that have been brought from the Australian coasts, though one species (*Trigla kumu*) is known to inhabit the seas of New Zealand. They were stated to agree with that species, with several Indian ones, and with *Trigla pœciloptera* of the Mediterranean, in their large pectoral fins being ornamented with eye-like marks similar to those on the wings of some lepidopterous insects. One of them, Trigla polyommata, has minute cycloid scales on the body, an unarmed lateral line and the dorsal plates confined to the first dorsal, there being no dilatation whatever of the interspinous bones of the second dorsal. All the spines of the head are stiletto-shaped, and one whose base occupies the whole anterior end of th

infraorbitar on each side, projects boldly beyond the snout, and gives the fish a very different aspect from any other known gurnard. The other may be thus characterized:—

5. Trigla Vanessa. *Tri. squamis aspersis mediocribus; lineâ laterali aculeatâ; fossâ dorsali ad finem usque pinnæ posterioris armatâ, orbitâ oculi edentatâ, pinnâ pectorali amplâ labeculis aculeis binis ornatâ, maculâ inter aculeum pinnæ dorsi quintum et octavum nigrâ.*

Radii:—Br. 7—7; P. 12—III.; V. 1, 5; D. 8, 12; A. 12; C. 13$\frac{3}{7}$.

Trigla Vanessa has a spinous infraorbitar tooth, larger than usual in gurnards, though not so remarkable as in the preceding species, and not occupying the whole end of the bone, there being a smaller tooth and some granulations beneath it. The arming of the dorsal furrow extends to both fins, and is formed by saddle-shaped dilatations of the interspinous bones, with a triangular spinous tooth on each side of each plate directed backwards. The scales of the body are rather large, and are studded on their uncovered portions with minute spiny points; those forming the lateral line are tubular both transversely and longitudinally, and are armed with several strong spines also tubular. There is a black mark on the anterior dorsal. The sides of the head are finely granulated without radiations, and there are no denticulations on the edge of the orbit either in this or the preceding species.

6. *Apistes marmoratus* (Cuv. et Val. 4, p. 416). The specimens correspond exactly with the description given in the work referred to, except that the first suborbitar has only one tooth anteriorly. The spine of that bone reaches in one specimen to the preoperculum, but in another it is one-third shorter, being in the latter case only just equal to the preopercular spine in length.

7. *Sebastes maculatus* (Cuv. et Val.). Two specimens in good order, when examined in reference to the account of the species in the work referred to, offer no discrepancy, except that the postorbitar spines are somewhat different from those of *imperialis*, which *maculatus* is said closely to resemble. *S. maculatus* is an inhabitant of the seas of the Cape of Good Hope, and although a range from thence to Van Diemen's Land may appear very great, it is not more extensive than that of the northern *sebastes* which has been taken on the coasts of Greenland, in the gulf of St. Lawrence, on the coast of Norway, and in the British Channel.

8. *Cheilodactylus carponemus* (Cuv. et Val.), known locally as the Perch, and described as having, when fresh, a bright silvery hue with dark spots.

9. Nemadactylus concinnus. The fish so designated is stated by

the author to be one of those species whose natural position is difficult to ascertain, from their partaking of the characters of several different groups. Viewed as the type of a new genus, *Nemadactylus* may be characterized as having none of the bones of the gill-cover armed or sculptured, the operculum itself being destitute of projecting points, but as differing from any described sparoid form in having simple inferior pectoral rays, one of them projecting beyond the rest, as in *Cheilodactylus*, and in the teeth, which are minute and slender, in a single row on the jaws. The palate, vomer, tongue, and pharyngeal parietes are toothless. The fins are scaleless, the dorsal single, the branchial rays only three in number, the scales cycloid, and the pyloric cæca few (three). There is but one specimen of *Nemadactylus concinnus* in the collection, which is three inches and a half long, has a compressed elliptical form, and a sparoid aspect. Its lateral line is marked by a series of bright thin scales, and beneath it, the integuments are merely silvery with wrinkles, as in some scomberoid fishes; but the specimen has been long in spirits with other fish, and it is possible that the scales of the flanks may have been detached. If they actually existed, they must have been proportionably larger than those on the back, judging from the wrinkles of the epidermis. The scales of the back and top of the head are small, thin, and delicate, like those of a mackerel. Vertebræ 34.

It may be thus characterized:—

NEMADACTYLUS, n. g.

Piscis acanthopterygius. *Operculum* lævе, inerme. *Pinnæ* esquamosæ, pinnâ dorsalis unicâ: *radii pinnæ* pectoralis inferiores (sex) simplices, quorum unus productus. *Costæ branchiostegæ* paucæ (tres). *Intermaxillarum pediculi* breves. *Dentes* gracillimi minuti in ambitu oris tantum positi. Fauces palatum et lingua glabri. *Squamæ* teneræ, læves, infraque lineam lateralem scomberoideæ. *Cæca* pylorica pauca (tria).

N. concinnus, species unica adhuc cognita.

Radii:—Br. 3—3; P. 9 et 6; V. 1, 5; D. 17, 28; A. 3, 15; C. $15\frac{6}{6}$.

10. LATRIS HECATEIA is the appellation given by the author to the type of another annectant genus, which he considers as taking its position most naturally among the *Mænoideæ*, but as having many characters in common with a percoid group composed of the genera *Therapon*, *Datnia*, *Pelates*, *Helotes*, and *Nandus*. In *Latris* the mouth is moderately protractile, the dentition is similar to that of *Mæna vomerina*, there is a scaly groove for the reception of the deeply notched dorsal as in *Gerres*, which genus it further resembles in its

opercular bones, the preoperculum being very finely denticulated, and the operculum terminated by a slightly concave line without projecting angles. The ventrals are still further back than in *Cæsio*, and the cæca are few in number. The scales are cycloid, without teeth or cilia, and the genus, unlike any previously described mænoid group, has the lower pectoral rays simple like those of *aplodactylus*. There are no elongated scales at the base of the ventrals. *Latris Hecateia* is marked by three well-defined dark stripes on each side of the back, with a more diffused one inferiorly on the flanks, the four pyloric cæca are short and wide, and the only specimen in the collection is eleven inches long, which is said to be the ordinary size.

The principal characters of this genus are as follows:—

LATRIS, n. g.

Piscis acanthopterygius, mænoideus. *Pinnæ* esquamosæ: dorsi pinnâ unicâ, profunde emarginatâ, in fossâ decumbens: ventrales pinnæ sub abdomine medio positæ. Radii pinnæ pectoralis inferiores (novem) simplices. *Preoperculum* denticulatum. *Os* modicè protendens. *Dentes* in oris ambitu tignoque vomeris positi villosi, in ossiculis pharyngeis parvi, subulati, conferti. Palatum linguaque læves. *Squamæ* læves.

L. Hecateia, species unica detecta.

Radii:—Br. 6—6; P. 9 et 9; V. 1, 5; D. 18, 36; A. 3, 27.

11. THYRSITES ALTIVELIS. *Thyr. radiis pinnæ dorsi aculeatis, corpus altitudine æquantibus; dentibus intermaxillæ utriusque quatuordecim, in latere maxillæ inferioris utroque duodecim.*

Radii:—Br. 7—7; P. 14; V. 1, 6; D. 20—1, 11 *et* VII.; A. 1, 10 & VII.; C. $17\frac{6}{5}$.

A single specimen of this fish in the collection, agrees in most particulars with the description of *Thyrsites atten* in the *Histoire des Poissons*, but the spinous rays of the dorsal fin are considerably higher in proportion, and the teeth on the jaws much fewer.

12. BLENNIUS TASMANIUS is an undescribed species strongly resembling some of the European ones.

13. CLINUS DESPICILLATUS differs from *C. perspicillatus* of the *Histoire des Poissons* in possessing a thicker form, a larger head, a proportionably smaller eye, and in wanting the nuchal marks which give the name to that species. The marks on the body are arranged as in *perspicillatus*, but there are three transverse bands on the pectoral and caudal fins, with many other spots not mentioned in the description of the latter. The dorsal rays are 36, 4, and in other particulars the two fish seem to be much alike.

14. LABRUS LATICLAVIUS. *Lab. smaragdinus, fasciis binis late-*

ralibus puniceis purpureo marginatis, posticè in unum coalescentibus, inque pinnâ productis ; pinnâ dorsi basi viridâ, *in medio latè purpureâ : supernè aurantiacâ, purpureo guttatâ, inque margine extremo cæruleâ ; pinnâ ani basi aurantiacâ, dein primulaceo-flavâ, utrinque cæruleo cinctâ, exinde purpureâ cæruleo guttatâ, denique in extremo margine cæruleâ.*

Radii :—P. 12; V. 1, 5; D. 9, 11; A. 3, 10; C. 14.

This is a very handsome species, having a duck-green colour, with two lake-red stripes, commencing at the gill-opening and uniting opposite the end of the dorsal to form a single broader stripe which is continued into the caudal fin. These stripes are bordered on both sides by dotted lines of plum-blue, and there are also five rows of blue spots on the sides of the belly, and three rows near the base of the anal fin, on a lake-red ground. Several purple lines radiate from all sides of the orbit, and some pass over the preoperculum, interoperculum, and lower jaw. The dorsal is dark-purple, with green at the base of the rays, and an orange band at the tips, spotted and finally edged with blue. The anal has an orange streak along its base, then a broad primrose-yellow band edged above and below by a narrow blue line, next a broad band of purple with many very regular blue spots, and finally a narrow blue edging. The caudal is purple, with many plum-blue spots near its extremity in a vertical band. The other fins are apparently colourless. The aspect of the fish is that of a *Julis*, but the operculum and cheeks are scaly.

15. Lepidoleprus australis. *Lep. squamis corporis ordinibus plurimis aculeorum arctè incumbentium instructis ; pinnâ ani plus duplici altitudine pinnam dorsi posteriorem superante.*

Radii :—Br. 6—6; P. 16; V. 1, 6; D. 2, 11—89; C. 1.

This is an example of a genus which had not previously been detected in the southern hemisphere. It has the general form of *Lepidoleprus cælorhynchus*, but there are abundant specific differences, especially in the relative size of the fins, and in the arming of the scales, which in the Antarctic fish consists of rows of closely-incumbent strong spines. The author has compared it with examples of *cælorhynchus* from the Mediterranean, and also from Madeira, both in the Society's museum, whose scales are totally different. None of these examples have the first dorsal ray serrated, as it is stated to be by writers who have described and figured the Greenland and Iceland *Macrourus rupestris*, yet Cuvier states that he has ascertained the identity of the latter with the Mediterranean fish. The first dorsal ray of *L. australis* is also smooth. There are sixty-seven vertebræ, of which fourteen are abdominal. The collection contained three specimens.

A *Platycephalus* intermediate between *fuscus* and *grandispinis*, a

Scorpæna, a *Cheironectes* which is figured in Ross's Annual for 1835, a *Dajaus* closely resembling its American prototypes, several handsome *Balistes* and *Monacanthi*, a *Diodon* and several *Tetrodontes*, a new form of *Torpedo*, some fresh-water fishes, and several other sea ones, are reserved for a future communication.

GEOLOGICAL SOCIETY.

Nov. 6, 1839.—A paper was read, "On the relative ages of the tertiary and post-tertiary deposits of the Basin of the Clyde," by James Smith, Esq., of Jordan Hill, F.G.S.

In former memoirs, Mr. Smith described the indications which he had observed of changes in the relative level of sea and land in the basin of the Clyde, by which deposits had been laid dry during an extremely recent geological epoch*; and the evidences adduced by the arctic character of several of the shells, that the climate of Scotland was colder while these beds were accumulating than it is at present†. In this paper he confines his remarks to the results of subsequent observations, which prove, that in these comparative modern deposits there are two distinct formations, differing in climate and the character of their fauna, and separated by a wide interval of time. In the lower or older of these formations, Mr. Smith has found from 10 to 15 per cent. of extinct or unknown species, and he accordingly places it in Mr. Lyell's proposed pleistocene system; whilst in the upper or newer he has found only one species which exists in the present seas, and he accordingly ranges it among the post-tertiary formations of that author. Both these deposits, however, are anterior to the recent or human period.

In the lower or pleistocene formation, Mr Smith includes the "till" or unstratified accumulation of clay and boulders, and the overlying beds of sand, gravel, and clay containing a mixture of unknown species of shells. He is of opinion that the beds presenting the same order of superposition in the basins of the Forth and the Tay, including the submarine forest of the latter, will be found to be of the same age, though nothing at present is known of their fossils, except the discovery in the elevated beds of the Tay of the *Nucula corbuloides* by Mr. Lyell; and that the parallel roads of Glenroy, recently shown by Mr. Darwin to be of marine origin, may be of cotemporaneous formation. Mr. Smith is also convinced, that a very great proportion of the superficial beds of sand, gravel, and clay are tertiary, although the evidence must sometimes be uncertain, owing to the want of organic remains.

* Proceedings, vol. ii. p. 427. † *Ibid.* vol. iii. p. 118. See also Mr. Smith's paper in the Wernerian Society's Transactions, vol. viii.

During the post-tertiary period, Mr. Smith is of opinion, an elevating movement to the extent of 40 feet took place, and that at this height, the relative level of sea and land remained stationary for a considerable time, exceeding the present period of repose. The proof of this, he states, is a magnificent range of inland sea cliffs, with beds of gravel and sand interposed between them and the sea*. At first Mr. Smith supposed that the beds of this period contained a small proportion of unknown species; latterly, however, he reduced the number to one, the *Arca papillosa*, which has within a few weeks been discovered recent by Capt. Portlock on the coast of Ireland.

During the existing geological epoch no change of level appears to have taken place in the Basin of the Clyde†.

To the paper is appended a list of the shells found in these beds, but not known as inhabitants of the British seas, and of which the following is a summary:—

Fossil in the Basin of the Clyde.	Fossil in other localities.	Recent in the
Tellina proxima	.....	Arctic Seas.
Crassina multicostata	Norway and Sweden.	
Withami	Wirk and Bridlington ...	Rothsay Bay.
borealis	Dalmuir	Arctic Seas.
Mya truncata, var.?	Uddevalla; Canada ...	St. Lawrence.
Pecten Islandicus	.....	North Seas; coast of Newfoundland.
Nucula oblonga.		
antiqua.		
corbuloides	Dundee; crag of Norwich.	
Mactra striata.		
Saxicava sulcata.		
Panopæa Bivonæ.....	Crag; Sicily	Yorkshire coast.
Natica clausa	Uddevalla	North Seas; coast of Newfoundland.
glaucinoides.		
fragilis	Crag.	
Nassa Monensis	Isle of Man.	
Buccinum granulatum ...	Crag.	
striatum.		
Trochus inflatus.		
Turbo expansus	.....	Arctic Seas.
Velutina undata	.....	North Seas; coast of Newfoundland.
Fusus Peruvianus	Crag.....	Arctic Seas.
imbricatus.		
Bulbus Smithii.		

Nov. 20.—An extract from a letter addressed to Dr. Andrew Smith by A. G. Bain, Esq., dated Graham Town, Cape of Good Hope, Feb. 21st, 1839, and communicated by Ch. Darwin, Esq., was first read.

The object of this extract is to announce the discovery, by Mr. Martin Smith, of the piths and portions of the head of an ox in the alluvial banks of the Modder, one of the tributaries of the Orange

* Proceedings, vol. ii. p. 428. † *Ibid.*, vol. ii. p. 428.

river, and 40 feet below the surface of the ground. The piths with the breadth across the *os frontis* measured 11 feet 7 inches, but it is calculated that 5 inches had been broken off the end of each tip; and the circumference of the piths at the root was 18 inches. The orbits were situated immediately under the base of the horns. Part of the upper jaw, containing five molar teeth and other fragments of the head, as well as a cervical vertebra, were found at the same time.

A notice on the Fossil Fishes of the Yorkshire and Lancashire Coal-fields, by W. C. Williamson, Esq., was then read.

About four years ago, Mr. Williamson first met with remains of fishes in the coal-measures of Lancashire. Nearly at the same time Sir Philip Grey Egerton detected them in the Staffordshire fields; Mr. Hutton had previously found them near Newcastle; Dr. Hibbert Ware had brought them before the public in Scotland; Mr. Bowman had detected scales of Holoptychus in Wales; and two or three instances had been noticed of their existence in the coal-fields of Yorkshire. Since that period, however, the coal-measures of Lancashire and Yorkshire have proved to be exceedingly rich in Ichthyolites. In the former, they occur throughout the whole series from the Ardwick limestone to the millstone grit; and at Middleton colliery, near Leeds, they have also been found in considerable quantity. At that locality there are three seams of coal, but only two are wrought. The following is a general section of the pits:—

Fish coal	14 inches.
Interval	60 yards.
Yard coal	3 feet.
Interval	32 yards.
Main coal	$4\frac{1}{2}$ feet.

Ichthyolites occur in the shale in connexion with all the seams, but principally in the uppermost one, to which the colliers have in consequence given the name of Fish Coal. They are contained in a fine bituminous shale, and in greatest abundance at the junction of the roof with the coal, where a very thin seam of coprolitic matter occurs. The author has obtained from it the following remains:—

Teeth of *Diplodus gibbosus* and *Ctenoptychus pectinatus*; scales jaws, and teeth of *Megalichthys Hibbertii*, and of another smaller species; rays of *Gyracanthus formosus*; scales, fins, and other portions of two species of Holoptychus, of a species of Acanthodes, or Cheiracanthus? of a species of Platysomus; three kinds of Ichthyodorulites, and other remains of which he has not yet determined the genera.

In the shale of the main coal Ichthyolites are much less abundant, but they are remarkable for their great size. They occur in a

coarser shale, and consist chiefly of large teeth and vertebræ of a species of Holoptychus and rays of Gyracanthus.

The yard coal shale is still less fruitful than either of the other seams, and has yielded only a few small teeth of Holoptychus, Ctenoptychus, and some other unimportant fragments.

On comparing these fossils with the Ichthyolites which he has found in Lancashire, the author has ascertained that many are identical, but that others differ. The species of Diplodus, Ctenoptychus, Megalichthys, Gyracanthus, one of Holoptychus? and Platysomus? exactly correspond in each district. In the Lancashire field he has found remains of *Ctenoptychus apicalis* and *C. denticulatus*, which he has not noticed in the Yorkshire; and he is inclined to think, that the former field is characterized, if there be a difference, by the greater prevalence of Lepidoid fishes, and the latter by those of the Sauroid family.

The Ichthyolites occur chiefly in highly bituminous shales, with the exception of the Ardwick limestone, and most abundantly where it is finely grained. They are rarely associated with any quantity of vegetable remains; and this disposition of the two kingdoms, Mr. Williamson is of opinion may assist in determining the conditions under which the coal-measures were deposited. The Ichthyolites also are in general more common in the roof than the floor of the coal; but in the cannel-seams of Wigan in Lancashire, and in the thin seams connected with the limestones at Ardwick, they are most abundant in the floor. They are rarely found in the coal itself, and the instances in which they have been met with in that position by the author, have been chiefly in the Middleton colliery.

The manner in which Ichthyolites are associated with other remains, Mr. Williamson states, is well worthy of attention. At Burdiehouse they occur in the midst of Unios, Cyprides, and *Microconchus carbonarius*; at Colebrook Dale, with species of Orbicula, Trochus, Nautilus, Orthoceras, and Conularia; in the lower measures of Lancashire in beds nearly associated with those containing *Goniatites Listeri* and *Pecten papyraceus*; in the higher measures of Lancashire and in Yorkshire, with Unionidæ and Entomostraca; at Middleton, with Lingulæ; at the top of the series in Lancashire and Derbyshire, with Mytili.

TWEEDSIDE PHYSICAL AND ANTIQUARIAN SOCIETY.

The stated quarterly Meeting of the Society was held on November 18, in the Library room, Kelso. The Duke of Roxburgh presided; and the meeting was very numerous and encouraging, great

accessions being made to the Museum. Besides those belonging to the class of Antiquities, books, and works of art, were numerous contributions in the department of Natural History, from Mr. Douglas, Mr. Dunlop, Astronomer at Paramata, (through Sir T. M. Brisbane, Bart.) from Mr. J. Blacket, Sidney, New South Wales.

Contributions to the Zoological department, several of them of great interest, were received from Dr. F. Douglas, and from Messrs. Wilkie, Beckwith, Yule, Smith, Black, Lockie, Stevenson, &c., &c. As the true value of the Museum must always lie in its collection of objects having a *local* interest, and as all contributions tending to illustrate the Natural History of the district must be deserving of especial attention, such are always received with gratitude.

It was announced to the meeting by Sir Thomas Brisbane, that Mr. Fergusson of Kelso had voluntered to keep a complete series of Meteorological observations at Kelso, for behoof of the Society, provided he were furnished with the necessary instruments; and that he (Sir Thomas Brisbane) had mentioned this to the Duke of Roxburgh, who had at once declared his willingness to supply these instruments to the Society at his own expense. Sir Thomas also made known his own intention of presenting an Astronomical Clock, to be placed in the new building when completed.

The Museum, and all that is connected with it, is now becoming an affair highly creditable to the district. The new building is in an advanced state, and its accommodation will be ample and appropriate. The friends of the Institution, at home and abroad, are daily becoming more numerous; its list of members is at present more full than at any time since its commencement: and it is receiving valuable donations from nearly every quarter of the globe.

The thanks of the Society were voted to the office-bearers for the past year; and particularly to Dr. Wilson, the secretary, and to Mr. Heckford the conservator of specimens for the Zoological department of the Museum.

ROYAL PHYSICAL SOCIETY OF EDINBURGH.

In the notice of Mr. E. Forbes's communication, p. 355, he is represented as maintaining that the cilia of the *Beroe* are not organs of motion. We have since learnt that the remarks which he made on this subject had a very different purport, namely, that the motions of the cilia were not sufficient of themselves to account for the movements of the animal, seeing that frequently when the *Beroe* or *Cydippe* lay still at the bottom of the vessel in which it was placed the cilia were in active motion.

MISCELLANEOUS.

MOVEMENT OF THE STYLE OF *GOLDFUSSIA ANISOPHYLLA*.

The following note by M. Morren accompanied the presentation to the Royal Academy of Brussels of a Memoir, entitled "Researches on the Movement and Anatomy of the Style of *Goldfussia anisophylla*," referred to above in p. 396.

"The object of the memoir which I now present to the Academy is to make known the mechanism employed by nature to move the pistil of this interesting plant. In his new Physiology (1838), M. Treviranus regretted that I had not explained my ideas relative to the movement of the column of the Stylidieæ, a movement of which I saw the cause in the excitability of the fecule, considered as an organized part, as a living organ of the plant, and not as a chemical product, as an inert substance. I now fulfill the wish of M. Treviranus by this fresh memoir. The movement of the style of the *Goldfussia* had escaped the investigation of naturalists; it is notwithstanding very remarkable. Most of the flowers in which we see a moveable pistil possess a bilabiate stigma; here the moveable part is awl-shaped and rather spindle-shaped. The true stigma occupies only the dorsal part of the style, and when it bends back it removes as far as possible from the stamina; when it again erects itself, it comes in contact with collecting hairs, which from the position of the flower, or by the help of insects, receive the pollen. The final cause of the phænomenon is very certainly the accomplishment of fecundation; but the mechanical cause is seated in the distension of the cylindrenchyme of the stigma; its tissue is formed by long cylinders dilatable at one or other of the extremities, and each is filled with a liquid containing globules. These globules are excitable. They are naturally carried towards the outer extremities of the cylindrenchyme, and then these extremities dilating, make the stigma bend; but when it is touched the globules and the liquid flow back to the bottom of the cylinders, and in this case, this side becoming the longest, the style erects or bends itself in a direction the reverse of that which it had before. The physiological cause resides therefore in the excitability of a vital fluid. I have made several series of experiments to prove these assertions, and I have given the anatomy of the parts. I am not aware that a similar structure has ever been found in a moveable part of plants.

"The morphology and the metamorphoses of the hairs likewise furnished as to this plant some curious observations. I have taken

in hand to give an account of them."—*Bulletin de l'Acad. Royale de Bruxelles,* vol. vi. No. 2.

ECHINOSPERMUM LAPPULA.

Echinospermum lappula, Lehm.—My friend, the Rev. E. A. Holmes, F.L.S., has communicated to me specimens of this most interesting addition to the English Flora, which were gathered by him between Southwold and Walderswick, on the Suffolk coast, in the month of August, 1839. They grew upon the inner slope of a broad gravelly bank which divides some marshes from the sea, at about 150 yards from high water mark, and had all the appearance of being aboriginal natives of England.—CHARLES C. BABINGTON.

GUIANA EXPEDITION.

The collection of Objects of Natural History made by Mr. Schomburgk in the course of his expedition in Guiana from 1835 to 1839, together with numerous specimens of the implements, weapons, dresses, and other works of art of the natives, with drawings of various objects and views of the country, the El Dorado of Sir Walter Raleigh, now form a very attractive public Exhibition at No. 209, Regent-street.

A specimen of the remarkable freshwater fish the Pirarucu (*Sudis Gigas*), a full-sized representation of the *Victoria Regia,* with a geological collection illustrating the formation of the district, are among the many objects of interest. The exhibition is attended by three of the Aborigines from the interior of Guiana, the first who ever visited Europe, natives of three Indian tribes, a Macusi, a Warrau, and a Paravilhana.

A Prospectus has also been issued for the publication of twelve Views, of the very interesting districts now first explored by Mr. Schomburgk; and as their execution must depend upon a number of subscribers sufficient to defray the expense, we trust he will not fail in obtaining adequate support.

GREW "ON THE PRINCIPLES OF BODIES."

"The Principles of Bodies, as they must of necessity have their dimensions, and therefore their solid figures, so withal they may be infinitely small, not only beyond all naked or assisted sense, but beyond all arithmetical operation or conception.

"To those who are not used to a rigid mathematick proof, this

may be illustrated by the smalness of many organized bodies. Ten thousand seeds of the plant called *Harts-Tongue*, hardly make the bulk of a peppercorn. Now the covers and the true body of each seed, the *parenchymous* and *lignous* parts of both, the fibres of those parts, the principles of those fibres, and the *homogeneous* particles or atoms of each principle, being moderately multiplied one by another, afford a hundred thousand millions of formed atoms in the space of a peppercorn; but how many more we cannot define.

"The same is yet more evident from the stupendious smalness of some animals, especially in the sperm of smaller insects. Which have been observed by Mr. Leuwenhoeck, to be a hundred millions of times smaller than a great sand. And what then must be the number and smalness of those formed atoms, whereof all the organical parts of these animals are composed?"—*Grew's Cosmologia Sacra*, 1701, p. 11, ch. vi.

NOTES ON THE BIRTH OF THE GIRAFFE AT THE ZOOLOGICAL SOCIETY'S MENAGERIE. BY PROFESSOR OWEN.

Connexion took place between the female Giraffe and the lighter-coloured male on the 18th March, 1838, and again on the 1st of April.

The young animal was a male, and was born June 9, 1839, being 444 days, or fifteen lunar months, three weeks, and three days, since the last observed, and, in all probability, the last coitus.

The new-born animal came into the world, like other Ruminants, with the eyes open, and the hoofs disproportionately large. The skin was marked as distinctly as in the adult, with large angular spots, which were somewhat darker than those of the mother; and the hair of the legs was of a deeper fawn colour. It sucked some warm cow's-milk from a bottle with avidity, and once or twice uttered a low, gentle grunt or bleat, something between that of a fawn and a calf. The young creature made several efforts to stand, raising itself on the fore knees; and was able to support itself on its vacillating and outstretched legs, about two hours after its birth.

"No one could have seen the young Giraffe," says Professor Owen, "without being struck with its large size, compact figure, and strength of limb. The condition or purpose of the long gestation is, evidently, to bring into the world the young Giraffe of a stature and strength suitable to the exigencies of a denizen of the desert—the birthplace, likewise, of the Lion and other destructives." The length of the animal, measuring from the muzzle to the root of

the tail, was six feet ten inches; the girth of the trunk was two feet nine inches; from the tuber ischii to the patella was one foot four inches; from the patella to the apex of the hind hoof three feet; from the olecranon to the carpus was one foot ten inches: from the carpus to the end of the fore hoof was one foot eleven inches. These segments of the fore leg were thus nine inches longer than the corresponding ones of the hind leg; and as this disproportion does not exist in the adult, it offers another instance of the precocious development of the anterior extremities in the mammiferous fœtus.

She would not yield her milk to, or even suffer her offspring to come near her. The young Giraffe was nourished by warm cow's milk. It gamboled actively about when one day old, and continued, without appearance of illness, till the 28th of June, when it was attacked by convulsions, and died.—*From the Proceedings of the Zoological Society.*

METEOROLOGICAL OBSERVATIONS FOR DEC., 1839.

Chiswick.—Dec. 1—3. Dense fog. 4. Frosty: fine. 5. Slight haze: fine. 6. Foggy. 7. Dense fog: fine: frosty at night. 8—10. Hazy. 11. Fine: hazy: rain. 12. Cloudy and windy. 13. Overcast: heavy rain at night. 14. Fine. 15. Frosty: hazy: rain. 16. Hazy: fine. 17. Fine. 18. Hazy. 19. Cloudy. rain. 20. Rain. 21. Cloudy: rain. 22. Rain: fine. 23. Fine: very mild for the period of the season: rain at night. 24. Boisterous with rain. 25. Very fine. 26. Heavy rain. 27. Rain: hazy. 28. Frosty: fine. 29. Clear and frosty. 30. Frosty and foggy. 31. Overcast: fine.

Boston.—Dec. 1. Fine. 2. Foggy: rain P.M. 3. Cloudy: rain A.M. 4. Foggy. 5. Cloudy: rain P.M. 6, 7. Foggy. 8, 9, 10. Cloudy. 11. Cloudy: rain early A.M.: rain P.M. 12. Fine: rain P.M. 13. Fine. 14. Cloudy. 15. Fine. 16. Foggy. 17. Fine. 18. Stormy: rain P.M. 19, 20. Cloudy: rain early A.M.: rain P.M. 21. Fine: rain P.M. 22. Cloudy: rain P.M. 23. Fine: rain P.M. 24. Cloudy. 25. Fine. 26. Fine: rain P.M. 27. Foggy. 28, 29. Fine. 30. Fine: hail and rain P.M. 31. Cloudy.

Applegarth Manse, Dumfries-shire.—Dec. 1. Clear and sunny. 2. Calm and clear: hard frost. 3. Dull: raw day. 4. Dull, but dry. 5. Frost A.M.: thaw P.M. 6. Dull moist day: hoar frost early A.M. 7. Dull and cloudy, but dry: hoar frost A.M. 8. Fine day: slight hoar frost. 9. Quiet and cloudy. 10. Quiet and cloudy: freezing P.M. 11. Fine day: wind rose P.M. 12. Heavy rain in the afternoon. 13. Fine morning: rain afternoon. 14. Moderate day: slight frost preceding night. 15. Foggy: slight frost preceding night. 16. Fine: slight frost early A.M. 17. Raw and cold. 25. Stormy day of wind and rain. 26. Clear day: frosty morning. 27. Snow in the evening, and frost all day. 28. A little more snow: hard frost P.M. 29. Clear and calm and frosty. 30. Looking dull A.M.: sleet and rain P.M. 31. Heavy rain all morning: cleared up P.M.

Sun 20 days. Rain 9 days. Snow 3 days. Frost and hoar frost 13 days.

Wind easterly 13 days. North-east 4 days. Southerly 4 days. Westerly 2 days.

Calm 13 days. Moderate 5 days. Strong breeze 4 days. Brisk 2 days.

Meteorological Observations made at the Apartments of the Royal Society by the Assistant Secretary, Mr. ROBERTON; *by* Mr. THOMPSON *at the Garden of the Horticultural Society at Chiswick, near London; by* Mr. VEALL *at Boston, and by* Mr. DUNBAR *at Applegarth Manse, Dumfries-shire.*

Days of Month. 1839. Dec.	Barometer.						Thermometer.									Wind.				Rain.				Dew point.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc.			Chiswick.			Boston. 8½ a.m.	Dumfries-shire.		London: Roy. Soc. 9 a.m.	Chiswick 1 p.m.	Bost.	Dumfries-shire.	London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Lond.: Roy. Soc. 9 a.m.
		Max.	Min.		9 a.m.	8½ p.m.	Fahr. 9 a.m.	Self-register. Max.	Min.	Max.	Min.			Max.	Min.									
1.	29·708	29·810	29·724	29·30	29·51	29·63	37·7	38·4	37·6	41	29	34		40	34½	E.	SE.	calm	ENE.	...	...	...	...	38
2.	29·882	29·992	29·890	29·54	29·78	29·90	38·8	39·4	37·2	42	33	37		36½	28½	E.	NW.	calm	E by S.	...	...	...	...	36
3.	29·960	29·985	29·962	29·61	29·92	29·89	38·8	39·4	35·8	39	27	39		44	31	S.	SW.	calm	NE.	...	...	·11	...	38
4.	29·830	29·963	29·835	29·48	29·78	29·82	34·3	34·6	32·0	38	30	35		36½	34½	NNW.	N.	calm	E.	·038	...	·08	...	34
5.	30·096	30·487	30·124	29·67	29·92	30·06	36·7	37·2	33·3	37	28	34		36	27½	SW.	NW.	calm	NE.	...	...	...	...	33
● 6.	30·364	30·508	30·397	29·94	30·19	30·15	36·7	37·3	36·0	37	32	32		38½	32	W.	S.	calm	NE.	...	·01	·10	0·00	35
7.	30·332	30·366	30·239	29·95	30·10	30·05	34·9	35·3	34·2	42	28	35		35½	30½	E.	SE.	calm	E.	...	...	...	...	33
8.	30·096	30·124	30·014	29·83	30·00	29·97	35·4	35·9	33·4	35	31	36·5		36½	31½	E.	E.	calm	E.	...	...	...	...	32
9.	29·830	29·860	29·712	29·60	29·81	29·65	34·9	36·0	34·7	37	32	35		36	32	NW.	NE.	calm	ENE.	...	...	...	...	31
10.	29·606	29·651	29·637	29·35	29·50	29·45	34·2	36·7	34·2	42	34	34		37	34	E.	E.	SW.	E.	...	...	...	...	31
11.	29·664	29·598	29·326	29·24	29·45	29·33	42·4	43·0	34·3	46	39	41		42	32	E.	SE.	calm	ENE.	...	·09	·14	..	37
12.	29·248	29·286	29·190	29·	29·18	29·10	44·8	45·3	41·9	48	35	42		45	39	E.	S.	E.	E.	·083	·10	·03	..	39
☽ 13.	29·294	29·311	29·277	28·87	29·10	29·09	43·3	46·4	41·3	48	42	38		46	38½	S.	S.	calm	E.	·061	·16	·09	...	40
14.	29·230	29·400	29·247	28·79	29·07	29·30	44·2	44·4	42·3	49	39	43		40½	40	S.	SW.	calm	S by W.	·250	...	...	0·48	39
15.	29·590	29·596	29·427	29·15	29·40	29·42	39·3	40·0	38·8	43	41	36		42	32	SW.	SE.	calm	S.	...	·09	...	...	36
16.	29·696	30·083	29·713	29·20	29·63	29·89	40·3	40·5	38·8	44	30	36		40	32	W.	SE.	calm	SSW.	·122	...	...	...	38
17.	30·074	30·094	29·868	29·64	29·89	29·63	38·3	38·8	37·4	44	31	34		38	32½	NE.	SE.	calm	E by S.	...	·28	...	...	37
18.	29·516	29·530	29·376	29·17	—	—	35·2	35·5	34·7	42	41	38·5		—	—	E.	SE.	E.	—	...	...	...	...	32
19.	29·418	29·426	29·356	28·98	—	—	47·7	48·4	34·7	55	50	46		—	—	S.	S.	calm	—	·333	·27	·29	...	40
○ 20.	29·282	29·480	29·262	28·82	—	—	51·3	51·7	47·3	55	46	51·5		—	—	S.	S.	calm	—	·322	·06	·12	...	46
21.	29·552	29·566	29·561	28·96	—	—	47·3	47·7	46·6	53	46	46		—	—	S.	SW.	calm	—	·180	·20	·06	1·56	45
22.	29·550	29·547	29·376	28·95	29·99	—	49·9	50·6	46·8	55	47	47		—	—	SW.	SW.	calm	—	·061	·06	·01	...	49
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25.	29·528	29·568	29·530	28·39	29·02	29·43	47·7	49·4	45·9	48	28	42		—	—	S.	W.	W.	W.	...	...	...	...	48
26.	29·732	29·728	29·322	29·28	29·49	29·45	40·7	41·2	38·3	54	38	34		37	30	S.	E.	calm	E.	...	·39	...	...	42
☾ 27.	29·342	29·577	29·386	28·90	29·30	29·42	47·2	47·8	39·4	46	29	42		34	29½	W.	NW.	calm	NE.	·305	·13	·18	...	45
28.	29·752	30·062	29·759	29·30	29·52	29·79	35·7	36·0	35·8	39	24	33		34½	21½	NW.	W.	calm	WNW.	·158	...	...	1·63	40
29.	30·280	30·440	30·320	29·81	30·08	30·26	33·3	33·5	32·2	40	21	32		35	26	W.	W.	calm	NW.	...	...	...	...	33
30.	30·398	30·436	30·163	30·08	30·14	29·80	32·3	35·2	32·0	44	34	29		35	21½	SW.	SE.	calm	ESE.	...	...	...	...	33
31.	29·924	29·975	29·727	29·45	29·41	29·33	44·8	45·3	32·0	52	45	42		44½	34	S.	S.	S.	SSW.	...	...	·10	...	38
Mean.	29·729	29·821	29·656	29·28	29·58	29·65	41·0	41·8	38·4	45·35	31·96	38·9		38·7	31·4					Sum. 2·326	2·32	1·77	3·67	Mean. 38·6

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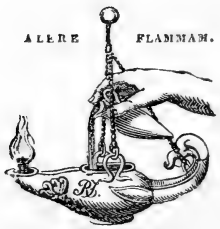

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1

Brachyphylla cavernarum.

2

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3

Nyctinomus macrotis

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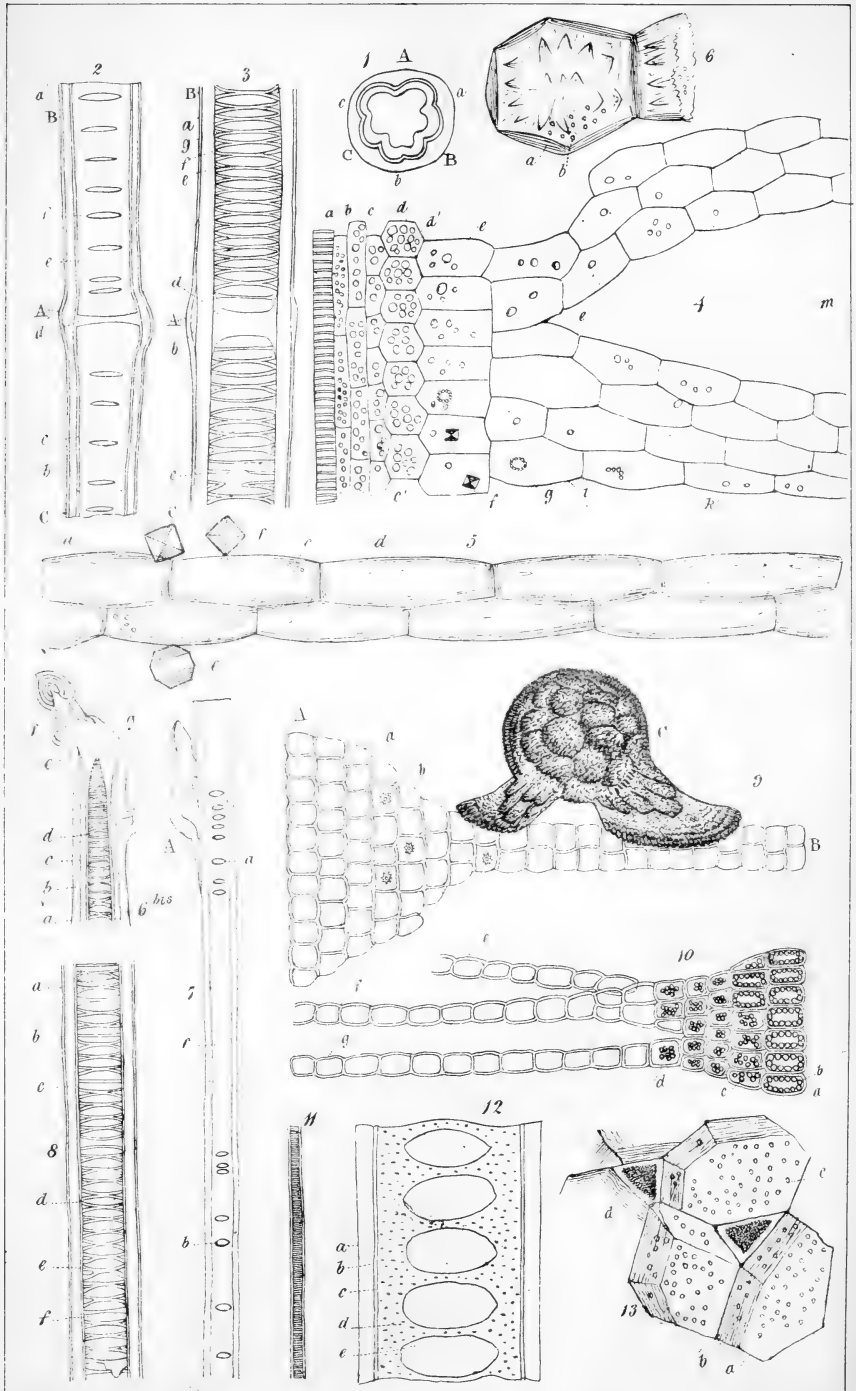
Cheiroptera of Cuba.



Car. Morren, secund. nat. J. Basire, lith.

1-5. Begonia argyrostigma. 6-9. Juglans regia.
10-11. Jasminum fruticans. 12-13. Phytolacca decandra

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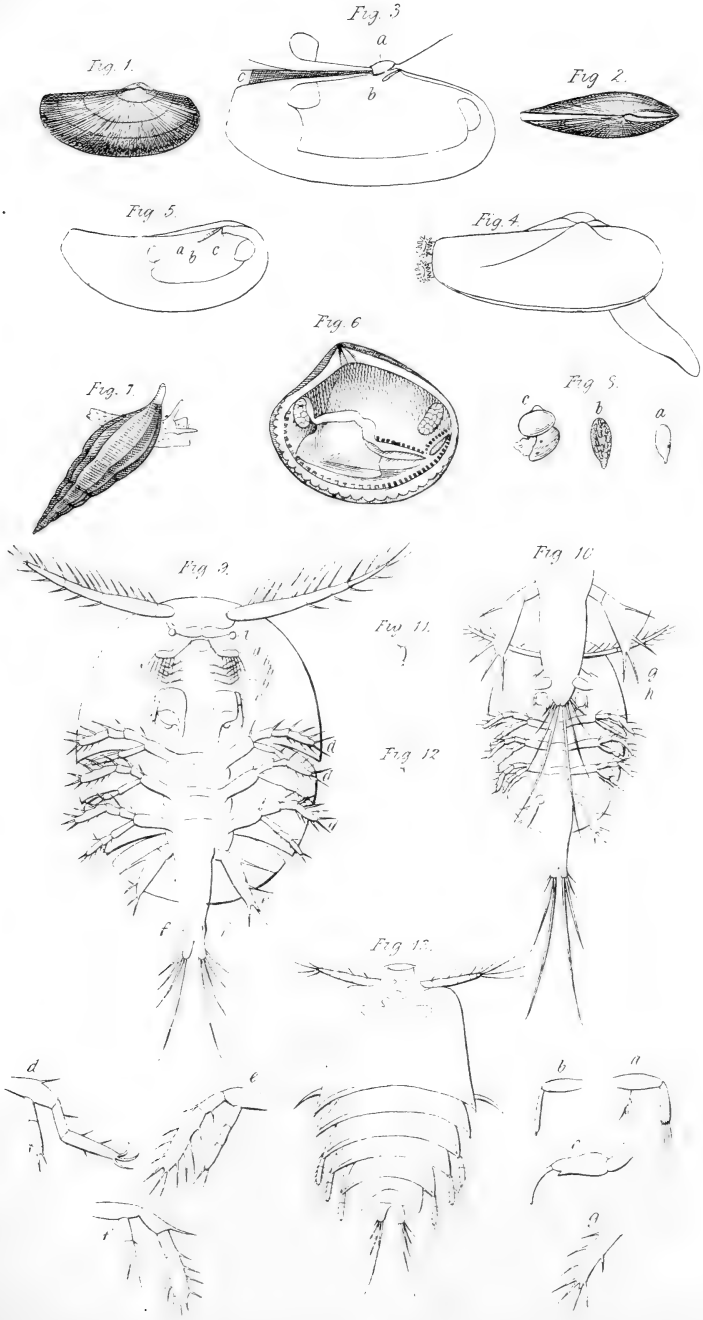
Fig. 1.
Fig. 3
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Fig. 2.
Fig. 5.
a b c
Fig. 4
Fig. 6
Fig. 7.
Fig. 8.
c
b
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Fig. 10
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h
Fig. 12
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Fig. 13.
d
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i
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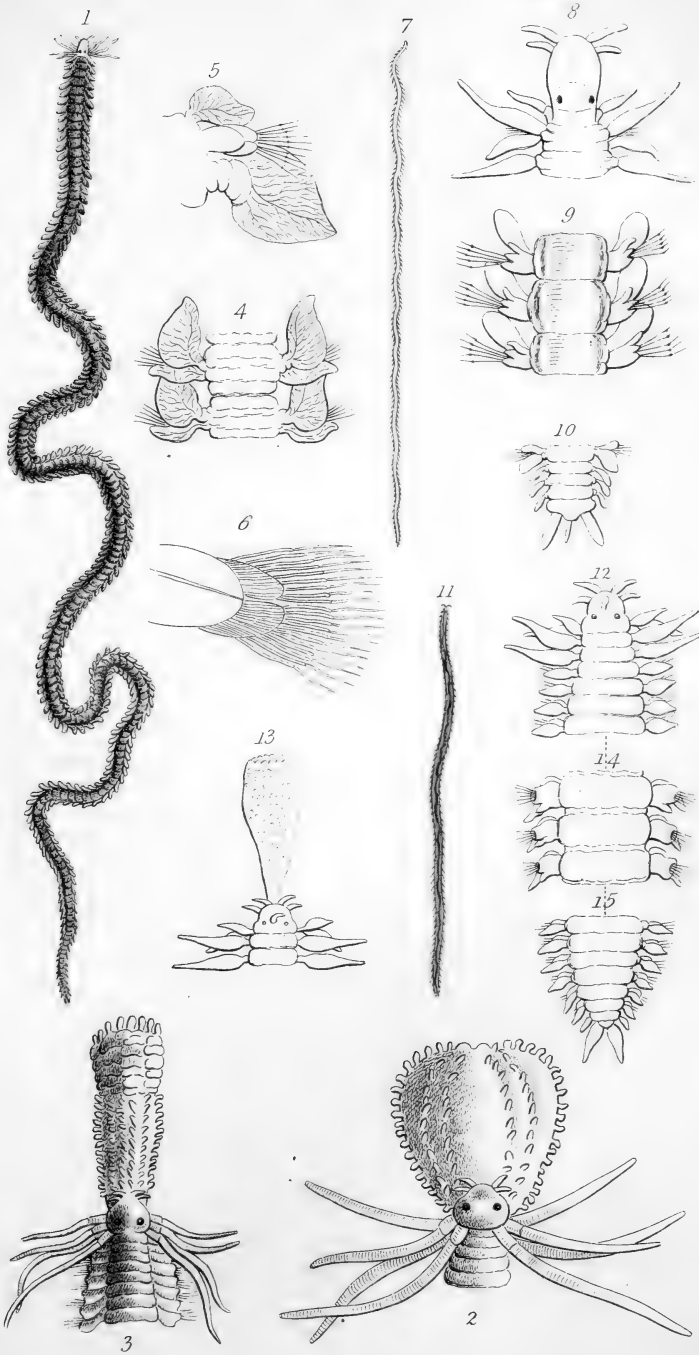
a
c
g
J. Dacre, lith.

Fructification of Fungi



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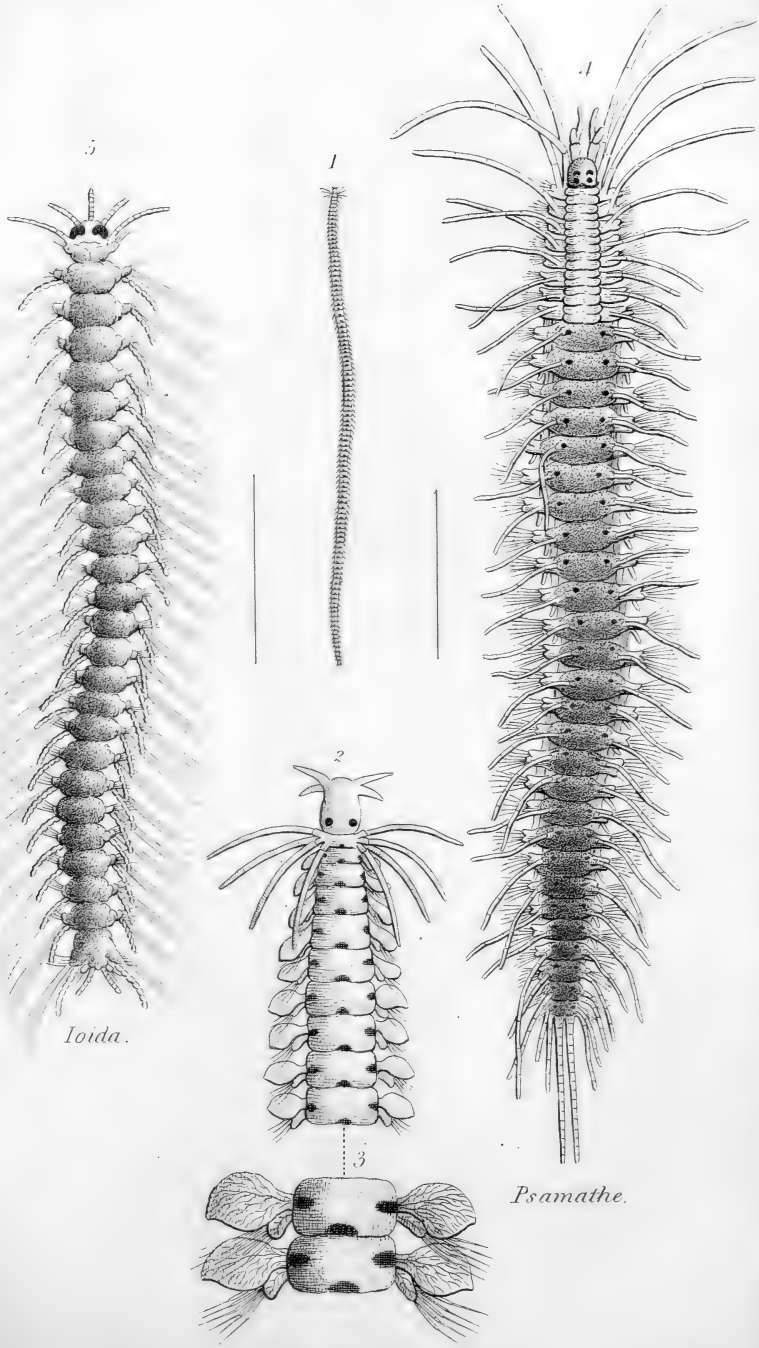

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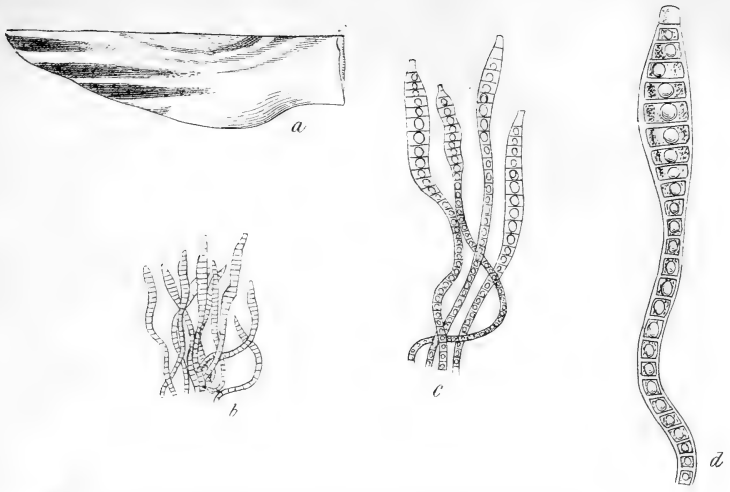

Fig. 1. Sporidesmium adscendens. Berk.

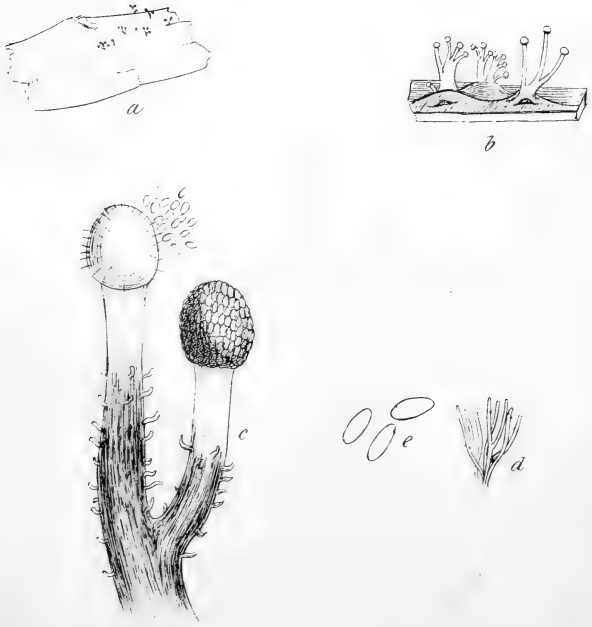

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Fig. 2. Stilbum lateritium. Berk.

Dædalea erubescens. Berk.

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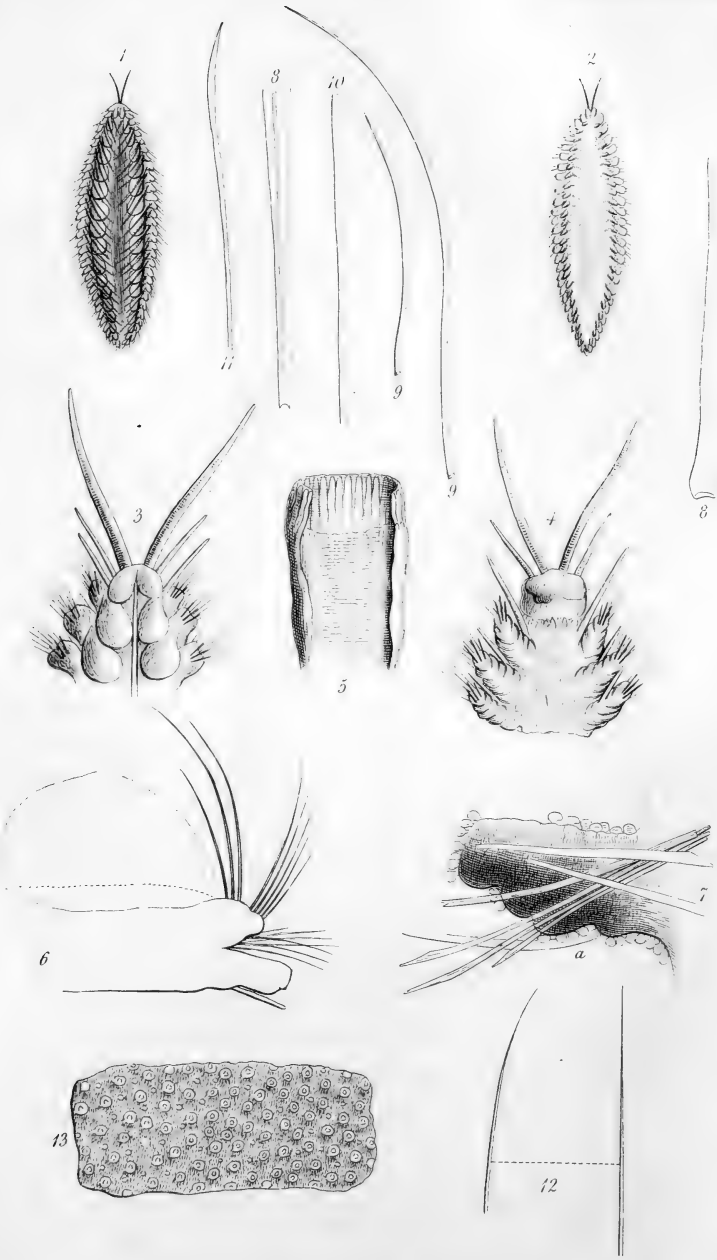

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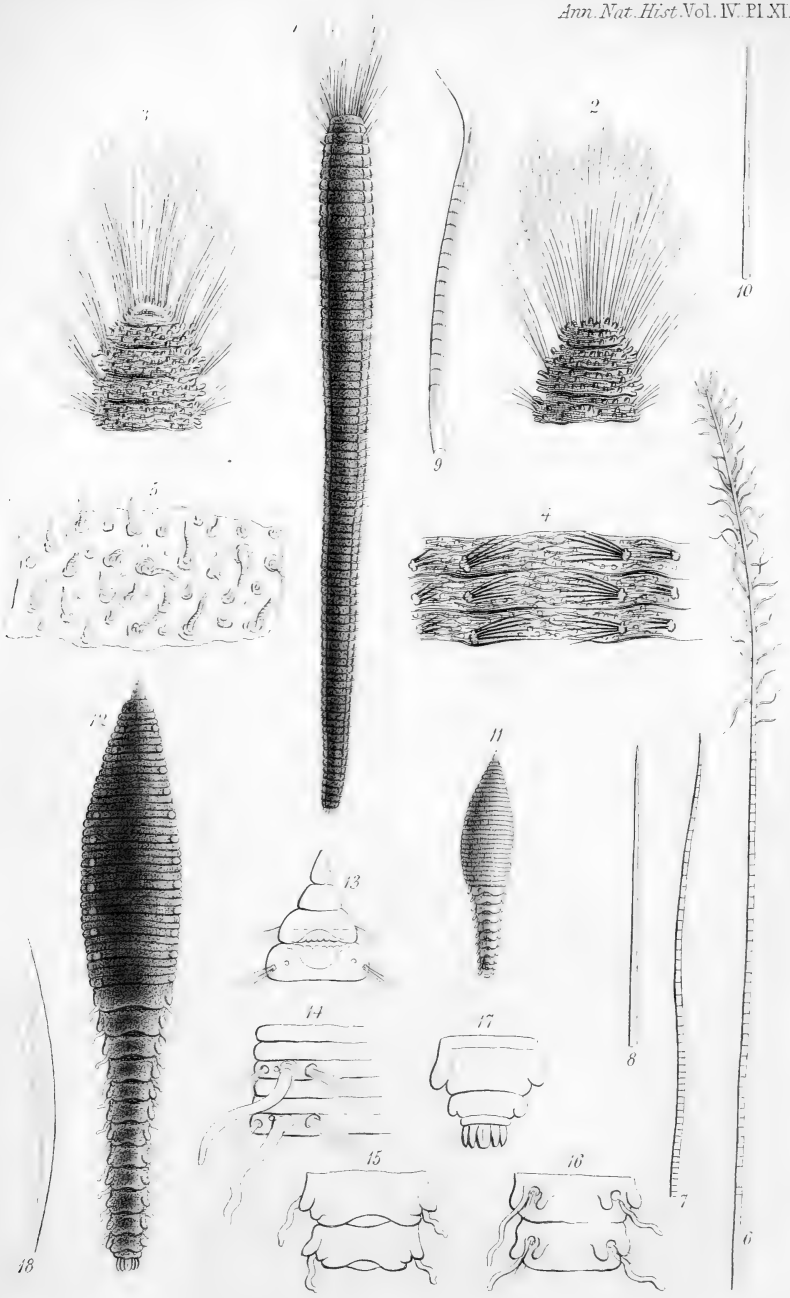

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FEBRUARY 1840.

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