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MAGAZINE

OF

ZOOLOGY AND BOTANY.

CONDUCTED BY

SIR W. JARDINE, BART.—P. J. SELBY, ESQ.

AND

DR JOHNSTON.

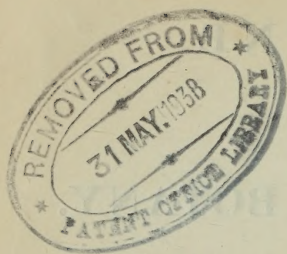
“Rerum naturalium sagax Indagator.”

VOLUME SECOND.



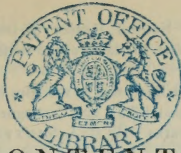
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“ Omnes res creatæ sunt divinæ sapientiæ et potentiæ testes, divitiæ felicitatis humanæ ; ex harum usu *bonitas* Creatoris ; ex pulchritudine *sapientia* Domini ; ex œconomia in conservatione, proportione, renovatione, *potentia* majestatis elucet.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





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OF THE

CONTRIBUTORS OF ORIGINAL ARTICLES

TO VOL. I. AND II.

- | | |
|--|---|
| Alder, Joshua, Member of the Nat. Hist. Soc. of Newcastle-upon-Tyne. | Henderson, Mr J., |
| Arnott, G. A. Walker, LL.D., F. L. S. | Henslow, Rev. J. S., M. A., Professor of Botany in the University of Cambridge. |
| Babington, Charles C., M. A., &c. | Hewitson, W. C., Esq. |
| Baird, William, Surgeon H. C. S. | Jenyns, Rev. Leonard, M. A. |
| Berkeley, Rev. M. J., M. A. | Johnston, George, M. D. |
| Bevan, Edward, M. D. | Little, Rev. William, |
| Bonaparte, Carolo L., Prince of Musignano. | Macgillivray, William, A. M. F. R. S. E. M. W. S., &c. |
| Clarke, Dr W. B. | Parnell, Richard, M. D. |
| Cooper, Daniel, Curator to the Botanical Society, London. | Selby, P. J., Esq. F. R. S. E., &c. |
| Couch, Jonathan, F. L. S. | Shuttleworth, R. J., Esq. |
| Dickie, George, Esq. | Smith, Andrew, M. D. |
| Doubleday, Henry, Esq. | Swainson, William, F. R. and L. S. |
| Drummond, J. S., M. D. | Thompson, William, Esq. Vice-President of the Nat. Hist. Soc. of Belfast. |
| Duncan, James, M. W. S. | Watson, H. Cotterel, Esq. |
| Eyton, P. C., | Westwood, J. O., F. L. S. |
| Forbes, Edward, | Wilson, James, F. R. S. E., &c. |
| Gould, F. L. S., &c. | |
| Gray, John Edward, F. R. S. | |



MAGAZINE

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ORIGINAL COMMUNICATIONS.

I.—*Account of a Botanical Excursion in the Alps of the Canton of Valais, Switzerland, in August 1835 ; and Catalogue of the Plants collected, with occasional Remarks.* By R. J. SHUTTLEWORTH, Esq.

THE following account of a botanical excursion to one of the most interesting parts of Switzerland, will be perhaps agreeable to some of your readers, and will give a fair idea of the variety and profusion of our Alpine vegetation.

Although the weather was on the whole very unfavourable, and prevented my exploring many points of peculiar interest to the botanist, the number of species I was enabled to collect was far from inconsiderable, and after my return home, many of them on examination proved to be particularly interesting, either from their rarity or novelty, or from the specimens being in a state which enabled me to rectify several errors contained in their descriptions, or to add remarks on characters hitherto passed over in silence. I have consequently added a list of all the species I collected, with such remarks as I imagine may prove useful ; and in order to render the Flora of the Gemmi more complete, I have incorporated the results of a short excursion made thither a fortnight later in the season this year. A few species from the neighbourhood of Zermatt are added, which were contained in a small parcel of plants purchased from a peasant, and which I was prevented from finding myself, either by the lateness of the season, or the unfavourable state of the weather. These are distinguished by an asterisk, and those of this year from the Gemmi by the date.

I might easily have increased the list by more than a hundred

species, had I enumerated such as I observed growing, but did not collect; but many of the Alpine species resemble each other so strongly, that I have rigidly abstained from admitting a single plant, which I did not bring home with me in such a state as admitted of careful examination and analysis.

I regret that I am unable to enter at all into the geographical distribution of the Swiss Alpine plants, but the flora of a small district, nowise bounded by natural limits, or distinguished by peculiar geological formation, can furnish data of but small importance individually; and I am firmly impressed with the conviction, that a thorough knowledge of all the species belonging to the flora of a country, as well as of the modifications which many species undergo according to locality and exposure, is indispensable, before generalising the results of detached observations. I am persuaded that the progress of this branch of the science is more impeded than advanced by the publication of indigested materials. An error once admitted into our printed records, often requires ages before it can be eradicated.

The remarks on the genera and species examined are by no means brought forward as infallible; they are, however, the result of a reiterated and careful examination: and I am fully aware that many of the reductions, as well as the claims of many of the species admitted, will not be approved. Some of the remarks also, on a celebrated German botanist, may perhaps be also blamed; but where a botanist establishes himself as a sort of dictator, and still errs, it is but just that his dictatorial expressions, only tending to mislead, should be quoted with full force against himself. In one or two genera, as *Hieracium* and *Aconitum*, a few species are adopted, which I also believe not to be based in nature; but until these genera are better understood, it is far preferable to distinguish marked forms as species, than leave them to be neglected as accidental varieties; and it must also be considered, that the true species of these genera, and of *Hieracium* in particular, often appear to pass by gradual transition into each other.

On the 15th of August 1835, I reached Kandersteg, at the foot of the Gemmi, (3280' s. m. Keller's Map, 1833,) where the rain obliged me to remain until the afternoon of the following day, when I ascended the Gemmi by the usual path, and took up my quarters at the Inn of the Schwarrenbach, (5840' Kell.) The 17th and 18th were employed in examining the rocks and heights behind the Inn, and those above the left bank of the Dauben See, (6860' Kell.) Just below the Inn, I observed a few stunted plants of the fir;

but as they were not in a state to examine, I am not sure whether they belonged to the Alpine variety of *Pinus sylvestris*, the *P. Mughos*, of Swiss botanists, or to the *P. uncinata* of Ram. The Gemmi is composed chiefly of limestone rocks, but the presence of detached masses of granite proves that the higher points are of that formation. The view is one of the most dreary; and the surface of the rocks between the Lake and the Daub (7049' Michaelis in Fröbel and Heer Mittheilungen aus dem gebiete der Theoretischen Erdkunde, Vol. i. p. 231, et seq.) the highest part of the passage bears evident marks of having once been the bed of the glacier, which now is at some distance on the left.

I was joined in the evening by two young friends, who accompanied me during the remainder of my excursion, and we descended to the baths of Louesche, (Leuk. 4402' Mich.) where it was dark before we arrived. On the 19th we botanized, passing through Inden (3580' Kell.) and Varen, (2370' Kell.) among the vineyards and waste fields along the horse road to Sierre, (Siders. 1712' Mich.) situated on the Rhone. Having sent home by the post the plants collected, we ascended, on the 20th, the Valais, passing through the town of Louésch, (2100' Kell.) where *Onopordum Acanthium* was growing in immense quantities, to Visp (2010' Mich.) a small town built at the entrance of the valley of the same name, which at Stalden (2537' Mich.), where we passed the night at the house of the Castellan or chief magistrate of the small town, branches into the Valley of Saas, and that of St Nicholas.

At Stalden we observed the last vineyards, and at a short distance higher up the last walnut trees, which were replaced by cherry trees.

On the 21st, we proceeded up the Valley of St Nicholas, through the hamlet of the same name, (3390' Kell.) Randaa (4475' Mich.), in 1819, half-destroyed by an avalanche, and Taesch, (4479' Mich.) beyond which place the valley suddenly narrows, and again expands into that of Zermatt, at which village (5040' Mich.) we arrived in the evening.

At Zermatt we were hospitably received by the parish priest, who is here, as in most of the retired parts of the Valais, the only person with sufficient accommodation to receive travellers. On the 22d, we started early in the morning, with the intention of extending our excursion to the edge of the glacier of the Col de Cervin, visible from the curé's house. We followed the course of the Vispbach for some time, and passed along the foot of the Rosa or Zermatt glacier, where I was surprised at finding patches of rye in almost immediate contact with the ice; but we had hardly reached the

Schwarzseeberg, where the foot of the Zermatt glacier (6589' Mich.) offered a rich harvest, when rain and fog came on, and drove us back about twelve o'clock. The glacier of Zermatt appears to have considerably advanced, as the remains of wooden sheds, almost covered by the Moraine, or wall of mud and stones ploughed up by the ice, attested. The formation of this part of the Valley of Zermatt, and of those parts we subsequently explored, is gneiss or granitic, which I mention, as it will serve to account for the difference between the vegetation observed here, and that of the Gemmi.

On the following morning, the rain still continued, but about twelve o'clock the day became more promising, and eventually cleared up, and we made an excursion to the glacier of Fünelen (or Finel,) on the northern not southern side of the valley, as it is erroneously marked in Keller's Map. (Base of the glacier, 6655' Mich.) The rarest plants rewarded us, such as *Artemisia mutellina*, *Pedicularis rostrata*, *Senecio uniflorus*, and *incanus* in various forms, &c. and the beautiful *Peltigera crocea*, Wahl. Fries. I was particularly pleased at finding the *Phleum commutatum*, Gaudin, and the *Phleum alpinum*, L. and Auct. Helv. growing together, though not promiscuously; the former in large quantities, on muddy pasture ground, at the immediate edge of the glacier. On our return we passed through a very thin and aged wood of *Pinus Cembra*, L. the nut of which has an agreeable flavour, and is much relished: the wood is by far the most durable of European firs; but the species is rare, and occurs but in small quantities, and will, I fear, soon be nearly extinct in most parts of Switzerland, from the careless way in which the peasants employ it.

The weather appearing perfectly cleared up, we engaged two guides to conduct us over the Glacier of Taesch into the Valley of Saas, where, besides other rare plants, the *Gentiana carinthiaca* is indicated. Most part of the night was passed in putting in paper the plants collected, and in arranging the luggage, which had considerably augmented in bulk, in a more portable form. The moon was up, and the heavens perfectly clear, affording the most magnificent view of the chain of the Rosa, the Col de Cervin, and the Matterhorn, (*M. Cervin, il Monte Sylvio*,) by far the most grand and awful scene I had ever witnessed. The Matterhorn rises a perfect pyramid of rock to the height of 13,854', (Gaudin) with sides so precipitous as to be entirely free from snow.

It was later on the following morning (the 24th) than we intended, when the guides made their appearance, and we were ready to start: They assured us that they knew the passage perfectly well,

that it was easy, and that the glacier would not require more than three hours to cross. It was six o'clock before we were off, when, retracing our steps for a short distance, we crossed the river, and gradually ascending the foot of the mountains through magnificent larch forests, we soon entered the small lateral valley of Taesch, at some distance above the hamlet of the same name. A few specimens of *Artemisia nana*, Gaud. nearly allied to, but certainly distinct from, the *Art. campestris*, were found; and having partook of the hospitality of the inhabitants of a few chalets at the entrance of the valley, called Alpen, who have the charge of the cattle belonging to the commune of Taesch, we followed the course of the small torrent nearly to the foot of the glacier; here we commenced a steep ascent between the north side of the glacier, and a wall of perpendicular rocks, occasionally enlivened by small waterfalls. On these rocks, I gathered the rare *Aretia tomentosa*, Schleich., and the *Poa Gaudini*, Kunth. (the *P. aspera*, Gaud. but certainly identical with the Scotch *P. cæsia*.) The vegetation was so luxuriant, and the plants so rare, that I spent much more time than was advisable in filling my box; but such plants as *Trifolium saxatile*, *Campanula cenisia*, *Gentiana glacialis*, *Juncus Jacquini*, β , (apparently hitherto never collected with ripe capsules,) *Senecio uniflorus*, All., *Phaca lapponica*, Wahl., and *Oxytropis cyanea*, M. B., were too powerful attractions to be resisted, and it was two o'clock before we reached the termination of the rocks, and that part of the glacier where we had to commence the passage.

Phænogamous vegetation had entirely ceased, but among the last flowering plants I observed growing on the Moraine, the *Myosotis nana* and *Aretia pennina*—the brilliancy of the bright blue of the one, and the softness and elegance of the pale rose, violet or white flowers of the other, no words can express. The last flowering plant was a small state of *Luzula spicata*, forming large dense tufts, and which, intermixed with lichens, formed the whole of the vegetation for some extent. Some Chamois were seen by the guides, but they had disappeared before I could distinguish them from the grey rocks on which they were standing.

From the edge of the glacier to the summit of the pass, the ascent was easy, and, excepting one or two chasms which occasioned a short delay, perfectly free from danger; but it was not without some anxiety and misgivings, that my attention was drawn, by the mutterings of the guides, to a mass of black clouds, which had formed on the summit of the Matterhorn.

We reached the summit of the pass, (10,947' at 6 metres below

the highest part of the ridge—probably the highest pass in Europe, as the Col de Cervin is, according to Saussure 10,284', or according to Welden 9948'; and the Col de Géant, 10,598', Michaelis. l. c.)—about 3 o'clock, and after a halt of a few minutes, we commenced a most rapid descent over a smooth field of snow, (at an angle of 15 degrees, Mich.) It soon became, however, more gradual, and eventually the descent was almost imperceptible; but chasm after chasm soon broke up the hitherto smooth surface of indurated snow, into the most rugged and dangerous glacier. The clouds had gradually spread, and we were soon enveloped in a thick and wet mist. All our endeavours to keep clear of the wider chasms were ineffectual, and having, with great difficulty and much expenditure of time, passed several, covered only with a thin layer of snow, which offered no resistance to the passage of our poles, we were obliged to give up the direction we had taken towards the right side of the glacier, and to attempt reaching the rocks on the left. Here we found more difficulty in proceeding, as the ice did not reach the rocks, but was separated from them by large apertures and deep wide clefts, of which the walls were more than 100 feet high. Again we attempted the centre of the glacier, but were not a little disconcerted at finding the chasms increase rapidly both in size and number. The fog was now so dense that we could not see ten yards before us, and at last the guides gave up all hope of getting off the glacier that night, as the rocks and higher points by which they were enabled to guide their course, were invisible. The impossibility of either advancing or returning was too evident, and nothing remained but to submit; and excepting a small piece of bread in our pockets, unprovided with food and clothed in linen dresses, it was not without considerable doubts whether we should succeed better on the following day.

On taxing the guides with their ignorance, one of them then said for the first time, that he had not crossed the glacier since the preceding year, and that the whole nature of the ice and the direction of the chasms were completely changed. However true this may have been, it is the usual excuse that guides bring forward on such occasions.

After considerable exertion, and several narrow escapes from being engulfed, we succeeded in reaching a high bank of smooth snow on the north side of the glacier, where night surprised us, still hunting out for the shelter of a rock. We were therefore obliged to take up our quarters under a mass of broken rock, which afforded a sort of shelter to our heads and backs, but not before we were so

wet through, that the tinder in our pockets was become perfectly useless, and after several vain attempts we were obliged to give up all hope of lighting a cigar. Although much fatigued, there was of course no prospect of sleep, and the night was passed half sitting, half standing, in keeping each other awake, and in stamping with our feet to prevent their becoming quite benumbed. The fog turned into snow during the night, and the cold was less intense than it would otherwise have been. The novelty of the position, the intense silence around us interrupted only by the rumbling of a dull low thunder, and occasional reports of masses of snow or rock precipitated from the heights upon the ice beneath, together with occasional distant glimpses of the rocks, and the bed of the glacier below us, lit up by flashes of lightning, afforded ample and not entirely disagreeable food for reflection.

Our guides had recourse to sleep, to muttering prayers, to occasional grumblings to pass the time, and one of them, who appeared never to have been in such a situation before, wished himself repeatedly back with his four-footed grunting companions in his snug chalet in the vale. At last they appeared rather more tranquillized, and finished by vowing a mass to their patron saint for all our souls, provided we got safe off the ice.

As soon as we could see on the following morning, we sent our guides out to report as to our prospects, and as to what was to be done : but, having already undergone so much, I insisted upon still attempting to descend into the valley of Saas.

Full two feet of snow had fallen during the night, and by its weight and softness had rendered the old snow quite unsafe, and the fog, which had partially cleared off during the early part of the morning, again thickened around us ; so that after several hours spent in gaining the opposite or south side of the Glacier, we were obliged to decide on retracing our steps, and returning to the valley of St Nicholas by the same route we had taken the day before. A sufficiently extensive view from the highest part of the southern side of the glacier, showed us an immense extent of glacier, which we should have had to pass over, covered with snow, but proving, by its undulated surface, that it was equally split up with chasms as that which we had already traversed.

We retraced then our steps to the point where we had left the course of the preceding day, and without deviating from our trail, which the fresh snow had not entirely effaced, we commenced our toilsome return. The chasms, which had been easily distinguished the day before, were now almost imperceptible to the unaccustomed eye, and before each step, the nature of the snow had to be examined with our poles.

Every now and then a shout gave notice that the snow had given way beneath one of the party, and one of my companions had a very narrow escape, being solely saved by falling with his pole across the chasm, which enabled him to support himself until we could come to his assistance. Yet such is the indifference to danger in such situations, that his first exclamation on our handling him rather unceremoniously was, "Take care what you are about, you'll tear my trowsers." After great exertion in bearing up against a cutting wind, mixed with frozen particles of snow, which blew directly in our faces, we reached the summit of the pass, and soon, with less difficulty than we expected, arrived at the termination of the glacier. It was, however, past two o'clock before we were off the ice. But what a change had taken place in the face of nature! for near 3000' below the spot where on the preceding day we had been struck by the luxuriance of the vegetation, the ground was covered with several inches of snow. We hurried on as quick as possible, and arrived at the village of Randaa about seven o'clock in the evening, where we were hospitably received by the curé.

A few minutes in the warm room produced a lively sense of pain and burning in the skin of the face and the eyes, and on the following morning (the 26th) I was completely blind. By degrees I could open my eyelids for a minute at a time, but we did not entirely recover from the effects of the reflection from the snow, and of the cutting wind, before a fortnight had elapsed.

Having engaged a man to carry our luggage, we slowly descended the valley of St Nicholas, and passing through Visp, slept at Brieg, where, with much suffering from my eyes, I put in paper the contents of my box, which I was delighted to find as fresh as when they were gathered. The mosses, however, of which I had collected a considerable quantity, having been tied up in a parcel, were entirely spoiled.

On the 27th we walked as far as Münster, at the head of the Valais, and on the 28th, hurried over the Grimsel, which we found covered with nearly a foot of snow, to Meyringen, whence we took a char to Brienz, and returned on the 29th through Interlaken and Thun to Berne.

Catalogue of the Plants collected, with occasional remarks.

1. *Chara aspera*, Willd.
H. In fossis prope Pfyn, inter Sidens et Leuk.
 2. *C. hispida*, L. β *gracilis*, Hook.
H. Cum præcedenti.
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3. *Polypodium Phegopteris*, L.

H. In ascensu M. Gemmi supra Kandersteg, 29 Aug. 1836.

4. *Cistopteris dentata*, Hook. Br. Fl. i. p. 451, *α*.

H. In saxosis umbrosis inter Randaa et St Nicholas, et forma tenuior plerumque sterilis, in umbrosis M. Gemmi supra Kandersteg, 29 Aug. 1836.

Obs. Frons pedalis et ultra, sed omnino convenit cum char. Smithii et Hookeri, et cum spec. Valesiacis a Thomasio lectis. Stipes glabra; sori generis forsan maximi, in partem frondis superiorem confluentes. Pinnæ vix alternæ, remotæ; pinnulæ ovatæ obtuse dentatæ alternæ, (infimæ interdum subpinnatifidæ.) Species Germanis vix cognita, vel cum Asp. Filix Fœmina confusa, et apud Wallroth in Bluff et Fing. Comp. Fl. Germ. iii. p. 20.

5. *C. fragilis*, Bernth.

H. In umbrosis M. Gemmi supra Kandersteg, et in fissuris rupium ad lacum Dauben, 29–31 Aug. 1836.

6. *C. alpina*, Desv.

H. In saxosis M. Gemmi supra Schwarrenbach.

7. *C. montana* (—?) *Polypodium*, All. Hoffm. Cyathæa, Roth.

H. In umbrosis M. Gemmi supra Kandersteg, 29 Aug. 1836.

Obs. Habitus *P. calcarei*, Sm. sed frons tenuissima, triplicatopinnata.

8. *Cryptogramma crispa*, R. Br.

H. In saxosis M. Grimsulæ infra Hospitium.

9. *Botrychium Lunaria*, Sw.

H. In pascuis M. Gemmi supra lacum Dauben. In M. Fünen supra Zermatt, et in Alpibus supra Tæsch.

10. *Lycopodium Selago*, L.

H. Prope Kandersteg.

11. *L. selaginoides*, L.

H. In M. Gemmi supra Kandersteg.

12. *L. helveticum*, L.

H. Ad terram inter muscos inter St Nicholas et Zermatt.

13. *Elyna spicata*, Schrad.

H. Copiose in graminosis M. Gemmi supra Schwarrenbach, et ad lacum Dauben. In M. Schwarzseeberg supra Zermatt.

Obs. Culmi biunciales atque fere pedales.

14. *Kobresia caricina*, Willd.

H. Copiose in humidis M. Gemmi ad pedem rupium supra Schwarrenbach usque ad summum M. Schalmette, et ad lacum Dauben.

Obs. Culmi bi-octunciales, in Helvetia rarissima.

15. *Carex (Vignea) foetida*, All.

H. In M. Gemmi supra Schwarrenbach, ad moles glaciales, M. Fünelen.

16. *C. (V.) incurva*, Huds. *C. juncifolia*, All. Gaud.

H. Rarissime ad moles glaciales M. Schwarzseeberg et Fünelen.

Obs. Non diversa a planta Scotica, nisi culmis vix incurvis.

17. *C. (V.) lagopina*, Wahl. ! *C. approximata*, Hoppe exs ! Gaud.

H. Ad moles glaciales M. Schwarzseeberg et Fünelen.

Obs. Paleæ fructu breviores foliaque marginibus scabra ut observat Hoppe, contra Gaudin.

18. *C. (V.) leporina*, L. *C. ovalis*, Good.

H. In uliginosis M. Grimsulæ supra Obergestelen.

19. *C. curvula*, All. α . minor, foliis culmisque vix 4-uncialibus, unilateraliter curvatis. β . major, culmis erectis, fere pedalibus, Gaud.

H. α . Ad moles glaciales M. Fünelen. β . ad fissuras rupium

M. Gemmi supra Schwarrenbach, et ad lacum Dauben.

20. *C. nigra*, All. *C. atrata* γ . *nigra*, Gaud.

H. In M. Gemmi prope die Wintereck ; ad lacum infra Schwarrenbach, et ad nives deliquescentes supra Schwarrenbach, copiose.

Obs. Cæspites densas efficit. *C. ustulata*, Wahl. ! (*C. atrofusca*, Schk.) qua cum, Smithio præunte, nostram plantam infauste conjunxit cl. Lindley, Syn. ed. ii. p 288, omnino diversa est. *C. nigra*, All. " spicis subquaternis ovatis confertis sessilibus rigide erectis, fructuque glabro," Gaudet.

21. *C. atrata*, L. α . varia ; spicis longius pedunculatis demum pendulis fructibusque flavis, culmo plerumque elatiori (glabro,) Gaud.

H. In M. Gemmi supra Kandersteg, et in graminosis supra Schwarrenbach.

Obs. Planta Scotica ex Alp. Clova plerumq. ad varietatem sequentem pertinere videtur. β . dubia, spica terminali mascula (flosculis paucioribus fœmineis intermixtis,) reliquis mere fœmineis, fructibus atro-purpureis unicoloribus, culmo elatiori, (sub spiculis scabro,) Gaud. *C. aterrima*, Hoppe.

22. *C. ornithopoda*, Willd.

H. In fissuris rupium M. Gemmi, ad moles glaciales Lammern-gletscher.

23. *C. glauca*, Scop. *C. recurva*, Huds., var. Alpina, spiculis fœmineis apice basique masculis.

- H. Ad rivulos et in uliginosis M. Gemmi supra Schwarrenbach.
24. *C. capillaris*, L. α . minor, culmo 4–6 unciali. β . major, culmo pedali et ultra.
- H. α . In M. Gemmi ad lacum infra Schwarrenbach, et ad rupes supra Schwarrenbach, et ad lacum Dauben. β . in M. Schwarzseeberg.
25. *C. brachystachys*, Schk.
- H. In graminosis M. Gemmi supra Kandersteg, 29 Aug. 1836.
26. *C. firma*, Host.
- H. Ad rupes M. Gemmi supra Schwarrenbach.
27. *C. Mielichhoferi*, Schk.
- H. In uliginosis M. Gemmi supra Schwarrenbach.
- Obs. Spicæ fœmineæ pendulæ non erectæ ut apud Lindley, Syn. p. 287. An Planta Scotica ad *C. ferrugineam*, Schk. (sempervirentem, Vill.) referenda?
28. *Blysmus compressus*, Panz. β . glacialis mihi. Spica tenui gracili fusca.
- H. In uliginosis ad moles glaciales valleculæ Tæsch.
29. *Cladium Mariscus*, R. Br.
- H. In paludosis prope Pfyn, inter Siders et Leuk.
30. *Eriophorum capitatum*, Host.
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- H. In uliginosis ad moles glaciales M. Fünelen.
31. *Brachypodium sylvaticum*, R. and S. α . spiculis villosis, Gaud. β . gracile, Rchb.
- H. Inter St Nicholas et Zermatt.
32. *Agropyrum glaucum*, R. and S. α . Spiculis omnino muticis, Koch. Triticum intermedium α . Gaud.
- H. In arvis incultis inter Inden et Varen.
33. *Cynodon Dactylon*, Rich.
- H. In arenosis inter Siders et Leuk, et inter Stalden et Visp.
34. *Agrostis alpina*, Scop. Kunth. A. rupestris, Willd. Gaud.
- H. Ad rupes M. Gemmi supra Schwarrenbach, 30 Aug. 1836.
35. *A. alba*, Schrad. θ . pauciflora, Koch. A. alba patula, Gaud. Rchb. Agr. Germ. Tab. 25, f. 1432.
- H. Ad viam inter Stalden et St Nicholas, et in glareosis M. Gemmi supra Schwarrenbach, 29 Aug. 1836.
36. *Calamagrostis tenella*, Lk. *Agrostis pilosa*, Schleich. Gaud.
- H. In consortio Junci Jacquini. β . in Alpibus supra Tæsch.
37. *C. acutiflora*, DC. Rchb. Agr. Germ. Tab. 39. f. 1442.
- H. In glareosis M. Gemmi supra Schwarrenbach, cons. Poæ distichophyllæ, Gaud. et P. flexuosæ, Wahl. 30 Aug. 1836.

Obs. Forsan forma alpestris *C. Montanæ*, Host. (*Deyeuxia varia*, Kunth.) ut opinantur cl. Koch et Duby ; sed facile distinguenda, panicula rigida et pilis palea acuminata brevioribus. cf. *Agrostis montana* γ . Gaud. Helv. i. p. 201, quæ differt pilis longioribus, foliisque ad vaginæ commissuram barbatis.

38. *C. Halleriana*, DC. *C. Pseudo-phragmites*, Lk. Rchb. *Arun- do Halleriana*, Gaud.

H. In uliginosis prope Randaa.

Obs. Habitus *C. montanæ*, Host. varietatis gracilis, sed differt pilis omnibus liberis, (sine penicello piloso, vel rudimento alterius flosculi) atque arista paleis breviori, nisi oculo armato, ægre distinguenda.

39. *Stipa capillata*, L.

H. Ad viam inter Varen et Siders, et inter Siders et Leuk, copiose.

40. *S. pennata*, L.

H. Copiose in sylva supra Zermatt, prope moles glaciales.

41. *Lasiagrostis Calamagrostis*, Lk. *Agrostis*, L. *Stipa*, Wahl.

H. In glareosis prope Kandersteg, et in apricis inter Inden et Varen.

42. *Setaria verticillata*, P. B.

H. In arvis et vineis prope Stalden.

43. *S. viridis*, P. B. α . minor, Gaud. Rchb. Agr. Germ. Tab.

47. f. 1467. b . β . major, setis longissimis, Gaud. Rchb. l. c. f. 1467.

H. α . In arvis incultis prope Varen. β . prope Varen.

44. *Phleum Boehmeri*, Schrad. β . paleis nudiusculis (ad carinam) scabris, Gaud.

H. In alpibus supra Tæsch, et prope Randaa.

Obs. In spec. prope Randaa lectis, paleæ etiam sub lente vix scabræ ; in spec. supra Tæsch lectis, paleæ evidenter scabræ, sed non ciliatæ.

45. *P. Michelii*, All.

H. Rarius in M. Gemmi supra Schwarrenbach.

46. *P. alpinum*, L. Gaud. Helv. i. p. 165. Dub. Bot. Gall. i. p.

508. Rchb. Agr. Germ. Tab. 50. f. 1485. Non Auct. Brit.

Phleum radice repenti vix cæspitosa, foliis supremis vagina vix inflata dimidio brevioribus ; Ligula suprema oblonga acuta, glumis glabris truncatis palea sublongioribus, setisque ciliatis.

H. In graminosis humidis M. Gemmi supra Schwarrenbach ; in uliginosis ad moles glaciales M. Fünelen ; in ascensu M. Grim- sulæ supra Obergestelen, (copiose etiam in pascuis et pratis M.

Stockhorn, Bürglen, et [Faulhorn, atque in pascuis summis Jurassi rarius, legi.)

Obs. In locis petrosis, vel in graminosis sterilioribus, spica ovato-cylindrica brevior magisque colorata est, foliaque paulo breviora : hæc videtur var. β . tenue, Kunth. Agr. i. p. 29. In locis crassioribus et præsertim in pascuis et graminosis pinguioribus circa casas Alpicolorum, tota planta laxior crassiorque evadit, foliaque latiora, sæpe longissima, et spica cylindrica biuncialis minus colorata, foliis supremis brevior, vaginæque semi-inclusa. Hæc forma habitum Phl. Michelii satis refert : in utraque varietati, notæ e setis vaginisque sumptæ constantes videntur, et species omnino a P. commutato, Gaud. diversa. Ligula in forma crassiore sæpe fissa occurrit.

47. P. commutatum, Gaud! Helv. i. p. 166. Dub. Bot. Gall. i. 508. P. alpinum, Auct. Brit. ! vix L.

Phleum radice repenti, valde cæspitosa, foliis supremis vagina inflata, quatuor parte brevioribus ; Ligula suprema brevissima obtusa, glumis glabris truncatis palea sublongioribus ciliatis, seta nuda, scabra.

H. Copiose in uliginosis ad moles glaciales M. Fünelen, cons. præcedentis.

Obs. Spica latior robustior quam in præcedenti, ovato-oblonga ; spiculæ fere duplo majores, foliaque glaucescentia ; seta scabra nec ciliata ; varietatem minorem P. alpini pro nostra planta sæpius accepi, et opinor planta vera Kochio et Kunthio omnino ignota est, quippe nulla ratione ad formam tenuem P. alpini redigenda nostra robustior rigidiorque planta. Icon in Eng. Bot. ed. 2da, Pl. 80, habitum P. commutati satis bene refert, sed nec hac neque ad præcedentem referenda quoniam glumæ omnino glabræ depictæ sunt. Quoad habitum potissimum ad Phleum Gerardi, All. et auct. plantam rarissimam, accedit, cujus diagnosim differentialem comparationis gratia hinc adjeci.

Phleum Gerardi, All. ! Kunth. Alopecurus, Vill. Colobachne, Link. Rchb. Agr. Germ. tab. 50. f. 1480.

P. radice bulbosa ; vagina suprema valde inflata, in folio brevi latoque attenuata, ad collum vix unquam constricta ; ligula brevissima, glumis villosis palea subbrevioribus, molliter ciliatis, in setam brevem scabramque attenuatis.

Obs. Spica lata brevis, ovata, setæque flavescentes. Mihi videntur omnino ad genus Phleum pertinere.

Ad hanc speciem ducit cl. Rchb. in Agrost. Germ. p. 18, P. commutatum, Gaud. et P. capitatum, Scop. In Fl. Germ. exc. No. 191, speciem distinctam constituit sub nomine " Ph. capitatum,

Scop." sed *P. capitatum*, Scop. Carn. i. p. 56, e descriptione cl. auctoris, "spica subrotunda," "calycinæ glumæ acuminatæ," omnino ad *P. Gerardi*, All. pertinet.

P. Gerardi, All. habui ex Herbario Allionii! a cl. Balbis; ex Alp. Delphin; a cl. Emeric; et ex Alp. Julio-Provinciæ a cel. De Candolle; (in Herb Roemer;) sed etiam sub hoc nomine *P. comutatum*, Gaud. Roemero misit Balbis.

Denique observandum est, utram specierum descripsit illust. Linnæus vix extricandum—forsan ambas?—sed minimi momenti si distinguuntur.

48. *Festuca alpina*, Sut. Gaud.

H. Ad rupes M. Gemmi supra Schwarrenbach rarius.

49. *F. Halleri*, All. Vill. Gaud. Kunth. Agrost. i. p. 399, et ii. p. 322.

Festuca racemo spiciformi congesto subsimplici, inferne rarius ramoso, ramulo biflori; spiculis 4-5 floris; aristis paleam pubescentem nervosam æquantibus; rachi pilosa, demum sæpius glabra; foliis capillari-setaceis.

H. In glareosis M. Fünelen, et in alpibus supra Tæsch.

Obs. Plantæ Allionii et Gaudini certe omnino eadem. Citata sola Allionii in Fl. Ped. ii. p. 253, No. 2245, est descriptio Halleri in Hist. ii. p. 215, No. 1441. Germen maturam lineari-oblongum, immaturum lineari-obovatum, et stigmata barbata germine maturo breviora vel subæqualia observavi.

Ab hac differre videtur planta, quam in M. Faulhorn legi, et pro *F. Gaudini*, Kunth. l. c. Syn. excl. habeo.

Festuca racemo spiciformi, subpatenti, superne simplici, inferne subcomposito, ramulis 2-4 floris; spiculis sub 4-floris, aristis palea glabra dimidio brevioribus; rachi aspera, foliis capillari-setaceis.—Germen obovatum vel subgloboso-pyriforme: stigmata dense barbata germine multo longiora, conspicua; sed denuo examinanda, annon mere *F. Halleri* varietas.

50. *F. violacea*, Gaud. α . vulgaris:— β . elatior, pedalis sesquipedalis, panicula coarctata.

H. α . In M. Gemmi supra Schwarrenbach. In M. Schwarzseeberg, et ad moles glaciales summi jugi alpium supra Tæsch. β ad rupes. M. Gemmi ad moles glaciales Lammerngletscher. 31 Aug. 1836.

Obs. Nullomodo lusus naturæ, *F. Halleri* All. ut quærit cl. Kunth. l. c. sed *F. nigrescenti*, Lam. valde affinis, quâ distinguitur spiculis duplo minoribus, &c.

51. *F. pumila*, Vill.

H. Ad moles glaciales summi jugi alpium supra Tæsch ; cæspites densissimos efficiens, in graminosis M. Gemmi supra Kandersteg, et ad rupes supra Schwarrenbach. 29–30 Aug. 1836.

Obs. Spec. ad moles glaciales lecta minora sunt ac minus colorata quam ea e M. Gemmi.

52. *F. varia*, Haenke. Gaud. *F. acuminata*, Gaud ! α . panicula contractiori, spiculis variegatis. Gaud.

H. In M. Schwarzseeberg supra Zermatt.

Obs. *F. xanthina* R. & S. ! *F. Hostii* Schott ! (etiam a Schottio missa ut *F. flavescens*, Host.) est omnino eadem ut. *F. flavescens*, Bellardi ! ; et vix ac ne vix diversa a *F. variæ* var. β flavescenti, Gaud.

53. *F. rubra*, L. Koch. Rchb. Gaud. var. panicula rigida coarctata.

H. Ad viam prope Zermatt.

Obs. *F. rubra* radice repenti egregie differt a *F. duriuscula* radice fibrosa—Specimina fere omnia qua e Britannia accepi et legi pro *F. duriuscula* ad formas *F. rubræ* pertinent.

54. *F. nigrescens*, Lam. Gaud !

H. In M. Schwarzseeberg supra Zmutt :—ad rupes M. Gemmi supra Schwarrenbach et lacum Dauben. 30, 31 Aug. 1836.

Obs. Occurrit folio caulino summo angustissime-lineari in sicco revoluta, et ad unam lineam lato plano.

55. *F. Scheuchzeri*, Gaud. *F. pulchella*, Schrad. Poa—Clairv.

H. In glareosis M. Gemmi supra Schwarrenbach. 30 Aug. 1836.

56. *Melica ciliata*, L.

H. Ad rupes prope pagum Stalden.

57. *Bromus squarrossus*, L. α . spiculis glabris.

H. Ad viam inter St. Nicholas et Zermatt.

58. *Poa Eragrostis*, L.

H. Ad viam inter St Nicholas et Stalden.

59. *P. laxa*, Haenke.

H. Ad rupes alpium supra Tæsch : in saxosis M. Gemmi ad moles glaciales Lammerngletscher et supra lacam Dauben, copiose. 31 Aug. 1836.

Obs. Planta valde variabilis. Culmi 4 unciales—semipedales et ultra : variat panicula rigidiori vix pendula, spiculis vix constrictis, atque panicula filiformi pendula, spiculis omnino constrictis : radix vix repens sæpius mere fibrosa. Forsan et Poam minorem, Gaud. legi, sed fateor, species mihi vix diversa videtur. cf. Rchb. Agr. germ. Tab. 72, f. 1623, et Tab. 74, f. 1630–31.

60. *P. alpina*, L. β vivipara, Gaud. Koch. γ . frigida Gaud. Koch. δ . brevifolia, Koch. *P. alpina*, II brevifolia, Gaud.
 H. β . in alpibus supra Zermatt, γ . in saxosis M. Gemmi, ad moles glaciales Lammerngletscher, 31 Aug. 1836. δ . ad moles glaciales summi jugi alpium supra Täsch.
61. *P. distichophylla*, Gaud!
 H. In glareosis M. Gemmi supra Schwarrenbach, et supra lacum Dauben ad nives perennes. 30, 31 Aug. 1836.
Obs. *P. cenisia*, All. cujus exemplaria nonnulla a cl. Balbis, diu possessori Herbarii Allionii, missa, habeo, certe diversissima, nec cum varietatibus *P. alpinae* ulla ratione conjungenda. Spec. mea, nisi locustis paucifloris, certissime non 7-floris, bene cum descriptione cl. auctoris in Auct. ad Fl. Ped. p. 40, No. 2209, conveniunt. Differt a *P. distichophylla*, Gaud. panicula gracili, pedunculis verticillatis, spiculis multo minoribus, et ligulis truncatis subnullis;— a *P. alpina* toto habitu et radice eximie repenti, stolonifera. Me judici ad Poam nemoralem, L. referenda, et forsan ad varietatem glaucam, R. et S. ! (*P. glaucantha*, auct. *P. nemoralis caesia*, Gaud.) Ex alpibus Tyrolensibus a cl. Siebero plantam possedeo etiam sub nomine *P. cenisiae* missam, quae autem differt radice fibrosa, spiculisque multo majoribus confertis, et omnino cum icone Rchb. Agr. Germ. Tab. 83. f. 1625, et cum spec. *P. badensis* Hænke, *P. alpinae badensis*, Gaud! convenit.
62. *P. flexuosa*, Wahl. Carp. excl. Syn. Gaud. Rchb. l. c. Tab. 74. f. 1633.
 H. In glareosis M. Gemmi copiose cum praecedenti. 1836.
Obs. Differt a praecedenti panicula effusa, gracili, pedunculisque inferne longe nudis: planta omnino gracilior.
63. *P. Gaudini* R. et S. Kunth Agr. l. 355. *P. aspera*, Gaud. *P. caesia*, Sm. α . panicula coarctata, Kunth. l. c. β panicula diffusa, Kunth l. c.
 H. Ad rupes alpinas supra Täsch.
Obs. α . Omnino convenit cum Spec. Plantae Scoticae e Ben Lawers, sed in H. B. E. cultis et a cl. Graham communicatis: certe a Poa nemorali distincta— β . variat ligula brevissima ac exserta in eodem individuo.
64. *P. nemoralis*, L. ζ . coarctata, Gaud.
 H. Ad viam prope Zermatt.
65. *Koeleria cristata*, Pers. α gracilis. Rchb. Agr. germ. Tab. 93. f. 1668. γ . lobata. Rchb. l. c. f. 1670.

H. α . In Schwarzseeberg, M. Fünelen, et ad rupes alpinas supra Täsch; γ . in M. Fünelen.

Obs. α . Variat foliis glabriusculis. β . In planta campestre, etiam valde variabili, panicula minus colorata, magisque ramosa, glumæ paleæque facile duplo majores occurrunt.—Ab hac specie, quacum sæpe confusa, omnino differt *K. valesiaca*, Gaud. (*K. tuberosa*, Pers. e spec. Hispanicis a Dufour missis, panicula glabra et etiam valde pubescenti, videtur omnino eadem. Nomen aptissimum forsân restituendum.)

Differt nempe panicula spiciformi valde congesta, ovato-cylindrica, foliis glabris glaucisque sed non semper convolutis, et præsertim culmo foliisque ad collum radicis tunicis filamentosis valde elongatis tectis; fere ut in *Phleo Bertolonii*, sed magis filamentosis. Speciem elegantissimam semipedalem, bipedalem et ultra, ad rupes aridas calcareas Jurassi comitatu Neocomensi copiose legi.

66. *Avena* (*Trisetum*) *subspicatum*, Clairv. Aira—*L. Koeleria*—Rchb.

H. In graminosis M. Gemmi supra Schwarrenbach: in alp. supra Zermatt, Zmutt et Täsch.

67. *A.* (T.) *distichophylla*, Vill. α . genuina, panicula contracta, pilis corollas subæquantibus. β . gracilis, mihi, panicula effusa, magis composita, pilis corollis multo brevioribus. *A. argentea*, Willd.? Koch?

H. α . In M. Gemmi supra Schwarrenbach: in glareosis M. Schwarzseeberg et in M. Fünelen. β . in glareosis M. Gemmi cum var. α . 30 Aug. 1836.

Obs. Var. β , quæ vix ab exemplaribus germanicis *A. argenteæ* differt, a var. genuina recedit tenuitate omnium partium, culmo albori graciliorique, foliis angustioribus multo longioribus, panicula magis composita, ramis nempe sæpius 5–6 floris, laxius effusa, et pilis glumis fere dimidio brevioribus: sed in utraque varietate, nihil magis variabilis quam foliorum, palearumq. longitudo. Folia nempe 8''' ad 16''' et etiam 2'' longa, et paleæ glumis breviores vel longiores.

68. *A. Scheuchzeri*, All. (1785) *A. versicolor*, Vill. (1787.)

H. In graminosis M. Gemmi supra Schwarrenbach: in Alp. supra Täsch.

69. *Anthoxanthum odoratum*, L. β . spadicea mihi, spiculis pubescentibus spadiceis, foliis, nisi ad vaginæ commissuram, glabris.

H. In graminosis M. Fünelen, prope pagam.

Obs. Specimina omnia Helvetica, qua possideo, panicula viridiflavescenti, spiculis glabris punctatis, et foliis pubescentibus gau-

dent ; sed in spec. Britannicis fere omnibus, spiculæ vage longeque pilosæ et folia glabriuscula sunt.

70.* *Crocus vernus*, All. var. *albiflorus*.

H. Zermatt.

71. *Nigritella angustifolia*, Rich.

H. In alpibus supra Tæsch : in graminosis M. Gemmi supra Schwarrenbach. 30 August 1836.

72. *Chamorchis alpina*, Rich.

H. In graminosis M. Gemmi supra Schwarrenbach et ad lacum Dauben. * in alpibus supra Zermatt.

73.* *Habenaria viridis*, R. Br.

H. Zermatt.

Obs. In alpibus spica sæpe rubescit.

74. *Luzula campestris*, DC. ζ . *nivalis* Koch. Deuts. Fl. ii. p. 602. *L. campestris* β . *latifolia* Ser. Gaud. *L. campestris*, β . *alpina*, Gaud. Agrost. exc. syn. *L. campestris* γ . *nigricans*, Gaud. Helv. exc. syn. plur. *L. campestris alpina* Ser. exsic !

H. In M. Gemmi in uliginosis summ. M. Schalmette.

75. *L. spicata*, DC. α . *major*, caule elatiori, spica elongata, interdum interrupta, phyllis capsulisque atrofuscis fere concoloribus. β . *minor*, cæspitosa, spica subglobosa, phyllarum marginibus capsulisque pallidioribus fere spadiceis.

H. α . in M. Gemmi supra Schwarrenbach. β . ad moles glaciales summi jugi alpium supra Tæsch, cæspites densos efficiens, et inter Lichenes sola phanerogama.

Obs. Capsulæ a Smithio in Eng. Fl. ed. 2da bene descriptæ sunt.

76. *L. lutea*, DC.

H. in graminosis ad moles glaciales, M. Schwarzseeberg.

77. *L. nivea*, DC.

H. In sylvis laricinis inter Zermatt et valleculam Tæsch.

78. *L. Spadicea*, DC.

H. In M. Gemmi in saxosis supra Schwarrenbach.

79. *Juncus filiformis*, L.

H. In uliginosis torfaceis supra Zermatt.

80. *J. triglumis*, L.

H. In uliginosis M. Gemmi supra Schwarrenbach.

Obs. Occurrit bi-quinqueflorus.

81. *J. Jacquini*, L. α . *minor*, semipedalis pedalisve. β *maximus* mihi, sesquipedalis et ultra, perianthiis pallidioribus, fuscescens. tibibus.

H. α . In uliginosis M. Gemmi supra Schwarrenbach et in summ.

M. Schalmette: in alpibus supra Zermatt, et Tæsch. β . copiose inter saxa in alp. supra Tæsch.

Obs. 1ma. In var. α , Capsulæ semper immaturæ, perianthiis multo breviores. In var. β . Capsulæ maturæ, perianthiis æquales vel sublongiores, capitulaque interdum longiuscule pedunculata, curvato-reflexa, hemisphærica vel subglobosa.

Obs. 2da. Fructus maturus ab auctoribus nondum visus ut videtur e descriptione cl. Gaudini, qui Hostii verba ita citavit: "Capsulæ ovato-triquetræ, angulis superne acutis (in Fl. Helv. ii. p. 561— "Alatis" in Agrost. ii. p. 233,) obtusæ, polyspermæ." Koch, in Deuts. Fl. ii. p. 593, capsulas, ex observationibus cl. Wahlenbergii, acutas perianthiis duplo longiores descripsit. Duby in Bot. Gall. i. 477, etiam capsulam forsitan immaturam male descripsit "perigonii segmentis lanceolatis acuminatis capsulam ovoideam obtusam mucronatam subsuperantibus," ut nonnisi longitudine perianthii a *J. castaneo* Sm. distinguendus, sed notas optimas omnino neglexit ut e descriptione sequenti patet. Capsula, perianthio vix longior, obtusa profunde emarginata, obtuse-triquetra, angulis valde compressis canaliculatis fere alatis. Stylus longiusculus ex emarginatura persistens. Semina parva ovalia tunicata, tunica utriusque longe producta curvata. In exempl. M. Gemmi, Faulhorn, &c. et in omnibus in Herbario meo conservatis, capsulas semper immaturas inveni: in var β . capsulæ omnes maturæ sed quoad longitudinem paulo variabiles sunt.

82. *J. trifidus*, L. α major, 1—3 florus. β minor, uniflorus. *J. monanthos*, Jacq.

H. α in sylvula ad viam inter St Nicholas et Zermatt. β . In alpibus supra Zermatt ad moles glaciales.

83. *J. bufonius*, L.

H. ad viam inter St Nicholas et Zermatt.

84. *J. fusco-ater*, Schreb Koch. *J. ustulatus*, Hoppe. β . alpinus, panicula simpliciuscula. *J. alpinus*, Vill.

H. In uliginosis, M. Schwarzseeberg.

85.* *Tofieldia borealis*, Wahl! *T. palustris*, Huds. et auct. Britannicorum?

H. In alpibus supra Zermatt.

Obs. Omnino congruit cum planta arctica a cl. Wahlenberg et Agardt missa, et, ut *Anthericum calyculatum* a cel. Thunberg. Planta Scotica tantum recedit racemo laxiori, multifloro, et perianthio magis obtuso coloratoque.

86. *T. calyculata*, Wahl. α . vulgaris, perianthio acutiusculo. β . glacialis, Thom. exs. *T. glacialis*, Gaud. Helv. ii. p. 596, perianthio obtuso, floribus longius pedicellatis. γ . ramosa, Thom. exs. *T. glacialis*, β . ramosa, Gaud. l. c. perianthio obtuso, floribus longius pedicellatis, pedunculis infimis productis multifloris, bracteolato-squamosis.

H.* α . In alpinis supra Zermatt. β and γ in graminosis humidis M. Gemmi prope die Wintereck. 29 August 1836.

Obs. In β . perianthium sæpius purpurascit. Planta variabilis, et persuasas sum *T. glacialis*, Gaud. mere forma alpina nec species diversa : sed non confundenda cum *T. boreali*, Wahl. species distinctissima Europæ septentrionalis alpiumque excelsiorum Helvetiæ incola.

87.* *Colchicum alpinum*, DC.

H. Zermatt.

88. *Ornithogalum fistulosum*, Ram. Koch. Gagea—Rchb. O. Liottardi Sterub. Gaud.

H. Rarissime ad nives deliquescentes M. Gemmi supra Schwarrenbach.

Obs. *O. fistulosum*, Gaud. e Rchb. fl. germ. exc. No. 735 ad *O. arvensem*, Pers. pertinet. Spec. nostra certe omnino cum descriptione sua *O. Liottardi* convenit.

89. *Allium acutangulum*, Willd. Rchb. Germ. exc. No. 767.

Pl. Crit. 8. Ic. 977. (sed culmus nimis elatus.) *A. acutangulum*
 β . montanum, Koch. *A. angulosum* α petræum, Gaud.

H. In arvis et incultis ad moles glaciales supra Zermatt.

Obs. Perianthium saturatius coloratum quam in spec. e Jurasso. Filamenta alterna basi dilatata, petalæque acutiusculo-cuspidata.

90. *A. vineale*, Sm. Gaud.

H. cum præcedenti.

Obs. E. sententia Kochii et Rchb. idem cum *A. arenario* auct. planta a cl. Thomasio sub hoc nomine accepta videtur diversa ; sed genus *Allium* e sicco fere inextricabile.

91. *A. oleraceum*, L. Gaud.

H. cum præcedentibus.

Obs. Spatha foliolis longissimis e basi ovata dilatatis nervosis, attenuatis ; folia certissime fistulosa staminibusque inclusis. Forma spathæ in spec. meis hujus et species sequentis differt et ab icone Rchb. pl. crit. 5. ic. 601 et 602, et a descriptione Gaudini.

92. *A. carinatum*, L. Gaud.— β . ? umbella mere bulbifera.

H. cum præcedentibus.

Obs. Spatha, foliolis prælongis inæqualibus basi ventricosis nervosis: folia e sicco plana videntur; floribus non evolutis, sed umbellæ bulbi feri maturi. In var. β .? Bulbilli magis elongati tenuioresque sunt, et spatha magis senescens, ut suspicor potius ad *A. paniculatum* Auct. Helv. referendum, cujus varietatem bulbiferam olim in Jurasso supra Biennem legi.

93. *Anthericum serotinum*, L. Lloydia—Rchb.

H. In alpinis supra Tæsch.

94.* *A. Liliastrum*, L. Czackia—Andrz. Rchb.

H. Zermatt.

95. *Asparagus officinalis*, L.

H. In incultis inter Inden et Varen.

96. *Larix Europæa*, DC.

H. Inter Inden et Varen—etiam in Valesia superiori prope Brieg, &c. et in valle D. Nicolai sylvas magnas efficit.

97. *Pinus Cembra*, L.

H. In M. Fünelen—Sylvula unica.

98. *Juniperus Sabina*, L. α erecta, β . prostrata.

H. α . Inter Visp et Stalden consort. Hippophae rhamnoides.

β . In alpinis supra Zermatt copiose.

99. *Betula alba*, L. δ . verrucosa (Ehrh.?) Gaud.

H. copiose ad rivulos et in glareosis inter St. Nicholas et Zermatt.

Obs. Differt a *B. albæ* forma vulgari foliis duplo majoribus dorso glandulosis, ramis ramulisque glanduloso-verrucosis—An *B. verrucosa* Ehrh. cum *B. pubescenti* a cl. Rchb. conjuncta? Planta helvetica certe non ad pubescentem sed ad *B. albam* referenda.

100. *Alnus incana*, Willd.

H. prope Kandersteg.

Obs. Forma monstruosa squamis foliaceis.

101. *Quercus pubescens*, Willd.

H. In collibus apricis prope Siders.

Obs. Folia ramorum juniorum nullo modo basi inæqualiter cordata, sed subtruncata vel in petiolum attenuata, sinuato-pinnatifida subtus cano-pubescentia, lobis sinuato-incisis acutiusculis apiculatis vel interdum obtusis.

102. *Salix myrsinites*, Gaud. Helv. vi. 263. *S. arbutifolia*, Ser. Essai
— φ σ . α latifolia, Gaud. l. c. Ser. Sal. exs. Rév. inéd N. 32 β !

— β . *angustifolia*, Gaud. l. c. *S. myrsinites*, α *arbutifolia*, Ser. Sal. exs. R v. in d. No. 32, α !— δ . *lanata*, Gaud. l. c. *S. myrsinites* γ . *pilosa*, Ser. l. c. No. 32, γ .

H. α . et β . Ad moles glaciales M. F nelen ; β . in M. Gemmi ad lacum infra Schwarrenbach ; δ . in M. Gemmi supra Schwarrenbach (forma *pilosa*) et ad moles glaciales Lammerngletscher, 31 August 1836, (forma *lanata*.)

Obs. var. α . fere forma eadem quam e Scotia ut *S. Myrsinites retuli*. var. β . variat amentis f emineis brevibus crassis. et elongatis gracilioribus, interdum dense sericeis : foliis maturis glaberrimis lucidis vel junioribus, pr sertim subtus, subsericeis. In var. δ . folia interdum mere *pilosa*, interdum lana subsericea densa utrinque tecta sunt.

103. *S. serpyllifolia*, Scop $\text{\textcircled{f}}$.

H. Ad moles glaciales M. Schwarzseeberg et M. F nelen.

104. *S. hastata*, L. Wahl ! $\text{\textcircled{f}}$ $\text{\textcircled{m}}$. non Hoppe. *S. Ludwiggii* Schleich !

H. Ad moles glaciales supra Zermatt.

Obs. Folia basi in equaliter rotundata, interdum subattenuata. *S. hastata* Hoppe exs. ! videtur potius *S. phylicifoli e* var.

105. *S. Monandra*, Hoffm. Gaud. var. ramis junioribus, foliisque subtus c sio-pruinosis.

H. Ad ripas Visp e prope Zermatt.

106. *Euphorbia Gerardiana*, Jacq.

H. In incultis inter Varen et Siders.

107. *E. falcata*, L.

H. In arvis incultis prope Siders.

108. *Empetrum nigrum*, L.

H. In M. F nelen.

Obs. Specimina omnia hermaphrodita, stamina nempe sub bacca matura persistentia inveni. In Jurassi M. Creux du Van specimina omnia, et permulta legi, dioica observari : differunt autem paululo a planta alpina habitu laxiusculo, caulibus nempe multo minus lignosis, foliisque remotioribus, longioribus angustioribusque. Planta Suecica, a cl. Thunberg missa, et Hibernica, in torfaceis Cunnamara lecta, videntur dioic e, sed specimina mea nimis manca.

109. *Thesium alpinum*, L. α . racemis secundis, bracteis flores superantibus. β . racemis secundis, bracteis floribus brevioribus.

H. α . In M. Funelen. β . In M. Gemmi ad lacum infra Schwarrenbach.

Obs. In Jurasso varietatem racemis non secundis cauleque elatiori sæpe legi, quæ mihi var γ . floribus sparsis.

110. *Hippophae rhamnoides*, L.

H. Ad Vispam inter Visp et Stalden, copiose.

Obs. Plantam prope Aberlady in comitatu Haddington lectam ab am. Macnab accipi, quæ a nostra Helvetica et ab alteris Britannicis recedit, foliis duplo latioribus baccisque facile duplo majoribus.

111. *Oxyria reniformis*, Hook.

H. In M. Gemmi ad rupes prope nives perennes M. Schalmette.

112. *Chenopodium olidum*, Curt. C. *fœtidum*, Lam. Gaud.

H. In fossis exsiccatis ad viam prope Siders.

113. *C. album*, L. α . vulgare.— β . concatenatum, Gaud. foliis angustioribus subintegerrimis (integerrimis acutis apiculatisve) racemis elongatis gracilibus, glomerulis globosis subdiscretis (remotiusculis.)

H. α . inarvis supra Zermatt. β . ad viam inter Stalden et St Nicholas.

Obs. In var. β . caules prostrati, viridi et albo fasciati. Hac, var β . riparium Bng. in Rchb. Germ. exc. No. 3740 β .

114. *C. Botrys*, L.

H. In carbonariis ad viam inter Siders et Leuk. In arenosis inter Stalden et St Nicholas.

115. *C. hybridum*, L.

H. In vineis prope Varen.

116. *Plantago major*, L. γ . *brachystachya*, Koch. Deutsch. Fl. i. p. 801. T. *minima*, Thom. exs! non DC. P. *uliginosa*, Baumg! (vix diversa.)

H. In uliginosis ad viam inter St Nicholas et Zermatt.

Obs. Spica pauciflora congesta ovato-oblonga, scapo folia 5–7-nervia crassa parva superante; rhizoma crassum. Huc pertinere videtur icon Tabernæmontani 1107, f. 2. Ad var. δ . *microstachyam*, Koch. l. c. pertinet T. *minima*, DC. Fl. fr. scapo debili foliis trinervis breviori, spica pauciflora (vix ultra 6-flora) floribusque laxis. Scapi interdum petiolis breviores; radix fibrosa tenuis. Hanc varietatem tantum ex uliginosis Jurassi prope Delemont lectam accipi, et in uliginosis torfaceis Hiberniæ prope Renvyle Cunnamara legi.

117. *P. montana*, Lam. P. *atrata*, Hoppe exs.!

H. In M. Gemmi in graminosis ad lacum infra Schwarrenbach.

Obs. Non confundenda cum var. humili *P. lanceolata*.

118. *P. holosericea*, Gaud. in Roem. et Schult. Syst. iii. p. 126.

P. montana β ? *holosericea*, Gaud. Helv. i. p. 400. *T. saxatilis* β *holosericea*, Rchb. Germ. exc. No. 2677 β .

Plantago, foliis lineari-lanceolatis 5-7-nervis subintegerrimis, scapis pilis patentibus lanuginoso-hirsutis, spica densa multiflora, ovato-globosa, bracteis latissimis subrotundis nervo viridi valido percursis apice longe ciliatis immarginatis. α foliis glabriusculis. β foliis lanuginoso-hirsutis.

H. α In glareosis M. Gemmi ad moles glaciales Lammerngletscher, copiose, 31 Aug. 1836. β In glareosis M. Gemmi supra Schwarrenbach, 1835, et cum var. α 1836.

Obs. A. *P. montana*, Lam. præter notas indicatas, spica densissima. multiflora, foliis multo latioribus et longioribus staturoque majori crassiori abunde differt. *P. saxatilis*, M. Bieb! quacum conjungit cl. Rchb, primo visu differt, bracteis latissime scarioso-marginatis, et, nisi fallor, corolla pilis obvallata at indicavit cl. auctor. Pl. argenteæ, Lap. (spec. unicum e Pyrenæis ab Endressis lectum possideo) vix varietas: in *P. argentea*, Lap. folia sunt dense argenteo-sericea, bracteæque scarioso-marginatæ vix coloratæ. Pl. victorialis (an vera?) e Dalmatia a Pettero missa etiam differt, spica ovata, floribus minoribus, scapo elatiori, foliis brevioribus latioribusque et habita omnino *P. lanceolatæ*.

119. *P. lanceolata*, L. β . *hungarica*, Rchb. Germ. exc. No. 2678 β .

P. hungarica, Walds. et Kit!

H. In arenosis ad Rhodanum prope Leuk.

Obs. Scapi numerosi decumbentes, 4-5 unciales; spica brevis ovata, bracteæ acuminatæ hyalinæ, folia vix duas lineas lata, brevia, lanugine alba tecta vel glabriuscula et ad collum radicis lanugine copiosa longa intertexta.

120. *P. alpina* L. Var. *rigida*, rhizomate incrassato, lignoso. *P. bidentata* β , γ *humilis*, Gaud?

H. In pascuis aridis inter Zermatt et St Nicholas.

Obs. Radix sæpe odorata fere ut in *Gnaphalio graveolenti*.

(To be continued.)

II.—On the Dentition and other Characters of the British Shrews, with reference to M. Duvernoy's recent researches into the structure of this genus of Animals. By the Rev. LEONARD JENYNS, M. A., F. L. S., F. Z. S., &c.

In the preface to the "Manual of British Vertebrate Animals," published in 1835, I alluded to the *Shrews* as one of those groups, the species of which required further investigation. I was led to

think so by the circumstance of my having observed great differences amongst individuals usually considered as belonging to the same species, and the belief that we had not attained to a knowledge of the true value of those characters with which such differences were connected. I had not, however, at the time the means of throwing any further light on the subject. I was afterwards in hopes that this might have been afforded by Mr Bell, whose accurate work on the *British Quadrupeds*, now in course of publication, is probably familiar to all who are interested in the matter under consideration. M. Duvernoy had also in the meantime published a memoir on the structure of these animals, which promised to afford much assistance in the inquiry. It does not appear, however, that the gentleman first alluded to had become acquainted with M. Duvernoy's memoir in time to avail himself of any information therein contained, before the publication of the third part of the "*British Quadrupeds*," in which the indigenous species of the genus *Sorex* are illustrated. The subject consequently remained where it was; Mr Bell at the same time joining in the belief that it stood in need of some further investigation, although not himself in possession of the requisite facts to enable him at that time to undertake the inquiry.

It was under these circumstances, and on the occasion of my being enabled to consult the entire memoir of M. Duvernoy, of which I had previously only seen an abstract, that I determined a short time since carefully to examine anew the characters of the British species of this genus. I had also been fortunate in obtaining a few specimens in addition to those which I possessed at the time of publishing the Manual above alluded to. The result of my inquiries is what I purpose to communicate in the present paper; and if I have not succeeded in establishing any species which may be considered as new, I yet trust I shall be the means of drawing the attention of naturalists to a few facts respecting the dentition of those hitherto met with in this country, which, when considered in connexion with M. Duvernoy's researches, must lead us to alter our opinion respecting their supposed identity with others met with on the Continent.

I may commence by stating that M. Duvernoy's memoir, which is entitled "*Fragmens d'Histoire Naturelle systématique et physiologique sur les Musaraignes*," is contained in the second volume of the Transactions of the Natural History Society of Strasburg. The memoir bears the dates of June and December 1834, although, I believe, it was not published until the following year. Its lead-

ing object is to make known the existence of three distinct *types of dentition* existing amongst the shrews, and to direct attention to the characters afforded by the teeth, as much more deserving our confidence than some of those usually resorted to for establishing specific differences in this genus. It has been the practice of naturalists, in describing these animals, to dwell too much on the colour of the fur, and on the form, as well as the relative length of the tail. M. Duvernoy has shown that these points afford very uncertain characters; and my own recent examination of numerous specimens leads me to accord entirely with his opinion. Not only does the colour of the fur vary in its tints with age, sex, and season, but in the mode according to which the tints are distributed. M. Duvernoy observes, that in some individuals of the *S. araneus* the under parts of the body are pale grey, whilst in others these parts are the darkest. He adds, that the upper parts of the body will vary in the same species from greyish-brown or black to a decided red. My own observation has led me to remark further, that the colours are not even constant in individuals of the same age; nor is there apparently any fixed relation between the period of growth and the nature of the prevailing tint. In some instances I have noticed young individuals as dark as, or even darker than, full-grown specimens of the same species; in others, young which were of a lighter rufous than any adult that I had ever met with. The characters of the tail, at least those derived from its form, seem to depend chiefly upon age. It is generally shorter in proportion, and always thicker, in young than in old individuals. This last circumstance is due in part to a copious growth of elongated bristly hairs, which closely surround the tail in young specimens, at the same time standing rather out, but which either fall as age advances, or become so worn from friction as finally to leave this part, in very old individuals, nearly naked. It is also manifestly due to a greater plumpness of the tail at this period. In after life, the muscular portions, as well as the investing skin, sometimes shrivel, so as to render the angles of the included vertebræ more apparent; hence entailing not only a diminished thickness of the tail, but, what is equally obvious in adult specimens, a change in its form from cylindrical to nearly square. With reference to this last point, M. Duvernoy observes, and I believe correctly, that the quadrangular form of this part is common to several species, but that it never appears till after a certain age, the tail in young subjects being always round. There is also a stricture sometimes observable at the base of the tail, which it is of importance to notice, because it was considered by Hermann as

the distinguishing character of a peculiar species (*S. constrictus*, Herm.), which, however, according to Duvernoy, who has examined the original specimens still preserved in the Museum at Strasburg, proves to be nothing more than the young of *S. araneus* and *S. fodiens*. In fact, this is a character likewise affected by age, if not altogether dependent upon it. The elongated bristly hairs above spoken of are rarely found quite at the origin of the tail, or, if present, are shorter here than elsewhere and more closely appressed. Hence at this point the tail appears thinner; but, from the circumstance of the hairs falling in advanced life, the difference becomes less and less obvious, and in some instances at length ceases to be observed.

I now proceed to notice the different types of dentition which M. Duvernoy has observed in these animals, after which I shall describe more at length the characters of the teeth as exhibited by the species found in our own country.

These types, which are three in number, are regarded by M. Duvernoy as indicative of so many sub-genera, or at least well-marked sections in the old genus SOREX.

I. The first, to which he continues the name of SOREX in a restricted sense, is distinguished by having the two middle incisors in the lower jaw *with an entire or simple edge*, the two corresponding ones in the upper *hooked, or furnished with a spur appearing as a point behind*; the three or four small teeth which follow, in the upper jaw, *diminishing rapidly in size from the first to the last; none of the teeth coloured*.—To this type belong, amongst other species, the *Sorex araneus* of Continental authors, and the *S. leucodon* of Hermann.

II. The second type (HYDROSOREX, Duv.) has the lower middle incisors *with the edge denticulated*; the upper ones *forked, the spur being prolonged into a hook (en crochet)*; the small molars above, which are five in number, *diminishing insensibly from the first to the last: all coloured at the tips*.—Of this group the *S. fodiens* of Pallas is considered as the typical species. M. Duvernoy includes also the *S. tetragonurus* of Hermann.

III. The third type possesses characters in some measure connecting it with each of the two former, on which account it is named by M. Duvernoy AMPHISOSEX. It is distinguished by the lower incisors being *simple*, and the upper ones *hooked*, as in the first type; but the first two of the small intermediate teeth (which are four in number) are *equal*, the third somewhat less than these, the fourth rudimentary: the tips of the incisors, as well as those of the molars,

are a little coloured. This type is characteristic of a peculiar species, which M. Duvernoy describes as new, under the name of *S. Hermanni*.

After attentively considering the characters assigned by M. Duvernoy to his three types respectively, it was easy to ascertain to which of them the species of *Sorex* hitherto described as natives of this country by our own naturalists, belonged. The result of the examination was,—*first*, that we have no British species, as yet identified, possessing the characters of his first type, and that therefore the *S. araneus* of English authors is *not the same* as the *S. araneus* of the Continent;—*secondly*, that the species to which it has been the custom here to apply that name, belongs to his second type HYDROSOEX;—*thirdly*, that neither is the *S. fodiens* of this country, judging from all the specimens I had seen, identical with the *S. fodiens* of Pallas, or at any rate of Duvernoy, but that it associates, in respect to its dentition, with the *S. Hermanni* of the author last mentioned under his third type AMPHISOEX.

With the view of establishing these points, which may cause a little surprise with some of our naturalists, I beg to direct attention to the structure of the teeth in each of the several species of the genus *Sorex* hitherto met with in Great Britain.

S. araneus. (Of English Authors.)

That this was probably not the same as the *S. araneus* of the continent, I ventured to suggest in the Manual of British Vertebrate Animals, from the circumstance of *our* species having the teeth coloured, which had been said by Geoffroy, in his description of the one found in France, to be *white*.* Mr Bell thought that Geoffroy's statement was erroneous, and that there was not sufficient ground for the above opinion.† It would seem, nevertheless, to be fully confirmed by Duvernoy, who, moreover, notes this character as one of those particularly distinguishing his first subgenus. But were this not so, and were we entirely to disregard the *colour* of the teeth, their *number and structure* would at once serve to separate our own *araneus* from the species bearing the same name on the continent.

The following description is that of the dentition of our *common shrew*, and applies to every specimen I have as yet examined.

The entire number of teeth is twenty in the upper jaw, and twelve

* See *Man.* p. 17, Note.

† *Brit. Quad.* p. 110.

in the lower. Of the former, the last four on each side are *true molars*, the second and third of which may be termed perfect, the two others imperfect.* The second and third molars may be regarded as formed each of two triangular prisms, with their summits directed inwards, on which side there is a projecting spur or heel at the base. In the second, the first prism is sensibly smaller than the following one. In the third, the two prisms are equal. The first molar is of a somewhat irregular form. Strictly speaking, there is only the second prism present, of which the posterior side may be regarded as excessively developed at the expense of the two other sides, as well as of the projecting spur within. The first prism is simply represented by a small point or denticle in advance of the second. Viewed in profile, this tooth presents the appearance of a sharp edge with three points, and resembles one of the false molars observable in many of the *Carnivora*. The fourth molar is small, and, like the first, formed but of a single prism. In this instance, however, it is the first prism which is present, the second being rudimentary, and exhibiting but one side, which is carried inwards to unite with the projecting spur, which is itself also rudimentary.

Between the molars just described and the two true incisors at the extremity of the jaw, which last, from their peculiar development, form a remarkable feature in the dental system of this genus, are five small teeth on each side, concerning the exact nature of which there has been much difference of opinion. Some authors have regarded them as canines, others as false molars, others again as lateral incisors. Without entering into the merits of this question, which had already been discussed by M. Isidore Geoffroy St Hilaire,† previously to Duvernoy's late memoir, I shall simply state that in the present paper I adopt the opinion of the author last-mentioned, who seems most disposed to regard them as *incisors*, principally from the circumstance of their being almost all implanted in the intermaxillary bone.‡ I shall, therefore, continue to call them, as some have done before me, *lateral incisors*, giving the name of *middle incisors* to the anterior pair of teeth so remarkably distinguished from all others by their form and great development.

* In describing the molars, which appear to be nearly similar in all the species, I have adopted, in a great measure, the language of Duvernoy.

† See *Dict. Class. d'Hist. Nat.* Tom. ii. p. 313.

‡ One argument for *not* regarding them as *false molars* is founded by Duvernoy on their relative proportions. He observes that false molars always increase gradually in size from the first to the most backward. In the instance of these teeth, on the contrary, the first in the series are the largest.

In the species under consideration, the middle incisors are of a compressed conical form, and very much produced, at first taking a horizontal direction, but afterwards curving downwards in a hook-like manner. Each is furnished with a spur or second point, arising from the horizontal portion of the tooth, and which is so much developed as nearly to equal the anterior point in size. Hence this tooth appears forked; and when viewed in the recent animal, and still covered in part with the muscular integuments, the points of the fork might easily be mistaken for two distinct teeth. These middle incisors are widely separated at their origin, but, gradually approaching, touch each other soon after bending to form the descending hook.

The lateral incisors form a closely compacted series, the first reposing in part upon the base of the middle incisor just described, and each one in succession upon that of the tooth immediately preceding. They are of a conical form, the first three having the base surrounded by an elevated margin most conspicuous internally. The first rather exceeds in size the posterior point of the middle incisor in advance; the succeeding ones decrease in a very gradual manner, the last being small and not easily observed.

In the lower jaw the true molars amount to three only on each side, the first being the largest and the last the smallest. Each is formed, as in the upper jaw, of two triangular prisms, with the summits, however, in this instance, directed outwards. In the third molar, the second prism is incomplete.

The two middle incisors in this jaw present a remarkable appearance, being very much produced, and standing out horizontally for nearly their whole length, the extreme tips only being slightly bent upwards. The upper margin, which forms a sharpish edge, exhibits three small denticles behind the main point, and when viewed in profile has a festooned or crenated appearance.

Between the middle incisors and the first molar are two lateral incisors of nearly the same form as those above, but rather more pointed as well as lengthened. The second, moreover, presents the rudiment of a second point, though so little obvious as scarcely to deserve notice, were it not for the circumstance that in the next species this second point attains a considerable development. The first of the lateral incisors, which is smaller than the other, rests in a great measure upon the base of the middle incisor preceding it. The second, in like manner, rests partly upon the first.

All the teeth in this species have their salient portions more or less deeply tinged with brownish red. In the case of the middle

and lateral incisors, it is more especially the tips and the outer surface which are thus coloured. It is also the outer surface in the lower molars; but in the upper molars it is principally the inner surface, and the internal elevated ridges which form the spur. In some specimens the colouring is very slight on the lateral incisors, but it may always be readily observed on the other teeth.

On the whole, the dental formula for this species will stand thus:

$$\text{Mid. Inc. } \frac{2}{2}; \text{ lat. Inc. } \frac{5}{2} : \frac{6}{2}; \text{ mol. } \frac{4}{3} : \frac{4}{3}; = \frac{20}{12}.$$

S. fodiens. (Of English Authors.)

In this species, the entire number of teeth is two less than in the one last described. The molars are the same, both as regards number and form, above and below; but a considerable difference appears in the middle and lateral incisors.

The former, in the upper jaw, are larger in relation to the other teeth, and more curved. The first point is also much more developed than the second; which last appears only as a short though sharp spur, and ceases to convey the impression of the entire tooth being forked. This spur is, however, itself distinctly furnished with a very minute second point, of which there is scarcely a rudiment in the last species. These middle incisors are less divaricated at their origin than in the *S. araneus*, and meet each other sooner, though in some individuals without actually touching. Their inner margins exhibit at their point of contact a small process, which may be also observed in *S. araneus*, but which is more obvious in the species under consideration.

The lateral incisors in this jaw are only four, and but three of these are readily seen, the fourth being extremely small, and placed rather within the line of the adjoining teeth, by which it is in part concealed when viewed from without. They are of a compressed triangular form, with the base more dilated than in the *S. araneus*. The first two are of nearly equal size; the third somewhat smaller.

In the lower jaw, the middle incisors are even more produced than in the *S. araneus*, and equally horizontal in their direction. The upper margin is almost entire, presenting only near its base one obtuse denticle, seldom very conspicuous, and apparently the less so as age advances.

The lateral incisors in the lower jaw are two in number, as in the case of the last species. The second is also the largest; but this tooth, as already mentioned, differs from its corresponding one in the *S. araneus* in having its posterior or secondary point considerably developed.

The teeth are all more or less coloured as in the last species. The dental formula is as follows:

$$\text{Mid. Inc. } \frac{2}{2}; \text{ lat. Inc. } \frac{4}{2} : \frac{4}{2}; \text{ Mol. } \frac{4}{3} : \frac{4}{3}; = \frac{18}{2}.$$

S. remifer. (Of English Authors.)

Of this species I have only been able to examine accurately the dentition of a single specimen. It does not differ materially from that of the *S. fodiens* last described. The processes on the inner margins of the upper middle incisors are rather more developed, and it is by means of these processes only that the two teeth approach one another. The fourth lateral incisor in the upper jaw is also a trifle larger, and terminates upwards in a more decided point. The lower middle incisors have their upper margins perfectly entire, not exhibiting even the rudiment of a single denticle. The colouring of all the teeth is the same, but in the specimen examined, not very intense.

After the details above given, it is hardly necessary to dwell on the essential differences between the first two of our British species and the two continental ones bearing the same names. It will be readily seen, on referring to the characters of Duvernoy's three types, that they differ particularly in the form of the middle incisors in both jaws, and in the number, as well as in the relative size of the lateral incisors above. The difference in number amounts, in the case of the *S. araneus*, to as many as four. It is in fact not a little singular that the dental system of our *araneus* should be nearly coincident with that of the continental *fodiens*; while that of our *fodiens*, though not exactly the same (in as much as it clearly belongs to Duvernoy's third type,) should yet closely approach the dentition of the continental *araneus*. But besides the distinctive characters afforded by the teeth, there are others observable in the form of the cranium. Of this I judge from a comparison of Duvernoy's figures of this part with the same part in our British specimens. In the instance of the *S. araneus*, the cranium is slightly larger in all its dimensions, but especially wider across the snout and less attenuated, than in the *araneus* of this country. In the *S. fodiens*, it is decidedly smaller, and the proportions of the snout not so considerable.

But if our British species be not the same as the *S. araneus* and *fodiens* of continental authors, it will naturally be asked,—to what other species we are to refer them? To this inquiry, at least as regards one of them, it is not so easy to return a direct answer, until

all those noticed by different authors shall have had their dentitions examined with reference to the three types indicated by Duvernoy. Our most common species, the so-called *S. araneus*, which, as before stated, unquestionably belongs to the second of the above types (*Hydrosorex*;) I have little doubt is synonymous with the *S. tetragonurus*, the only other noticed by Duvernoy under that section, besides the true *S. fodiens* of Pallas and himself, from which it is clearly different. M. Duvernoy has given a description of this species, as well as a coloured representation of the entire animal, and though this last may appear at first sight larger than our *araneus*, as well as slightly different in some other respects, yet it accords exactly with specimens of a rather unusual size obtained by me from the fens of Cambridgeshire, to which I shall have occasion to refer presently. His description is for the most part of a relative nature serving to distinguish the *S. tetragonurus* from the *S. fodiens*. Hence it will not admit of direct application where we have not the last-named species with which to contrast it. But so far as it can be judged of, it would seem to favour the opinion I have above hazarded. Thus he observes that it is distinguished, in the first place, by its much smaller size; secondly, by the form of the snout, which is narrower and more elongated; thirdly, by the form of its feet, which are less thick and less broad than those of the *S. fodiens*. Lastly, he notices some slight differences in the teeth compared with those of the species just mentioned. One of these consists in the first denticle on the margin of the lower middle incisor being so little removed from the point of that tooth as to appear but as a lobe of this last, and to give in consequence to the extremity of the tooth a bilobated character. Another difference consists in the denticle of the second lateral incisor in the lower jaw being less developed. With respect to the last two peculiarities, of the former it is not easy to judge without knowing its appearance in the *S. fodiens*, but I conceive it will be hardly thought inapplicable to our species, in which I have already noticed (when describing its dentition) three denticles arranged in a series behind the main point of the tooth in question, to which last the first is sufficiently approximated to convey the appearance above alluded to by Duvernoy. To the latter,—the rudimentary state of the second point in the second lateral incisor below,—I have in like manner already drawn attention.

M. Duvernoy assigns the following dimensions to the *S. tetragonurus*:

	Millim.	Inc. Lin.
Length of body,	0,070	= 2 9 $\frac{1}{4}$
of tail,	0,045	= 1 9 $\frac{1}{2}$ nearly.
From the orifice of the ear to the end of the snout,	0,021	= 0 10, or more.
From the eye to the same point,	0,010	= 0 4 $\frac{3}{4}$;

which are not very different from those of many individuals of our common species, which last varies very much in this respect,—in the relative length of the tail and body especially.

The *S. tetragonurus* was first described by Hermann, in 1783, from specimens found in the neighbourhood of Strasburg by the celebrated Dr Gall. To his work, entitled *Tabula affinitatum Animalium*, I have had no access. The species, however, has been subsequently noticed by several other authors besides Duvernoy, in whose descriptions I find scarcely any thing at variance with the characters of the *S. araneus* of this country. Geoffroy's, indeed, is almost the only one which appears founded upon original observation.* And one remark of his, relating to the teeth, which perhaps may be thought not strictly applicable to our species, it will be right to notice. He states that all the canines, (by which name he designates what in this paper are called lateral incisors) are of equal size. But it must be remembered, that he is here, as well as in most other parts of his description, contrasting the *S. tetragonurus* with the *S. araneus* of the continent, in which last, according to Duvernoy, the teeth in question diminish in size very rapidly. Hence the expression must not be taken strictly, and according to the letter. As to the form of the tail, which has obtained for it its name, and which is much dwelt upon by Geoffroy, we have already shown that this is not in any case to be depended on. The dimensions given by him are :

Length of body 60 millimetres	= 2 inc. 4 $\frac{1}{2}$ lin. nearly.
tail 40	= 1 inc. 7 lin.

which differ from those of Duvernoy, shewing that in this respect the *S. tetragonurus* is equally variable as our British *araneus*. Its tendency to vary in other respects also, we may gather from the account of this species by Isidore Geoffroy St Hilaire in the *Dictionnaire Classique d'Histoire Naturelle*,† where, after repeating several of the characters already noticed by Geoffroy, he states that he has examined many individuals apparently referrible to it, in which he

* Memoire sur les espèces de genre Musaraigne.—*Ann. du Mus.* Tom. xvii. (1811,) p. 177, pl. 2, f. 3.

† Tom. xi. p. 320.

observed considerable differences of colour. Both authors speak of it as being found in nearly the same situations as the *S. araneus*,—in barns, gardens, &c. the latter adding that it is not of unfrequent occurrence.

Desmarest, * Fred. Cuvier, † and Fischer, ‡ in their descriptions of the *S. tetragonurus*, add nothing to what had been previously said by Geoffroy.

Although I have referred above our British *araneus* to the *S. tetragonurus* of Duvernoy, I think it not impossible it may still be the same as the *S. araneus* of Linnæus. This indeed cannot be inferred from the brief description in the twelfth edition of the *Systema Natura*, in which there is no mention made of the teeth. But in the *Fauna Suecica*, (edit. 1761,) he speaks of the upper middle incisors as *bifid* and curved, the lower ones *serrated*; the canines (lateral incisors) in the upper jaw as *four* in number, and very small. These characters are not inapplicable to our species; for although there are really *five* lateral incisors above, the fifth is so minute as readily to escape observation. M. Duvernoy was led by the description in the work last referred to, to consider the Linnæan *araneus* (the only European true *Sorex* known to the Swedish naturalist,) the same as the species afterwards called *fodiens*; but this is explained by the circumstance of *his* (Duvernoy's) *fodiens* having in fact the *same dentition* as *our* *araneus*; and he seems to have been more impressed with the idea that it was distinct from *his* *araneus* (which it certainly is) than with the possibility of its being his *tetragonurus*, with which, as above shewn, *our* *araneus* ought probably to be associated.—But however this may be, as there is some doubt attached to the Linnæan species, I should feel inclined in this, as in all similar cases in which there have been two or more species confounded under the same name, *to continue that name to that one in particular which has been best characterized by subsequent authors*. Hence, without any reference to Linnæus, I should propose suffering the name of *araneus* to remain with the species so well described by Daubenton, Geoffroy, and Duvernoy, and calling ours (at least till it be shewn that it is *not* the species so designated by Hermann,) by that of *tetragonurus*.

We must now proceed to make some remarks respecting the *S. fodiens* of this country, which, as before stated, it is hardly possible, in the present state of the subject, to identify with complete cer-

* *Mammal.* p. 150.

† *Dict. des Sci. Nat.* Tom. xxxiii. p. 425.

‡ *Synops. Mammal.* p. 253.

tainty in the descriptions of foreign authors. In fact it is quite clear that, in this instance also, there have been at least two, if not more, species confounded; sometimes under the name of *S. Daubentonii*, at other times under that of *S. fodiens*. The former name, I believe, originated with Erxleben,* by whom it was applied to the *Musuraigne d'eau* of Daubenton, † which is probably the same as the species described subsequently under the same name by Geoffroy and many of the French writers, but by Hermann under that of *S. carinatus*, and by Duvernoy, in his recent memoir, under that of *S. fodiens*. The latter (*S. fodiens*) was first given by Pallas to a species discovered by himself near Berlin, of which he sent several prints to Pennant, who considered it the same as the *water shrew* of this country, but of which the exact characters had not then, and, so far as I am aware, have never since been published. ‡ Hence we have not the means of judging what Pallas's species really was. If Duvernoy is right in regarding it to be the same as his, from which ours is decidedly different, it is at once evident that the name of *fodiens* no longer of right belongs to the *British* species. Whether ours be the *fodiens* of any other author subsequent to Pallas, is a distinct question; and that it is, there are strong grounds for believing, of Gmelin in particular, whose characters of the teeth will not accord with those of Duvernoy's *fodiens*, but are very nearly similar to those of our own. It must, however, be mentioned, that several new aquatic species of *Sorex* have been indicated of late years by the continental naturalists, which tends to make the inquiry more perplexing. Brehm has briefly described three, in addition to one which he considers as the *S. fodiens* of Bechstein, in the periodical conducted by himself under the title of *Ornis*. § More recently, a sketch of a new arrangement of the shrews by Wagler|| has been published in the *Isis* of 1832. In this last essay, the species are distributed under three distinct genera, somewhat analogous to Duvernoy's subgenera; and judging from the characters of the teeth assigned to one of them, (*Crossopus*, W.) in which he places the *S. fodiens*, I think it probable that the species intended under this last name, (considered by him as synonymous with the

* *Systema Regni Animalis. Class. I. Mamm.* Lips. 1777. p. 124.

† *Mém. de l'Acad. des Sci. de Par.* 1756, p. 211, pl. 5. f. 2.

‡ See *Penn. Hist. of Quad.* (Edit. 1793.) Vol. ii. p. 225, note.

§ The characters of these four species will be also found in *Bull. des Sci. Nat.* 1827. Tom xi. p. 287.

|| Said to have been found after his death amongst his manuscripts. A brief abstract of the arrangement is given by Duvernoy at the conclusion of his memoir, with remarks. There only have I seen it.

fodiens of Brehm) may be the same as the *fodiens* of this country. But it will be unprofitable at present to pursue this inquiry further. And until we have a more exact knowledge of the characters of those species to which the name of *fodiens* has been applied abroad, I think it would be advisable to abstain from applying that name to our own species, or at least considering this last as necessarily identical with any of the above. One thing is certain;—that it is not the *S. fodiens* of Duvernoy, which is probably synonymous with the *Musaraigne d'eau* of the other French authors. If it be asked by what name we are to call the water shrew of this country, I would propose, (at least for the present) restoring to it that of *bicolor*; a name originally given to it by Shaw, *—one extremely applicable, and, so far as I know, not adopted by any foreign author as a name for any of the species met with on the continent.

With respect to the *S. remifer* of this country, I have nothing new to adduce on the subject of its synonymy. In Duvernoy's memoir there is not the slightest mention made of this species, by which we can get a clue to the dentition of the one originally so named by Geoffroy, or the section to which it belongs in his own arrangement. I shall simply state, that, judging from the slight differences in the teeth already alluded to, added to its other characters previously established, I feel strengthened in the opinion of its being really distinct from our *S. fodiens*, to which, however, it is at the same time *very closely allied*.

Having endeavoured in the preceding pages to elucidate the characters, and to rectify the nomenclature, of our three British Shrews, I am anxious now to direct attention to two varieties of our most common species (*araneus* of authors,) met with in my own neighbourhood, and which, had they occurred to persons not very conversant with these animals, might easily have been regarded as distinct. The first which I shall notice is one already alluded to in a former part of this paper as remarkable for its size.

Var. 1.—Dimensions as follows:—

	Inc.	Lin.
Length of the head and body, - - - -	3	1
of the head, - - - - -	0	11
of the tail (to the end of the bone,) - - -	1	7
of the hind foot (from the heel to the extremity of the claws,) -	0	6½
of the fore foot (from the wrist in like manner,) -	0	4
of the ears, - - - - -	0	1¾
From the eye to the anterior margin of the orifice of the ear, -	0	4
to the tip of the snout, - - - - -	0	4¾

* *Nat. Misc.* Vol. ii. pl. 55.

Notwithstanding this variety exceeded in bulk and *entire length* any individuals of its kind I had before met with, it will be observed that its head and tail taken separately were each *shorter* than in either of the specimens of which the dimensions are given by Mr Bell and myself in our respective works. It proved to be a female which had recently produced young, the nipples being distended and very prominent; and all its characters, as regards size and form, clearly shewed that its peculiarities were due simply to age. Its *snout* was very much attenuated, (thus confirming a remark of M. Duvernoy, that this part is always thicker in young subjects): the *tail* distinctly quadrangular, somewhat flattened horizontally towards the tip; not nearly so stout as in ordinary specimens; almost naked; the investing hairs being worn to the stumps, closely appressed, and not extending at the tip more than $\frac{3}{4}$ ths of a line beyond the bone. The *teeth* in like manner indicated age: the upper middle incisors were completely ground down to their point of contact, (giving the appearance of their being more than usually divaricated at their origin;) the lower ones possessed but two denticles on their upper margin, the first of the three ordinarily present having become obsolete from use. The *colours* (which, however, in this instance had probably nothing to do with age) were also rather peculiar in this variety. They were distinctly of three kinds: that of the sides being separated from the colour of the back by a well-defined line, originating at the hind quarter, thence passing straight onwards to the shoulder, where it inclined upwards, terminating finally at the ear. The parts above the line were of a very dark red-brown, approaching to black, with a few cinereous hairs intermixed;—the sides themselves reddish ash;—the parts beneath cinereous, or dirty white, with a faint tinge of yellow: region of the anus dusky.

With the above specimen, which was procured from Burwell Fen in Cambridgeshire, I think in the month of June, I received a second, also a female, closely resembling it in all its essential characters, but not quite so large. The length of the head and body was 2 inc. 9 lines; that of the tail 1 inc. 9 lines, *this being the same as in the former instance*. The snout was equally attenuated, and the tail equally quadrangular as well as naked. The colours were somewhat different; the upper parts being generally paler, and the sides darker, the boundary-line visible but not very distinct: the back, however, was variegated with two or three large jet-black patches. It is worth adding, that in both of the above specimens, the ears were quite as short as in common specimens, almost entirely con-

cealed, and without any white spot; the feet and tail not ciliated, (although met with in the heart of a marshy district subject to inundation;) nor the former relatively larger than in common specimens.

The other variety to which I would direct attention was taken in the same fen, and at the same time, as the preceding. Of this I likewise obtained two specimens, of different sexes, however, the female being big with young. They were quite similar; but both, in general appearance, extremely different from those last described, as also from most others I had previously seen. Their chief peculiarity consisted in their bright rufous colour, with several indications of their being young, or at least hardly adult individuals, although quite as large as, or indeed in some respects larger than, the specimens of our common shrew usually met with.

Var. 2.—Dimensions:—

	<i>Inc.</i>	<i>Lin.</i>
Length of head and body, - - -	2	6
of head, - - -	0	11½
of tail (to end of bone,) - - -	1	7
of hind foot, - - -	0	6½
of fore foot, - - -	0	4
of ears, - - -	0	1½
From eye to orifice of ear, - - -	0	3
to the tip of snout, - - -	0	4¾

The above measurements are those of the female, which was the larger of the two specimens. The only respect in which they are at all peculiar is in that of the hind foot, which, it will be observed, is as long as in the variety first described, notwithstanding the great difference in their general size. In fact this part was decidedly larger than in ordinary specimens of the same *entire* length. There was likewise in the recent animal a marked fulness about the head and snout, causing these parts also to appear larger than usual, although not to be inferred from the dimensions given in the table. Some of the other characters, as already stated, seemed to indicate immaturity. The points of the teeth were all sharp: the tail thick, and nearly round, the angles scarcely sensible; well clothed throughout its whole circumference with long hairs, and tipped with a fine pencil extending very nearly three lines beyond the bone. The colour of all the upper parts was bright chestnut, passing on the sides into ash-grey, which last colour pervaded also the parts beneath: tail and feet as well as the snout, light rufous.

In the male, the length of the head and body was 2 inc. $4\frac{1}{2}$ lines ; that of the tail 1 inc. 9 lines ; the rest of the proportions the same as in the other sex. The tail was equally stout, and more hairy, the pencil at the extremity extending still further beyond the bone. The colours on the whole similar, but the rufous tinge brighter and more distinct ; the snout, feet, and tail, testaceous yellow.

I think it just possible that the variety last described *may* prove to be a distinct species, but I dare not consider it as such at present, and without inspecting more specimens from different localities. With regard to the first, as well as some others which I have seen, but which I do not think it necessary to dwell upon, I feel confident that they have no claim to be regarded in that light. I was, indeed, till lately strongly inclined to believe, like Mr Bell, that under the name of *common shrew*, we had in this country two or more species confounded. And possibly it may still be so. I can only say, that after the closest examination of every specimen of which I could get possession, I have failed in detecting any tangible characters upon which a specific difference could with certainty be established. If any such difference exist, it must be sought for in the number and form of the teeth, in the greater or less development of the auricle, in the breadth and size of the snout (compared in two individuals *of the same age*,) and perhaps in the size of the feet (similarly compared,) as well as in the presence or absence of *cilia* on these last ; but *certainly not* in the absolute dimensions, nor in *all* the relative proportions, nor in the colour of the fur. As for the tail, neither its length, nor thickness, nor form, nor hairiness, afford characters of the slightest value.

I shall not conclude without earnestly soliciting from the readers of this Journal, any specimens of shrews which they may meet with in their own neighbourhood, but which they have not the leisure to examine themselves, or not the opportunity of comparing closely with others. Although I have been unsuccessful hitherto in the search after new British species of this genus, it is far from improbable that such remain to be discovered. There is no reason why we should not possess the *S. araneus* of Duvernoy, which it has been one of the objects of this paper to prove to be distinct from ours, nor the *S. fodiens* of the same author, equally distinct from the species so called by our own naturalists. It is, indeed, much to be suspected, that either this last, or some other aquatic species besides those with which we are well acquainted, has been already met with in this country, though not identified at the time of being observed. On comparing the descriptions, extant in different works,

of our *common water shrew*, it will be found that they do not agree in all particulars. Some of these variations may be due to accidental causes, or to differences of age or sex in the respective cases. Nevertheless, the circumstance is worth mentioning, as affording a stimulus to the researches of those naturalists who may be inclined to turn their attention to these animals.*

Reference to the Figures. Plate I.

In the annexed plate are given representations of the crania, and of portions of the upper and lower jaw, of the *S. araneus* and *fodiens* of Duvernoy, and of the similarly named species of British authors. The figures relating to the *continental* species are copied from Duvernoy's memoir, and are inserted for the purpose of comparison with our own.

The species are severally distinguished by the Roman numerals I. II. III. IV. as explained at the bottom of the plate. When these numerals are simple, the objects are represented of their natural size. When accompanied by a *dash* (I'. II'. &c.) they are to be considered as magnified twice their natural size.

The Figures 1, 2, 3, 4, 5, indicate the numbers of the several kinds of teeth.

The letters refer to different views of the head, and jaws, and are the same for each species :

- a.* Is the cranium viewed from above.
- b.* *The same* viewed from beneath.
- c.* Is the anterior portion of *the same* viewed in profile.
- d.* Is a branch of the lower jaw, viewed externally.
- e.* *The same* viewed from within.

It should be mentioned that in the case of 1, *d* and *e* are those of a young individual.

f. Is intended to represent the mode of union of the two upper middle incisors as seen from the above, the occiput being turned towards the spectator.

*f**. Relates to *Var. 1*, of the *British araneus*, in which these incisors were worn down to their point of contact.

Swaffham Bulbeck,

Feb. 18, 1837.

* See in particular a notice in *Loud. Mag.* Vol. iii. p. 471, of a shrew taken near Liverpool, which the writer was unable to identify with either of our two well-known British species.

Postscript.—Since the above paper was written, I have had an opportunity (through the kindness of Mr Gray) of examining, in company with Mr Bell, the different specimens of British and Continental shrews preserved in the British Museum. The result was most satisfactory, being in exact accordance with what I had been led to believe from Duvernoy's memoir. In that collection, there are French specimens both of the *S. araneus* and the *S. Daubentonii* of foreign authors, and on closely comparing them with individuals of our own species, the differences in the teeth became immediately obvious.

London, Feb. 25, 1837.

III.—*Contributions to the Natural History of Ireland.* By WILLIAM THOMPSON, Esq. Vice-President of the Belfast Natural History Society.

No. 2. *On the Birds of the Order Raptores.*

IN the following paper it will be observed, that the catalogues of birds in the Statistical Surveys of Ireland are but rarely quoted, and, although it is my earnest desire to do justice to every one who has in any way contributed to a knowledge of the Natural History of the country, I am unwilling to bring forward species from the mere circumstance of their names appearing in a catalogue; indeed, in some instances where descriptions are given, from which the species can be identified, they have evidently been copied from authors, instead of being the result of an examination of actual specimens. The common English names, too, of species being misapplied, have led to errors, in consequence of the scientific appellation being appended as if they were correct: the county history, which contains the best and most ample catalogues of birds and fishes, bears evidence of this in both departments. Having thus far written in explanation, it must be added that I complain not of these catalogues, but consider that it would be most unreasonable to expect the many individuals who undertake writing in the statistics of a country, and who have not previously bestowed attention on natural history, to furnish us with zoological or botanical catalogues to satisfy the scientific naturalist.

GOLDEN EAGLE—*Aquila chrysaetos*, Vigors.—The collection of my friend, William Sinclair, Esq. of Belfast, contains a splendid specimen in adult plumage of the golden eagle, which was trapped

a few years since on Muckish mountain, in the county of Donegal. The gamekeeper of Mr Stewart of "the Horn"* informed me when there in June 1832, accompanied by Richard Langtry, Esq. that since he entered on his present occupation in 1828, he had destroyed thirteen or fourteen eagles, one only of which was of this species—it was taken on one of the inland mountains of "the Horn." When about the same time I visited the precipitous mountain of Rosheen, near Dunfanaghy, in the same county, I was told that, previous to the last twelve years, a pair of eagles had their eyrie in one of the inaccessible cliffs, and, as their young advanced in growth, levied such contributions from the surrounding neighbourhood, that the country people finally resolved upon their destruction. This was effected by lowering from the summit of the precipice a lighted brand, which ignited and consumed the nest, and three unfortunate eaglets fell scorched and dead to the ground. The old birds from this time deserted the mountain. From the situation selected for this eyrie, the species was most probably the golden eagle.

On visiting Achil, off the coast of Mayo, in June 1834, in company with Robert Ball, Esq. of Dublin, Lieutenant Reynolds of the Preventive Service, a keen sportsman, and well acquainted with birds, assured us that one or two pairs of golden eagles breed annually in the island. When subsequently on the mountain of Croaghpatrick, that volcano-like terminates in a magnificent cone, and is in elevation the second in Connaught, we for a considerable time observed a pair of these eagles towering above its summit. In the county of Kerry a few weeks afterwards, an eagle, supposed to be of this species, was seen by some of our party when viewing the lakes of Killarney from the topmost ridge of Mangerton. When on a visit to this same place the previous autumn, my friend, Robert Patterson, Esq. of Belfast, made the following note, which he has kindly permitted me to use:—"Near to the little lake called the Devil's Punch-bowl, we disturbed four eagles preying on a full grown sheep; they rose majestically into the air as we approached. The people who were with us supposed the sheep, being perhaps sickly, had been killed by the eagles,—a supposition corroborated by the quantity of fleece scattered over the ground for some yards in one direction. The flesh of the neck was completely removed, although that of every other part was untouched. We were assured that two eagles will occasionally pursue a hare, one flying low and

* The name given to the peninsula bounding the western entrance to Sheephaven, in the county Donegal, and which terminates in the stupendous promontory of Horn Head.

coursing it along the ground, the other keeping perpendicularly above the terrified animal. When the lowest eagle tires, they change places, and pursue the same system of tactics, until the hare is completely wearied out. I was told the same circumstance a few days afterwards near Tralee, and again near Monasterevan : my informant in every instance stated the fact as having fallen under his own knowledge, and not as a matter of hearsay."

In October 1833, when looking over a collection of the British Falconidæ belonging to William Sinclaire, Esq., in company with Mr Adams, lately gamekeeper at Glenarm Castle, he at once recognized a golden eagle as the species of which he had killed four individuals in Glenarm Park (Antrim.) The first he saw was in the month of March, when two visited the park. At this time, there were but five lambs dropped, and on each of the two first two days of the eagles' appearance, two lambs were carried off, thus leaving only one. Mr Adams finding that lambs were in such request with these birds, procured two of them to bait his traps, and had thus the satisfaction of capturing both eagles. In November, a third individual made his appearance, and was seen by Mr Adams and several other persons in pursuit of a hare. This poor animal took refuge under every bush that presented itself, which, as often as she did, the eagle approached the bush so near as apparently to beat the top of it with his wings, and thereby forced the hare to leave her refuge. In this way she was eventually driven to open ground, which did not long avail, as the eagle soon came up with, and bore her off in his talons ; and so disappeared from the spectators. Mr Adams, hearing that this eagle had killed several of a neighbour's ducks, lost little time in obtaining one for his trap, and with this tempting bait secured him. The fourth eagle he came upon by chance when out shooting. This bird flew over him at about twenty yards distance, when he was fired at ; the shot from the first barrel bereft him of many feathers, but even after receiving the contents of the second, and though severely wounded, he was able to fly off. Mr Adams saw no more of him after this, until informed by some men who were near, that they had seen an eagle mobbed by magpies, and he was eventually discovered by the great number of these birds collected about the place where he lay dead on the heath with wings outstretched.

On Oct. 14, 1835, I saw an adult specimen of the golden eagle,* which was trapped the day before at Claggan (county Antrim.) It

* Now preserved in the Belfast Museum.

was accompanied by two others, which were also attempted to be taken, but unsuccessfully.

By Dr M'Donnell, and another elderly friend, both of whom well recollect the circumstance, I have been told that the same plan adopted by the Kerry peasant for supporting his family in a season of scarcity,* was successfully resorted to about thirty years ago at Glenariff, in the county Antrim. One of a pair of eaglets taken from a nest there, was so placed, that during the summer its parents supplied it with rabbits and hares in such abundance, that its owner obtained a sufficiency of animal food besides for himself and family. The old birds did not alight with their prey, but circling for some time above the eaglet, apparently until certain that the food would fall to the ground within its reach, then let it drop.

A sporting friend who was eye-witness to the fact, assures me that when out hunting among the Belfast mountains many years ago, an eagle, which from the darkness of its plumage he concluded was the golden, appeared above his hounds as they came to fault on the ascent to Devis, (the highest of the chain,) after a good chase. As they came on the scent again, and were at full cry, the eagle for a short time kept above them, but at length advanced, and carried off the hare when at the distance of from three to four hundred paces before the hounds.

In the two excellent works, "Gardens and Menageries of the Zoological Society," and "Illustrations of British Ornithology," the golden eagle is characterized as indocile: in the latter, Mr Selby speaks from his own experience of two individuals which were kept by him for some years. But my friend Richard Langtry, Esq. of Fortwilliam, near Belfast, has at present a bird of this species, which is extremely docile and tractable. It was taken last summer from a nest in Inverness-shire, and came into his possession about the end of September. This bird at once became attached to its owner, who, after having it about a month, ventured to give it liberty, a privilege which was not in the eagle's part abused, as it came to the lure whenever called. It not only permits itself to be handled in any way, but seems to derive pleasure from the application of the hand to its legs and plumage. This eagle was hooded after the manner of the hunting hawks for some time, but the practice was abandoned, and although it may yet be requisite if the bird be trained for the chase, hooding is otherwise unnecessary, as it remains quiet and contented for any length of time, and no matter

* Smith's Kerry. p. 97.

how far carried, on its master's arm. It is quite indifferent to the presence of any persons who may be in his company, and is unwilling to leave him even to take a flight, having to be thrown into the air whenever he wishes it to do so. When this eagle is at large, my friend has only to hold out his arm towards it, which, as soon as perceived, even from a distance, it flies to, and perches on. I have seen it thus come to him not less than a dozen times within half-an-hour, without any food being offered. It runs very fast. When on the ground, and the lure is thrown comparatively near, it prefers this mode of progression to using its wings. It is also fed from the "fist." Live rats have several times been turned out of the cage-trap to this bird, but before running very far, they were invariably pounced upon. Four full-grown rats have been taken at a meal; an entire Heron, (*Ardea cinerea*), except the head and legs, was also eaten on one occasion. It differs somewhat in its manner of feeding from two sea eagles (*Haliæetus albicilla*) which are kept along with it; when the head and neck of a goose is offered, the golden eagle eats them entire, the latter take the flesh off only, leaving the harder parts; and when entire birds are given, the sea eagle plucks many more feathers off than the golden; the latter assimilating to the peregrine falcon (*Falco peregrinus*) in this respect. This golden eagle is more partial to alighting on trees than the sea eagles, and stationed on their tops, keeps its master in view, following him about the demesne, and where plantations often intervene, flying from one to another in the direction he walks, indolently remaining as long as possible where it perches, consistently with keeping him in sight.

A golden eagle, also from Scotland, belonging to Mr William Sinclair, is a much more familiar bird than a sea eagle in his possession, but being kept in town, its docility has not been put to the proof as in Mr Langtry's bird.

The golden eagle is generally represented as exceeding the sea eagle in magnitude, but such specimens of the latter as I have examined were invariably of superior size to the former, and I speak from comparison of adult individuals of the same sex.

SEA EAGLE.—*Haliæetus albicilla*, Selby.—The first Sea Eagle I had the satisfaction of seeing in Ireland was on the 25th of June 1832, when visiting the majestic promontory of Horn Head, which rises precipitously from the ocean to an elevation of nearly 600 feet. On looking over the cliff on the eastern side, one of these birds rose from a platform of rock about sixty yards distant. Immediately

after, on reaching the northern side, I perceived another sitting on her nest about a fourth of the way from the summit of the precipice; when she flew off, two eggs, greenish-white in colour, like those of the swan (*Cygnus olor*) were exposed to view. Very near to this was another nest at a similar distance from the top, but it was untenanted, and from its proximity to the other, I should rather suppose that both had belonged to the same pair of eagles in different years, than that they were occupied by two pairs at the same time. But less than a furlong distant to the eastward of the Head, there was a nest similarly situated, and containing two eaglets. To obtain these, we, on the 28th of June, engaged a man accustomed to the apparently hazardous exploit of descending precipices, and, a rope being attached to his body for safety, and a basket to his back for the reception of the eaglets, he was lowered to the nest, from which he brought up the birds without injury either to himself or them. The parents were most vociferous during the robbing of their eyrie, taking hurried flights, evidently in despair, towards the nest, but did not attack nor even closely approach the plunderer, nor did they come within fair gun-shot of the rock. The eaglets were almost entirely feathered. The first layer of this nest, as well as that of the other two, was composed of strong stems of heather; being unable to see the lining, I had it brought up, and found it to be the tender twigs of heath, and plants of the *Iuzula sylvatica*, both of which grow on the summit of the cliff. About the nest there were many legs of rabbits and the remains of puffins (*Mormon fratercula*, Temm.)

On the following day I saw five sea eagles in mature plumage,* all that I understood were then at "the Horn." The bird we raised from the nest containing eggs, the gamekeeper thought had no partner, as he killed a male bird a few weeks before. At three of these eagles I gazed a long time, both when they were at rest and on wing; at first through a telescope, but permitting a much nearer approach than was anticipated, I had afterwards an excellent and near view of them. The head and neck in every position, and I looked attentively to this point, appeared almost as white as the tail,† and was so distinguished from a great distance, more espe-

* Excepting eaglets, the gamekeeper has never seen any but white-tailed or adult eagles here at this season.

† In the colour of the head and neck in preserved specimens of adult birds (having the tail pure white) which I have examined, there is considerable difference in this respect, and, though none has this portion of the plumage alto-

cially, when thrown into relief by a dark and rocky back ground. Several gulls (*Larus canus*?) and kestrels (*Falco tinnunculus*) kept flying closely after one of these birds, and occasionally approached so near as apparently to strike him, this a gull certainly once did, but "towering in his pride of place," the eagle never condescended to take even a momentary notice of them.

Under the head of Golden Eagle, it has been mentioned, that of the number thirteen or fourteen eagles killed at "the Horn" within four years,* all but one individual were the *Haliæetus albicilla*. I was informed by a gentleman resident at Dunfanaghy, the village nearest to Horn Head, that in winter the sea eagle is comparatively numerous, and that he has sometimes seen as many as six and seven in company on the strand.† They are supposed to be attracted hither at this season by rabbits, which greatly abound at "the Horn." In an article by John Vandeleur Stewart, Esq. on the Birds, &c. of Donegal, which appeared in the Magazine of Natural History for 1832, (p. 578,) the sea eagle is mentioned as resident and common. The author states that he had received three specimens for his museum, besides five living eaglets. Mr William Sinclair, also, has a bird of this species from the same locality. In this county it likewise frequents Malin Head, the extreme northern point of Ireland.

When in June 1834, at Achil Head, which is fondly, but erroneously believed by the inhabitants of the island to approximate the shores of the western world, more nearly than any other European land, and stretching out afar into the Atlantic, is rendered sublime less from altitude, than from the utter barrenness of its desolate and inaccessible cliffs, a suitable accompaniment to the scene appeared in a sea eagle which rose startled from her nest on the ledge of an adjoining precipice. Two of these birds were seen by us the next day, soaring above a lake in the island, and we were informed by Lieutenant Reynolds, that four pairs of sea eagles breed in Achil. With respect to this species being in so wild a district comparatively fearless of man, it may be stated that on one occasion, when out

gether white, yet some are marked so faintly with very pale ash-grey, as to exhibit the appearance of soiled white, which, contrasted with the dark hue of the back and wings, gives from a distance the appearance thus described.

* The reward alone could hardly have prompted the destruction of this number,—one shilling a head only being given by the proprietor of "the Horn" for them.

† Temminck remarks that this species is common in winter on the shores of Denmark. "Man. d'Orn. de l'Eur." part 3, p. 27.

shooting in Achil, Lieut. Reynolds had with his first barrel shot a grouse, which an eagle stooped to carry off, and when just in the act of seizing was brought down by the second barrel. By Serjeant Croker of the Constabulary, a most intelligent man, we were assured that, about six months since, an eagle carried off a hen from the village of Ballycroy, when a few yards only distant from him and several other persons. He was told that a similar occurrence had several times before taken place.*

At Fairhead, the most lofty and sublime of the basaltic headlands of Antrim, this eagle has an eyrie:—in the same county it has been taken at Glenarm Park. In the Belfast mountains, far remote from any of its habitations, I was once (on October 2, 1832,) gratified by the sight of an eagle, which was soaring, attended first by one, and afterwards by a second kestrel. The snowy whiteness of the tail proved it to be an adult bird. It remained in view for about a quarter of an hour, then disappeared in the direction of the Cave-hill. In the deer park here, the last eagle I have heard of being taken near Belfast, was trapped upwards of twenty years ago.

When in August last, at Sleive Donard,† the chief of the Mourne mountains, in the county of Down, a cliff was pointed out as the “Eagle’s rock,” so named in consequence of having at one period been the eyrie of this bird. Our guide informed us, that eagles had not bred here of late years, (their place is supplied by ravens,) but that they annually build at less frequented places amongst these mountains. Here they are frequently met with by Lord Roden’s gamekeeper, but are seldom seen so low down as Tollymore Park, where one only has been taken within the last nine years.

Montagu relates an instance of a sea eagle being so much wounded by a charge of snipe-shot, as, after flying some distance, to fall and be captured. I saw one which was similarly obtained at “the Horn,” by Mr John Sims of Dunfanaghy, near to whom it rose as he was returning from snipe-shooting, when his gun was loaded only with this, the smallest of the sportsman’s charges.

Of the two eagles taken from the nest at “the Horn,” it may be stated, that Mr R. Langtry trained them so far, that they allowed him to carry them on his arm, and on giving them liberty in the morning, they flew about the demesne during the day, generally attend-

* When reading of this feat a short time before, in the “Wild Sports of the West,” I looked upon it as an embellished tale.

† Montagu obtained specimens of the sea eagle from this mountain. The individual from which Pennant drew up his description was taken in Galway.

ed his call to the lure in the evening, when they were put up for the night, throughout which, however, they were occasionally at large. As food, they preferred rats to fish. When not very hungry, they, after tasting the blackbird (*Turdus merula*), showed a dislike to it, but that this did not arise from colour was further evident from black chickens being always as acceptable as others; gray crows (*Corvus cornix*) were also disliked, though magpies (*Corvus pica*) were favourite food.* On one occasion during rainy weather, they refused to eat for a few days, though at the same time they never retired to the shelter of their sheds, as buzzards (*Buteo vulgaris*), and peregrine falcons (*Falco peregrinus*), did which were kept along with them. One of these, a male, killed four pet birds, his constant companions in the same enclosure, † and which when he was tied. ‡ either alighted near him, or were carelessly fastened within his reach; these were a white owl (which he devoured), a kite, a buzzard, and a peregrine falcon. This last bird, the eagle had partly plucked preparatory to eating, just as my friend appeared in view, when he instantly sprang from the falcon, the consciousness of his misdeed being further evinced, by his allowing it to be carried off, though any food given in the ordinary manner he would not permit to be removed. After having one of these birds about two, and the other four and a half years, they were both lost by flying to a distance, where they were shot. The latter assumed the white tail early in October 1836, then four and a half years old: it proved a male bird on dissection, and weighed 11 lbs.

OSPREY—*Pandion haliaetus*, Savigny.—The only occasion upon which I have seen the osprey in Ireland was when sailing on the lower lake of Killarney, on the 13th of July 1834, during which a single bird appeared for a short time in view, displayed its mode of fishing, and struck at some prey on the surface of the water.

* The peregrine falcon also shows distaste and partiality to birds nearly allied; thus the blackbird is disliked, whilst thrushes (*Turdus musicus*) are favourite food, and, though it will kill and eat the landrail (*Crex pratensis*) when hungry, it is averse to it, and has in some instances been observed to eject it from the stomach.

† Lieutenant Reynolds, once in Achil saw a pair of old sea-eagles attack a young bird of their own species, which they killed and eat, leaving only the bill and legs.

‡ When the Golden Eagle, Sea Eagle, Peregrine Falcon, Kite, Buzzard, and Kestrel, all of which Mr Langtry had at the same time, were at liberty, they never molested each other.

In the collection of Dr J. D. Marshall of Belfast, there is a fine specimen of the osprey, which was stated by the person of whom he bought it, to have been killed in Queen's county.

This species is mentioned by Mr Lingwood, as having been seen by him in August 1835, at Oughterard, county Galway.—Mag. Nat. Hist. Vol. ix. p. 128.

JER FALCON—*Falco Islandicus*, Latham.—The following note appears under the head "Jer Falcon," in the MS. of the late John Templeton, Esq.—"In 1803, I received the skin of a bird of this species, which had been shot near Randalstown," (county, Antrim.) In a letter from John P. Stewart, Esq. dated Rockhill, Letterkenny, Feb. 3, 1837, it is mentioned that in his collection there is a jer falcon, which "was killed in a rabbit-warren close to Dunfanaghy, when on the wing." It is said to exhibit "the mature plumage of the male, (which sex it proved to be on dissection) as described by Temminck, the only point of difference being that my specimen has the bluish cere and tarsi of his young bird." The detailed description of the individual, kindly communicated to me by Mr Stewart, places the identity of its species beyond a doubt.

PEREGRINE FALCON—*Falco peregrinus*, Linnæus.—It may be stated in general terms, that the peregrine falcon occurs in suitable localities throughout Ireland. In the four maritime counties of Ulster it has many eyries,* and in Antrim, whose basaltic precipices are favourable for this purpose, seven at least might be enumerated—of these one only is inland; at the Gobbins, regularly frequented by a pair, there were two nests in one year within an extent of rock considerably less than a mile. This is the only instance known to me of so close an approximation on the part of the peregrine falcon. Even at "the Horn" in Donegal, where the extent of lofty precipices is very great and continuous, we met with but a pair of these birds, and were informed that they contain only one other eyrie.

On the two following occasions I had opportunities of remarking this falcon in haunts similar to those which, according to Wilson, it frequents in America. On the 8th of May 1832, as the banks of Belfast Bay,† at about a mile from the town on the northern shore,

* In rocks only have I known these in Ireland.

† Several species of the Raptores being mentioned as occurring in Belfast Bay, it should be stated that the tide recedes here to a very great distance, leaving a vast extent of banks uncovered, on many parts of which the grass-wrack (*Zostera marina*) grows so profusely as to impart a greenish tinge; the whole at low water presenting somewhat the appearance of a marsh.

were becoming bare from the ebbing of the tide, they were literally covered with dunlins (*Tringa variabilis*) and some ringed plovers (*Charadrius hiaticula*) intermixed, all busily feeding on the rejectamenta of the waves. This flock, consisting of many hundreds, to my surprise, suddenly, and without any apparent cause of alarm, took wing, but immediately afterwards I observed a peregrine falcon bearing down upon them. As they flew out to sea he followed them only a short way above the water, and returning without any prey, after a few bold and graceful sweeps, alighted on the beach they had left, when, with the aid of a pocket-telescope, I had the satisfaction of identifying his species with certainty. Again, on July the 13th 1833, when crossing the ferry near the junction of the river Bann with the ocean, I was attracted by the near call of a curlew, and on looking round, saw coming towards us what at first appeared to be two of these birds, flying close together just above the water. I was surprised to see the foremost dip in the river like a swallow, fly on a short way, and then alight in it, when the other bird, which proved to be a peregrine falcon, gave up the chase, and, flying past us, alighted on the beach at some distance. The curlew now finding it was safe, rose from the water, and flew back in the direction from which it had been pursued.

In the autumn and winter I have in Ireland met the peregrine falcon very far remote from any of its native rocks. In the south of Europe it is, according to Risso,* a bird of passage, appearing in the autumn and departing in the spring.

Some of our northern eyries have, for about the last twenty-five years, been in requisition annually to supply different sportsmen, but chiefly my friend, John Sinclair, Esq. with falcons for the chase.† Woodcocks have always afforded the best flights with these birds, and in this exciting sport I have often witnessed that singular trait in their character, of leaving their quarry the moment it takes to cover.‡ In this way I recollect what promised to be a good chase, being at once terminated by the woodcock's descent close to a public road, and as it could not be again sprung, another had to be sought for. When returning home, however, about six hours after-

* Tom. iii. p. 26. ed. 1826.

† Mr Sinclair tells me that, on going to obtain these hawks, he has frequently remarked the tercel or male bird circling at a great height in the air, from which he dropped his prey to the female as she kept flying about and screaming in the vicinity of the nest, to which she bore it.

‡ Mr Sinclair's best falcon the first year pursued woodcocks into dense cover, so that it was difficult to get her out with safety to her plumage. This his falcons or female birds generally did the first year, but very rarely afterwards.

wards, a woodcock was raised from the base of a hedge at the road-side, where the bird had been lost in the morning, and was doubtless the same individual, as, unless pursued, such a place of refuge would never have been chosen. Here this bird had in all probability remained during the day, though many persons must have passed on the footway within a yard of it, but until this time it may not have recovered from its fright.

On one occasion, a woodcock, caught by a trained falcon of Mr Sinclair's, was carried across a ravine, and a few minutes had elapsed before the falconer could come up with her, but even then, on disengaging the woodcock, it proved so little the worse as to afford a chase of average length to another falcon.* This is mentioned as an extraordinary instance, as is likewise the following. One of these hawks having caught a land-rail (*Crex pratensis*,) which it was about to eat on a house top, instantly gave chase to another rail that was sprung, and, still retaining its first victim, secured the second with its other foot, and bore both off together. †

In the winter of 1820-21, Mr Sinclair lost a trained falcon, and knew nothing of her for some months, nor until a paragraph appeared in a Scotch newspaper, stating that a hawk, which had for some time frequented a rookery near Aberdeen, was killed, and on the bells attached to her, the name of "John Sinclair, Belfast," was engraved. Another of this gentleman's falcons once left him, and took up her abode at a rookery about twelve miles distant from his place, and there remained for about six weeks, when she was again recaptured. When flown at rooks (*Corvus frugilegus*,) this bird always struck down several before alighting to prey on one. A person who was eye-witness to the fact assures me, that he once in Scotland saw a trained falcon similarly strike to the ground five partridges in succession out of a covey; but such occurrences are rare.

Mr Sinclair, when once exercising his dogs on the Belfast mountains, towards the end of July, preparatory to grouse-shooting, saw them point, and on coming up he startled a male peregrine falcon

* The strike of this species is more fatal than its clutch.

† Upon one of the early days of February last (1837,) when this gentleman was hawking at some miles distance from his place, one of his falcons was lost in consequence of a heavy fog coming on, but she re-appeared in the hawk-yard a week afterwards; others of them have similarly returned after a much longer absence. The first flight of a falcon given by Mr Sinclair to a gentleman resident about four miles off, returned to her old quarters, which she had been taken from six months before.

off a grouse (*Tetrao Scoticus*) just killed by him, and very near the same place he came upon the female bird, also on a grouse. Although my friend lifted both the dead birds, the hawks continued flying about, and on the remainder of the pack, which lay near, being sprung by the dogs, either three or four more grouse were struck down by them, and thus two and a half or three brace were obtained by means of these wild birds, being more than had ever been procured out of a pack of grouse by his trained falcons.*

In December 1832, one of these birds, which had her liberty at Mr Sinclair's country place, was observed to fly several times over a pond on which a wild golden eye (*Anas clangula*), in the beautiful plumage of the adult male, had just alighted, and was remarked to keep watch on him during the day. At dusk, when wild fowl betake themselves to their feeding haunts, this golden eye departed from the pond, and was perceived by the falcon, which instantly commenced pursuit, and after a short chase, seized and brought him back to the place he had just left, when, by struggling violently, he became disengaged from her grasp, and took refuge in a small and shallow pond. Here again he was persecuted by two persons who had witnessed the above occurrence, and though his wings had not been in the least degree injured, he did not again venture to take flight, but seeking escape only by diving, was eventually captured, thus affording evidence of the feathered being more dreaded than the human tyrant. † He was now pinioned, and compelled to take up his abode with the other wildfowl in the aquatic menagerie, a place he had, in the unlimited freedom of flight, happened to visit but a few hours before.

In October 1833, a female peregrine falcon of Mr Sinclair's, a bird of that year, and consequently but a few months old, got loose in the hawk yard, and killed a male of her own species a year or two older than herself, and which had the power of moving at least a yard from his block. She had him nearly eaten when a person entered the yard to feed them, which he did once daily at a regular hour. This female bird was "full fed" the day before, and had never got more than one meal in the day. Montagu relates a si-

* The same gentleman has frequently, when out shooting, obtained a single grouse, which had been thus killed by wild peregrine falcons, but never more, except in the above instance.

† Birds of all kinds, when put into cover, by peregrine falcons, generally allow themselves to be captured by the hand, rather than again venture on wing; even the black-cock (*Tetrao tetrix*) I have known to be thus taken.

milar occurrence in the Supplement to his "Ornithological Dictionary." About fifteen years ago, Captain Johnson of the 1st battalion of the Rifle Brigade, then stationed in the county Limerick, invited a large party, of which the fair sex as in the olden time formed a portion, to a day's hawking, but on going to the mew it was found that his peregrine falcon, having obtained her liberty, had killed and devoured a merlin (*Falco æsalon*) her partner in captivity. The misfortune on such an occasion was not only the loss of the merlin, but was twofold, as the feasting on it prevented the falcon's service in the chase for that day.*

HOBBY—*Falco subbuteo*, Linnæus.—This bird is mentioned in the MS. of the late Mr Templeton, as having twice occurred to him in summer, in the mountains of Wicklow and Londonderry. It appears in Mr Stewart's published catalogue of the birds of Donegal, as an occasional but very rare visitant; this gentleman, however, in a letter to me dated Feb. 3, 1837, expresses doubt about it. The specimen alluded to in his catalogue is not preserved. I have never been able to obtain sight of an Irish *Falco subbuteo*.

ORANGE-LEGGED HOBBY—*Falco rufipes*, Bechstein.—To the following record of this species, communicated to the Zoological Society of London, on June 9, 1835, when the subject of it was exhibited, I have nothing further to add.

"An immature specimen of this bird, shot in the county of Wicklow, in the summer of 1832, forms part of the collection of T. W. Warren, Esq. of Dublin."—Zool. Proc. 1835, p. 78.

MERLIN—*Falco æsalon*, Gmelin.—The merlin is indigenous both to the north and south of Ireland. For many years it has been known to me as breeding in the mountains of the county of Londonderry, whence I have in more than one summer seen nestlings, which were brought to William Sinclair, Esq. These he in due time trained to the pursuit of larks and snipes. The intelligent gamekeeper at Tollymore Park informs me, that these birds breed regularly in the mountains of Mourne, (Down,) where in the summer of 1836, he had four of their nests. At Claggan, (Antrim,) I have also been told by com-

* As Pennant in treating of the *Lanner* remarks, "this species breeds in Ireland," and Bewick repeats the words without acknowledgment, it is perhaps requisite to state, that the true *Falco lanarius*, Linn. has never to my knowledge occurred in this country. The bird called Lanner by Pennant is now considered to be the peregrine falcon at a certain age.

petent authority, that the merlin has bred for the last few years. For the same purpose it is stated, by Mr Robert Davis, Junior, of Clonmel (Tipperary) to resort to the mountains in that neighbourhood, and Mr R. Ball informs me, that young merlins have been brought to him at Youghal, (Cork.) It can hardly be doubted that it similarly frequents many other mountainous parts of the country. The nests are said, by all who have seen them, to be invariably placed on the ground among the heath.

At the approach of winter, both the adult and immature merlins descend to the low grounds, where they sometimes remain until spring is far advanced. The earliest date at which in such places they have occurred to me * about Belfast, was the 3d of October, and the latest, the 17th of April.

On March the 9th 1832, when walking on the shore of Belfast Bay, as the tide was flowing, a merlin, which flew past me, was observed for some time coursing above the uncovered banks, the edge of the waves being the limit to his flight. This at once led me to believe he was in search of prey, which was confirmed by his giving chase to a large flock of dunlins (*Tringa variabilis*,) in pursuit of which he disappeared. From the oldest of the "shore-shooters" in Belfast Bay, I have heard that frequently, but chiefly in the autumn, he has seen hawks, which from his description were considered to be the merlin, follow and kill dunlins on the banks at low-water: this the above circumstance, witnessed by myself, tends to corroborate. I am not aware that the merlins thus resorting to the sea shore have been before noticed: the weather was mild in such instances.

The stomachs of several merlins I have examined contained the remains of birds alone.

Mr William Sinclair has remarked to me, that when his merlins were given living prey, they instantaneously extinguished life, whether or not they at the time began feeding, whilst under similar circumstances, he has seen the peregrine falcon retain a bird in its grasp for some time, putting an end to its existence only when urged by hunger, though like the merlin, when it did commence, the most vital part was invariably the first "entered upon." His sparrow-hawks, it need hardly be added, began feeding indiscriminately on any part of the living objects offered them.

* On October 22d, I have seen it in the low grounds about Megarnie Castle, Perthshire.

The merlin is found in the south of Scotland during the whole winter.—E.D.

KESTREL—*Falco tinnunculus*, Linnæus.—This species is common and resident in Ireland, and is of more frequent occurrence in the north than any of the Falconidæ. It is met with about all our inland and marine cliffs, and builds within their fissures. Throughout the whole range of noble basaltic precipices in the north-east of Ireland, I have remarked its presence. In trees, church towers,* &c. it also builds with us. The kestrel has been so far trained by Mr William Sinclaire as, when given its liberty, to attend and soar above him like the peregrine falcon, and fly at small birds let off from the hand. One of these hawks, which was kept by this gentleman in the town of Belfast, had its freedom, and flew every evening to roost in an extensive plantation in the country, about a mile distant, in flying to and from which it was at first recognized by the sound of the bells attached to its legs. This bird returned regularly to its town domicile at an early hour in the morning.

Mr R. Langtry has often seen a wild kestrel rise from the enclosure in which his eagles, &c. are kept, but never having observed it to carry away any food, knows not whether this, or curiosity (which we often see displayed by birds,) may have been the object of its visit.

Often as I have seen the swallows follow in the train of birds of prey, I never but in the following instance saw one of them become the pursued. On September the 22d 1832, when walking with a friend in the garden at Wolfhill, near Belfast, a male kestrel, in close pursuit of a swallow (*Hirundo rustica*) appeared in sight over the hedge-row, and continuing the chase with extreme ferocity, lost not the least way by the swallow's turnings, but kept within about a foot of it all the time, at one moment passing within five or six yards of our heads. It is idle to conjecture how long the foray may have lasted before we witnessed it, but immediately on the kestrel's giving up the chase, the swallow, nothing daunted, became again, accompanied by many of its species, its pursuer and tormentor, and so continued until they all disappeared. The kestrel was probably forced to this chase by the particular annoyance of the swallows, they and the martins, (*Hirundo urbica*,) being more numerous this day at Wolfhill, than they had been at any time during the season.

(*To be continued.*)

* The only place of this kind in the vicinity of Belfast that I know to be selected for the purpose is the tower of Ballylesson church, which, of the many edifices of this description in our populous neighbourhood, is the only one which contains a set of musical bells.

IV.—*Cheloniorum Tabula Analytica.* Auctore CAROLO L. BONAPARTE, Muxiniani Princip.

QUI primus forte omnium ostenderam posse Testudines, *Testudinina* a me ipso appellatas, majori proprietate distingui, non intuitu articulationis amplius testarum, sed potius connexionis; intereaque nonnulla tunc mihi perspicua genera definivi, ac caetera omnino statuenda fore praefatus sum; nunc integrum Cheloniorum ordinem complecti quasi ex contractu debere, et quae descripseram confirmare, et quidquid recentiores Erpetologi de Testudinibus tradunt colligere judico. Nemo vero sanus opellam hanc meam alienis veluti flosculis simpliciter intertextam reprehendet; cum enim hic Reptilium stipes in Galliis non minus quam in Britannia ac Germania celebretur adeo, ut viri doctissimi Grayus, Bellus, Waglerus, Dumerilus cum Bibrono, et Fitzingerus praecipue sedulam illi operam navent; nefas mihi foret ab eorum sapientia desciscere, eorundem imo doctrinas non consectari. Idcirco diurna nocturnaue manu illorum scripta versando non pauca decerpsi characterum rudimenta ad genera melius singulatim decernenda omnia; quamobrem vocabula etiam nonnulla quae sapientes illi protulere de suo, non casu aliquo sed libens volensque de dedita opera arripui quoties uni eidemque rei significandae inservirent. Cui properando operi tabellam tantum de more analyticam sine ullo verborum apparatu ad usum literariarum ephemeridum maturavi.

Dabam Romae prid. Id. Majas MDCCCXXXVI.

CAROLUS L. BONAPARTE, Muxiniani Princeps.

CHELONII (Testudines, WAGL.) sunt *Reptilia* corpore inverso, testeo; cute fornici dorsali et sterno adstricta; tetrapoda, edentula.

CONSPECTUS FAMILIARUM ET SUBFAMILIARUM.

I. TESTUDINIDAE. (Testudinidae, Emydae, Chelydae, GRAY. Chersites, Elodites, DUM. Tylopoda, Steganopoda rostrata, Steganopoda mandibulata, FITZ.) Pedes ambulatorii, longitudine pares. Thorax scutis corneis tectus. Labia nulla.

1. TESTUDININA. (Testudinidae, BELL. Chersites, DUM. Tylopoda, FITZ.) Pedes digitigradi, clavati, digitis indistinctis. Os corneum. Collum retractile. Pelvis mobilis.

2. EMYDINA. (Emydae, GRAY. Elodites cryptodères, DUM. Steganopoda rostrata, part. FITZ.) Pedes plantigradi, digitis distinctis, plerumque palmatis. Os corneum. Collum retractile. Pelvis mobilis.

3. HYDRASPIDINA. (Chelydae, *part.* GRAY. Elodites pleurodères, *part.* DUM. Steganopoda rostrata, *part.* FITZ.) Pedes plantigradi, digitis distinctis, palmatis. Os corneum. Collum versatile. Pelvis immobilis.
4. CHELINA. (Chelydae, *part.* GRAY. Elodites pleurodères, *part.* DUM. Steganopoda mandibulata, FITZ.) Pedes plantigradi, digitis distinctis, palmatis. Os coriaceum. Collum versatile. Pelvis immobilis.
- II. TRIONYCIDAE. (Trionycidae, GRAY. Potamites, DUM. Steganopoda labiata, FITZ.) Pedes ambulatorii, longitudine pares. Thorax corio laevi indutus. Labia carnosa.
5. TRIONYCINA. (Trionycidae, GR. Potamites, DUM. Steganopoda labiata, FITZ.) Pedes plantigradi, digitis distinctis, palmatis. Os corneum. Collum versatile. Pelvis immobilis.
- III. CHELONIDAE. (Chelonidae, GRAY. Thalassites, DUM. Oiacopoda, FITZ.) Pedes natatorii, compressi, longitudine inaequales, digitis indistinctis. Labia nulla.
6. CHELONINA. (Chelonidae, BELL.) Thorax scutis corneis tectus.
7. SPHARGIDINA. (Sphargidae, BELL.) Thorax corio verrucoso indutus.

CONSPECTUS GENERUM ET SUBGENERUM.

FAMILIA I. TESTUDINIDAE.

SUBFAMILIA I. TESTUDININA.

1. TESTUDO, DUM. (*Chersine*, MERR.) Metathorax inarticulatus: sternum antice inarticulatum: pedes pentadactyli.
1. CHERSUS, WAGL. Sternum postice articulatum.
Testudo marginata, SCHOEPP. Eur. As. Afr. 2.
2. TESTUDO, WAGL. Sternum inarticulatum, scutis duodecim.
1. TESTUDO, FITZ. Scutellum nuchale: scutellum caudale bipartitum.
Testudo graeca, LINN. Eur. m. As. 3.
2. PSAMMOBATES, FITZ. Scutellum nuchale: scutellum caudale integrum. *Testudo polyphemus*, DAUD. Afr. Am. s. 4.
3. GEOCHELONE, FITZ. Sine scutello nuchali: testa margine laterali angulata. *Testudo stellata*, SCHWEIGG. As. Afr. Am. m. 6.
4. CHELONOIDIS, FITZ. Sine scutello nuchali: testa margine laterali rotundata. *Testudo tabulata*, WALB. Am. m. 3.
3. CHERSINA, GRAY, Sternum inarticulatum scutis undecim.

1. CYLINDRASPIS, FITZ. Sine scutello nuchali.
Testudo Vosmaeri, FITZ. Afr. m. 3.
2. CHERSINA, FITZ. Scutellum nuchale.
Testudo angulata, DUM. Afr. m. 1.
2. HOMOPUS, DUM. Metathorax inarticulatus : sternum inarticulatum : pedes tetradactyli.
Testudo areolata, THUMB. Afr. m. 2.
3. PYXIS, BELL. Metathorax inarticulatus : sternum antice inarticulatum.
Pyxis arachnoides, BELL. As. m. Oc. 1.
4. KINYXIS, BELL. (*Cinixys*, WAGL.) Metathorax postice articulatus.
1. CINTHORAX, FITZ. Scutella marginali cum nuchali viginti quatuor.
Kinixys Homeana, BELL. Am. m. 2.
2. CINIXYS, FITZ. Scutella marginalia sine nuchali viginti tria.
Testudo erosa, SCHWEIGG. Am. m. 1.

SUBFAMILIA 2. EMYDINA.

§ GULA SINE PAPILLIS.

5. CISTUDO, NOB. (*Terrapene* part. BELL. *Cistudes clausiles*, DUM. *Pyxidemis*, FITZ.) Sternum metathoraci ligamentis adnexum ope scutorum abdominalium : sine scutellis axillaribus et inguinalibus : testa gibba binis valvis sternalibus undique obserabilis.
Testudo clausa, LINN. Am. s. Oc. 3.
6. EMYD, NOB. (*Cistudes baillantes*, DUM.) Sternum metathoraci ligamentis adnexum ope scutorum pectoralium atque abdominalium : scutellis axillaribus et inguinalibus : testa depressa non obserabilis.
1. EMYD, WAGL. Sternum articulatum.
Testudo lutaria, LINN. Eur. As. Afr. 2.
2. CYCLEMYD, BELL. Sternum inarticulatum.
Cistudo Diardi, DUM. As. m. 1.
7. TERRAPENE, NOB. (*Emys*, DUM. *Clemmys*, WAGL.) Sternum metathoraci per symphysin affixum, inarticulatum ; scutis sterno-costalibus duobus discretis non interjectis : digiti palmati : ungues anteriorum pedum quinque, posteriorum quatuor : cauda gracilis.
1. CLEMMYS, FITZ. Nasus prominulus.
T. lutaria, SCHWEIGG. nec LINN. (*Sigriz*, MICH.) Eur. As. Am. Oc. 36.
2. RHINOCLEMMYS, FITZ. Nasus protractus.
T. verrucosa, WALB. Am. m. 2.
8. GEOEMYD, GRAY. (*Emys*, part. DUM. *Clemmys*, part. FITZ.) Sternum metathoraci per symphysin affixum, inarticulatum :

digiti fissi : ungues anteriorum pedum quinque, posteriorum quatuor : cauda gracilis.

Emys Spengleri, SCHWEIGG. Afr. 1.

9. TETRAONYX, LESS. Sternum metathoraci per symphysin affixum, inarticulatum : digiti palmati : ungues undique quatuor : cauda gracilis.

Tetraonyx longicollis, LESS. (*Emys Batagur*, HARDW.) As. or. 2.

10. PLATISTERNON, GRAY. Sternum metathoraci per symphysin affixum, inarticulatum, latissimum : scutis sterno-costalibus tribus : digiti palmati : ungues anteriorum pedum quinque, posteriorum quatuor : cauda grandis et longa.

Platysternon megacephalum, GRAY. As. or. 2.

§ § GULA CUM PAPILLIS.

11. CHELYDRA, SCHWEIGG. (*Chelonura*, FLEM. *Rapara*, GRAY. *Saurochelys*, LATR. *Emysaurus*, DUM.) Sternum metathoraci per synchondrosin affixum ope scutorum abdominalium, inarticulatum, angustum : scutis sterno-costalibus tribus, uno tantum interposito : scutella marginalia viginti quinque : scuta sterni duodecim : cauda grandis et longa, cristata.

T. serpentina, LINN. Am. s. 1.

12. STAUROTYPUS, WAGL. (*Sternotherus*, part. BELL.) Sternum metathoraci per symphysin ope scutorum pectoralium abdominaliumque affixum, angustum, antice articulatum : scutis sterno-costalibus duobus contiguis interpositis : scutella marginalia vigintitria : scuta sterni octo : cauda brevis.

Terrapene triporcata, WIEGM. Am. s. 1.

13. KINOSTERNUM, NOB. (*Cinosternum et Staurotypus*, part. DUM.) Sternum metathoraci per symphysin ope scuti abdominalis affixum, articulatum ; scutis sterno-costalibus duobus contiguis interpositis : scutella marginalia vigintitria : scuta sterni undecim : cauda brevissima.

1. STERNOTHERUS, FITZ. (*Staurotypus*, part. DUM.) Sternum angustum, antice articulatum.

Testudo odorata, DAUD. Am. s. 1.

2. CINOSTERNON, WAGL. Sternum latum, antice et postice articulatum.

Testudo pensylvanica, GM. Am. s. 5.

SUBFAMILIA 3. HYDRASPIDINA.

§. CAPUT DEPRESSIUSCULUM ; OCULI LATERALES.

14. PELTOCEPHALUS, DUM. (*Podocnemys*, FITZ. part.) Caput scutellatum, grande : mandibulae incurvae : sine scutello nuchali : pedes parum palmati : cauda unguiculata.

Emys tracaxa et macrocephala, SPIX. Am. m. 1.

15. **PODOCNEMYS**, WAGL. Caput scutellatum, superne sulcatum : sine scutello nuchali ; mandibulae rectiusculae : pedes late palmati : cauda mutica.

Emys expansa, SCHWEIGG. Am. m. 2.

16. **EMYDURA**, NOB. (*Platemys* part. DUM.) Caput corio tectum : scutellum nuchale.

Emys Macquaria, CUV. Oc. 1.

§§ CAPUT DEPRESSUM : OCULI SUPERI.

† GULA CUM PAPILLIS.

17. **PELOMEDUSA**, WAGL. (*Pentonyx*, DUM.) Ungues undique quinque : sternum inarticulatum.

Testudo galeata, SCHOEFF. Afr. 2.

18. **PELUSIOS**, WAGL. (*Sternotherus*, GRAY. DUM.) Ungues pedum anteriorum quinque, posteriorum quatuor : sternum articulatum.

Testudo subnigra, LACEP. Madag. 5.

19. **HYDRASPIS**, GRAY, (*Platemys*, DUM.) Ungues pedum anteriorum quinque, posteriorum quatuor : sternum inarticulatum.

1. **PLATEMYS**, WAGL. Caput scutellis tectum : nasus prominulus : pedes scutellis contiguus. *Testudo planiceps*, SCHN. Am. m. 6.

2. **RHINEMYS**, WAGL. Caput scutellis tectum : nasus productus : pedes scutellis contiguus. *Emys nasuta*, SCHWEIGG. Am. m. 4.

3. **PHRYNOPS**, WAGL. Caput corio tectum : nasus prominulus : pedes scutellis discretis. *Emys Geoffroana*, SCHWEIGG. Am. m. 2.

† † GULA SINE PAPILLIS.

20. **CHELODINA**, DUM. (*Hydraspis*, FITZ.) Ungues undique quatuor.

1. **CHELODINA**, BELL. Scutellum nuchale scutellis collaribus interpositum. *Testudo longicollis*, SHAW. Oc. 1.

2. **HYDROMEDUSA**, WAGL. Scutellum nuchale scuto vertebrali primo et scutellis collaribus interpositum.

Emys Maximiliani, MIKAN. Am. m. 2.

SUBFAMILIA 4. CHELINA.

21. **CHELYS**, DUM. (*Matamata*, MERR.)

Testudo fimbria, GM. Am. m. 1.

FAMILIA II. TRIONYCIDAE.

SUBFAMILIA 5. TRIONYCINA.

22. **AMYDA**, SCHWEIGG. (*Aspidonectes*, WAGL. *Trionyx*, GRAY. BELL. *Gymnopus*, DUM.) Testa margine cartilagineo : sternum angustum : pedes non retractiles.

† Ossa costalia postica contigua.

1. **ASPIDONECTES**, FITZ. Os cervicale vertebralibus conjunctum, in tota superficie rugosum. *Trionyx Aegyptiacus*, GEOFFR. As. Afr. 4.

2. PLATYPELTIS, FITZ. Os cervicale vertebralibus conjunctum, in medio tantum rugosum. *Testudo ferox*, GM. Am. s. 2.
3. PELODISCUS, FITZ. Os cervicale a vertebralibus separatum, in medio tantum rugosum. *Aspidonectes Sinensis*, WEIGM. As. or. 1.
 † † Ossa costalia postica interpositis vertebralibus discreta.
4. AMYDA, FITZ. Os cervicale a vertebralibus separatum, in medio tantum rugosum. *Trionyx subplanus*, GEOFFR. As. m. 2.
23. TRIONYX, WAGL. (*Emyda*, GRAY. BELL. *Cryptopus*, DUM.) Testa ossiculis marginalibus aucta: sternum latum, lateribus valvis munitum: pedes retractiles.
Testudo granosa, SCHOEPP. As. m. Afr. 2.

FAMILIA III. CHELONIDAE.

SUBFAMILIA 6. CHELONINA.

24. CHELONIA, BRONGN. (*Caretta*, MERR.) Sternum latum, scutis tredecim scutello intergulari, ope scutorum humeralium, pectoralium, abdominalium et femoralium metathoraci affixum: scuta disci tredecim.
1. CHELONIA, NOB. (*Chelonées franches*, DUM.) Scuta disci postposita: nasus prominulus: mandibulae denticulatae: gnathotheca tribus partibus constans. *Testudo mydas*, LINN. Atl. Pac. 3.
2. CARETTA, NOB. (*Chelonées imbriquées*, DUM.) Scuta disci imbricata: nasus productus: mandibulae integrae: gnathotheca individua.
Testudo imbricata, LINN. Atl. Pac. 1.
25. THALASSOCHELYS, FITZ. (*Chelonées Caouanes*, DUM.) Sternum angustum, scutis duodecim sine scutello intergulari, ope scutorum pectoralium, abdominalium et femoralium metathoraci affixum: scuta disci quindecim.
Testudo caretta, LINN. Med. Atl. Pac. 1.

SUBFAMILIA 7. SPHARGIDINA.

26. SPHARGIS, MERR. (*Coriudo*, FLEM. *Dermochelys*, BLAINV. *Scytina*, WAGL. *Dermatochelys*, FITZ.)
Testudo coriacea, LINN. Med. Atl. Pac. 1.

V.—*Miscellanea Zoologica*. By GEORGE JOHNSTON, M. D. Fellow of the Royal College of Surgeons of Edinburgh. Plates II. III.

III.—THE BRITISH ARICIADÆ.

THE Annelides, say MM. Audouin and Milne-Edwards,* which we group round the genus *Aricia* of Savigny, and of which we form the fifth family in the order ERRANTES, present very considerable dissimilarities in their external structure,—a circumstance

* Ann. des Sciences Nat. Vol. xxix. p. 388.

which ought not to surprise us, for whenever organs, because of their minor developement, become of slight importance in the economy of the animal, and are about to be obliterated more or less entirely from its anatomy, we find them to vary proportionably in their forms. Such is the case with the exterior appendages of the ARICIADÆ, a small family which intervenes to smooth the abruptness of the passage between the more typical AN. ERRANTES, and the Annelides of the orders TERRICOLÆ and TUBICOLÆ.

It is probably from this discrepancy among them that, up to this time, no naturalist has seized upon the characters which seem to us to unite them in one, but every one has scattered its members among different groups. Several of them have been considered as related to the Earth-worms, others to the Nereides, and a certain number have been collected together by M. de Blainville in his family "Nereiscoles." The end which that zoologist had in view in the establishment of that family is very nearly the same which has led us to unite in one distinct group the Annelides in question; and it is probable that if Blainville had personally observed a greater number of species, his opinions relative to the *composition of the family* would have been more in unison with ours than they happen to be.*

The ARICIADÆ have in general the elongated linear form of the Nereides and Euniciaidæ, but their body is not truncated in front as in these Annelides, rather diminishing, on the contrary, in thickness at the cephalic extremity. It is nearly cylindrical, and is composed of a very considerable number of narrow segments. The head is small,—often not to be distinguished from the superior lip, and it is not distinctly separated from the body. The antennæ are in general obsolete, but in some of the genera more than usually developed; while the eyes are either wanting or very minute. The proboscis is very short, and does not perceptibly exceed the cephalic segment: it is rather membranous than fleshy, and is never furnished with jaws, but sometimes we observe tentacula in it. The anterior rings of the body are narrow, and have always ambulatory feet, which, in general, are slightly prominent, and divided into two

* A great number of the *Nereiscoles* of M. de Blainville are only imperfectly known by the descriptions of Muller, Otho Fabricius, &c. and ought, in the opinion of Audouin and M. Edwards, to be referred to the *Euniciaidæ*; while in the works of these authors the Annelides, with a few exceptions, which constitute the present family, are not to be found, and could not take a place among the *Nereiscoles*, if regard were to be had to Blainville's character of it. Hence Audouin and M. Edwards have found a new designation necessary to prevent confusion.

branches, and in no instance replaced by tentacular cirri. The bristles with which they are garnished are too weak to be of much use as defensive organs. In most of the genera all the feet are similar on all the rings, but in some we find those of the anterior portion of the body to differ from the succeeding ones, and of which the ventral branch at least resembles those feet with crotchets which we meet with so constantly in the order Tubicolæ. The soft appendages are subject to much variety in the Ariciadæ. The cirri never fail at least on one of the branches of the foot, but commonly we do not find them on both; they have sometimes the form of fleshy filaments, more or less delicate, at other times they constitute flattened tonguelets. Branchiæ properly so called are in general defective; sometimes, however, they exist under the form of well-developed lobules fixed to the feet, and in other cases they consist in a certain number of tentacular filaments, similar to the cirri, and fixed upon the dorsal arch of some of the rings of the anterior part of the body,—a disposition of parts which evidently leads us to that more peculiarly characteristic of the *Annelides tubicolæ*.

The character of the family may be summed up as follows:

FEET slightly prominent in general and of little complexness of structure, sometimes alike throughout, sometimes dissimilar in different parts of the body, but never alternately furnished with, and destitute of certain soft appendages: *BRANCHIÆ* none or very simple: *HEAD* rudimentary: *ANTENNÆ* and *EYES* frequently wanting: *no JAWS*: *PROBOSCIS* very short and indistinct: *no TENTACULAR CIRRI*: In general a single *CIRRUS* to each foot, and when a second exists, this is rudimentary.*

Of the four genera which Audouin and Milne-Edwards include in this family, we have two native species of one only; but it is remarkable that our other species, which as yet are limited to the number of three, constitute two new genera in it very distinct from any hitherto characterized. The fact is an additional illustration of an axiom in natural history,—that all aberrant and osculant groups are not only comparatively few in species, but at the same time these species are so dissimilar among themselves that each, or every two or three of them, will be found to have characters which are properly generical.

It may be useful to give the characters of all the genera hitherto proposed, for as the British species are probably more numerous than has been ascertained, so it is not unprobable we may have a representative of each genus.

* Translated, but not always closely, from Audouin and M.-Edwards, ut sup. cit.

* *Feet of two kinds, dissimilar.*

- I. **ARICIA.** *Feet* raised upon the back, those of the anterior part of the body composed of two very dissimilar branches, the ventral branch having some analogy to the feet with crotchets,—the other feet with two branches nearly alike: *Head* conical: *Antennæ* none or rudimentary: *No oral Tentacula.*
- II. **LEUCODORE.** *Feet* papillary and setigerous, the first four pairs abranched, the fifth with crotchets; the following like the anterior, but with a cirrus reflected on the back, and becoming branchial: *Head* conical: *Antennæ* two, occipital, setaceous: *Proboscis* none.

** *Feet co-ordinate, and alike.*

- III. **NERINE.** *Head* small but distinct, furnished with two long occipital *antennæ*: no oral *tentacula*: *Feet* biramous, each branch consisting of a membranous lobe and a short setigerous pedicle: *Branchiæ* forming a series of short setaceous filaments along each side reflected on the back, with a small *cirrus* at their base.
- IV. **AONIA.** *Head* small but distinct, surmounted with a conical very short *antenna*: no oral *tentacula*: *Feet* divided into two branches each garnished with a lamellar lobe: a dorsal but no ventral *cirrus*: no *branchiæ*.
- V. **OPHELIA.** *Head* indistinct, terminated by two large tentacular horns, surmounting a circle of oral *tentacula*: *Feet* with two branches scarcely protruding, and without membranous lobes: no dorsal *cirrus*: a ventral *cirrus* upon the rings of the middle part of the body.
- VI. **CIRRATULUS.** *Head* conical indistinct, and destitute of all soft appendages: *Feet* scarcely projecting, with two branches widely separate: no ventral *cirrus*: the dorsal *cirri* filiform and very long: in general *branchiæ* exactly similar to the cirri and fixed upon the back of one of the rings of the anterior part of the body.

II.—LEUCODORE, * Johnston.

CHARACTER.—*Body* vermiform: *head* conical: *mouth* simple, *emandibulate*: *eyes* four: *antennæ* 2, occipital, large, long, and setaceous, ciliated: *four anterior segments with papillous setigerous feet,*

* Name from λευκος white, and δωρε a gift: The naturalist who has experienced the joys of finding a hitherto unseen animal, and to whom the pleasing duty has been reserved of publishing an additional illustration of the wisdom of his

the fifth with crotchets, the rest with papillous feet like the anterior segments, but furnished besides with a branchial cirrus reflected on the back: anal segment campanulate, the anus opening in its concave centre.

L. CILIATUS. Plate III. Fig. 1-6.

Hab. In crevices of slaty rocks near low-water mark. In Berwick Bay.

Description.—Worm from 6 to 8 lines long, linear-elongate, or slightly tapered to the tail, somewhat quadrangular, of a yellowish or flesh colour, with a dark red line down the middle. Head small, depressed, in the form of a short cylindrical proboscis, encircled with a raised hood or membrane; mouth edentulous; eyes 4, minute, placed in a square at the base of the antennæ, which are more than a fifth of the length of the body, tapered, wrinkled, and clothed along their inferior sides with short cilia. Segments numerous, narrow, distinct, the first four with an inferior papillary cirrus on each side, and a brush of retractile bristles; the fifth with a series of bristles curved like an italic *f*, obtuse, not capable apparently of being protruded like the others, and having rather a more ventral position; the following segments have on each side an obtuse branchial cirrus originating from the dorsal margin, as long as half the diameter of the body, held either erect, or reflected across the back to meet its fellow on the mesial line, beneath it a small mammillary foot, armed with five or six sharp slightly curved bristles of unequal lengths, under this a bundle of much smaller bristles (crotchets?) with a small conical cirrus with a still more ventral position. The branchial cirrus is clothed on its lower aspect with rather long moveable cilia; it becomes very small or entirely disappears on the posterior segments, in which the bristles on the contrary appear to be longer and more developed; bristles simple, unjointed; anal segment conformed into a circular cup or sucker, in the centre of which the anus opens by a small round aperture.

In this worm the cilia which cover the under sides of the branchial processes are remarkable for their size and length, for they can be seen with a common magnifier fanning the water with equal and rapid beats, and driving the current along their surface. Their analogy with the cilia of zoophytes is obvious, but here their motion

Creator, and of filling up a blank in our knowledge of His works, will at once divine the origin of this name so strangely applied to a worm.

“Nomen habes niveis nunc inscriptum ergo lapillis.”

The scholar may remember that the name was originally formed by some classical wit for Dr Whitgift, the famous Archbishop of Canterbury, temp. reg. Elizab.—See Walton's Lives by Zouch, p. 209. York, 1807.

is certainly dependant on the will of the animal, for I have repeatedly seen it begin and stop, and be again renewed after an interval of repose, and again be checked in a manner that could leave no doubt but that the play of the organs was entirely voluntary. The cilia of the antennæ, notwithstanding the larger size of the organs, are less than half the length of those of the branchiæ.

Leucodore ciliatus lives between the seams of slaty rocks near low-water mark, burrowing in the fine soft mud which lines the fissures. Its motions are slow. When placed in a saucer it keeps itself rolled up in an imperfectly circular manner, lying upon its side, and the painful efforts made to change its position, and with little or no success, shew too plainly that it is not organized to creep about like the Annelides errantes, but on the contrary that its proper habitat must be a furrow similar to those of the Tubicolous worms, to which, in structure, it evidently approximates in several particulars.

Plate III. Fig. 1. *Leucodore ciliatus* of the natural size. 2. The same magnified. 3. An antenna more highly magnified. 4. The bristles of the fifth segment. 5. A branchial process separated to shew the cilia. 6. A few of the oviform bodies which lie between the intestine and skin.

III. NERINE,* Johnston.

CHARACTER.—*Body vermiform, subquadrangular: head small, distinct: mouth sub-inferior, with a very short edentulous proboscis: eyes minute: antennæ two, occipital, large, long, tapered: branchiæ forming an uninterrupted series of short tapered ciliated filaments along each side reflected on the back, with a lobe at their base: feet all alike, well developed, biramous, each branch consisting of a compressed lobe and a short pedicle armed with simple bristles: anus stellated.*

OBSERVATIONS.—The body of the Nerines is elongated and vermiform, narrowed a little at the head, and tapered gradually towards the anal extremity. It is somewhat quadrangular, and is formed of numerous narrow segments. Each segment has on each side, affixed to its dorsal margin, a subulate branchial process, as long as the semidiameter of the animal, and of a fine red colour, which proceeds from two large blood-vessels running up within it. A cuticular fold or membrane invests the base of each branchial filament, and mounts along the side to an extent which varies with its position; for on the filaments of the anterior third of the body

Nerine, a patronymic of the daughters of Nereus.

the membrane rises to the very apex and is comparatively broad, but posterior to this the point of the filament is free, and still further back the membrane gradually shortens until it at length is no longer to be traced,—the branchiæ at the same time becoming gradually less, and ultimately obsolete on the caudal segments. (Pl. II. fig. 12, 5, 6, 13.) When in water the branchiæ are raised and extended, and in almost constant movement; but when the worm is removed from the water, they are laid across the back, their points meeting in the middle, and give the body the appearance of being marked with transverse folds or elevated striæ. They are fringed on both margins with a single series of vibratile cilia, discoverable with a magnifier of common powers, but these cilia are deficient on the apex, as well as on the lobe, while they extend over the dorsal arch of the segments. (Fig. 3.) The head is furnished with two large slightly tapering antennæ which originate from the occiput, and which are often cast off in the struggles of the animal: they consist of two large central vessels filled with red blood, and coated with a white mucous skin which, when magnified, appears roughish or crenulate, and one side has a row of minute cilia, not, however, to be seen except with a good glass. The antennæ can be directed to any point, and are capable of being rolled up in a spiral form. (Pl. II. Fig. 11.) There is a good deal of complexity in the structure of the feet, which renders their description and delineation difficult: they are lateral, and deeply divided into a dorsal and ventral branch, which is compressed, and armed with a series of retractile bristles of unequal lengths, and to each branch there is affixed a rounded plain compressed lobe, probably a modification of the cirrus of other annelides. The bristles are simple, curved, and acutely pointed, those of the dorsal branch longer than those of the ventral, and there is a small fascicle of longer ones at the root of the branchial filament. (Fig. 3.) The feet are apparently alike along each side until within a few segments of the tail, when the branchial filaments become very short or disappear, and the ventral branch seems to acquire a superior development, and to be armed also with longer bristles. (Fig. 4.) The anus is dorsal in its aspect, and is surrounded with eight short equal papillæ, which assume a star-like form when the aperture is dilated.

The Nerines inhabit the sea shore, and the margins of our river, a little below high-water mark. They prefer a soil composed of sand and mud, and in which the latter rather preponderates. They are found lurking under stones, or burrowing in the soil, and in the latter situations, the surface to a great extent is seen full of small

round perforations, and covered with little heaps of its tubular and spiral excrements. When disturbed, they descend in their furrows with great rapidity, and to a considerable depth; when taken they throw themselves into violent contortions, as they "were waxed mad," during which the body generally separates into several portions, or loses its antennæ, which always separate at their very base. Their several portions retain their vitality for at least some days, which they evince not merely by their contortions when pricked, but even by moving from one place to another. The animals are named "Rag worms" by our fishermen, and are used in this neighbourhood as bait to take the fry of the coal-fish.

This genus is evidently very different from any characterized by Audouin and Milne-Edwards. I have seen two species, of which the characters are:

1. *N. VULGARIS*, head obtuse and lunated in front. Pl. II. Fig. 1-8. *Spio vulgaris*, Johnston in Zool. Journ. iii. 335 and 487.

HAB. The shore between tide-marks. Very common in Berwick Bay.

Description.—This worm is from 3 to 4 inches in length, of a yellowish-brown colour, dusky in places from the contents of the intestine, and marked with red cross lines from the overlapping branchial filaments. The head is prolonged above the mouth into a sort of triangle, the base being outwards, and each angle prolonged into a short conical point somewhat contractile. There is a black spot on the vertex, and the bases of the tentacula are also stained with black, where the eyes, which are very small, are placed in pairs, but in several specimens I have not been able to detect these organs. The antennæ are rather more than half-an-inch long. The last ten segments appear to be defective in the branchiæ, and to have a more developed ventral foot and longer bristles than any of the others.—Plate II. Fig. 1, *N. vulgaris* of the natural size. 2. The anterior portion enlarged. 3. A view of a segment cut transversely. 4. The caudal extremity. 5. A branchial filament separately. 6. Another view of a branchia. 7. Bristles much magnified. 8. Oviform bodies.

2. *N. CONIOCEPHALA*, head conical. Pl. II. Fig. 9-13. *Spio viridis*, Johnston in Zool. Journ. iii. 486.

HAB. In sand near low-water mark. Berwick Bay, not uncommon.

Description.—Worm from 4 to 8 inches long, as thick when full grown as the little finger of a boy, flattened dorsally, rounded on

the ventral aspect, down the centre of which a blood-vessel runs from one extremity to the other, of a flesh-red colour anteriorly, but backwards the colour is usually a dull dirty green, with red lines and dusky blotches. Head conical, pointed like a snout, pale: proboscis very short with a lobed orifice: eyes 4, minute, placed at the base of the antennæ in pairs, but apparently often wanting: antennæ approximate at the base, from half to an inch in length. Segments narrow, numerous; the filaments of the anterior fringed to the point with a broad membrane, those of the middle free and rather long, but becoming very short on the posterior. Feet much like those of the preceding, but proportionally less developed. Anus stellate.

This species inhabits our shore at low water-mark, and is seldom found with the preceding, which loves a station higher up. It is rare that an entire specimen can be got, the animal breaking with ease into several portions, and throwing off its antennæ.—Plate II. Fig. 9. *N. coniocephala* of the natural size, the tail wanting. The specimen was one of unusual size. 10. The proboscis. 11. An antenna magnified. 12. One-half of a cross section of an anterior segment. 13. A similar view of a segment from near the middle.

The *SPIO CRENATICORNIS* of *Montagu*, *Lin. Trans.* xi. p. 199. Tab. 14. fig. 6, is nearly related to this genus; but a new examination of the worm is necessary to determine its true place in the system.

VI. CIRRATULUS,* Lamarck.

CHARACTER.—*Body vermiform, subcylindrical, the segments narrow and numerous; head small, conical, labriform, without any organ of sense; mouth inferior, naked, emandibulate; two or three first segments apodal and naked, all the others with small papillary setigerous feet forming a double series along each side, and many of them, especially the anterior, carrying dorsally long tubular tortuous filaments; anus dorsad, terminal, simple.*

1. *C. MEDUSA*, proper branchial filaments originating from the anterior margin of the 4th segment; the posterior filaments few and scattered. (Plate III. Fig. 7–12.)

Cirratulus Medusa, *Johnston* in *Mag. Nat. Hist.* vi. 124. fig. 13.—*C. fuscescens* et *C. flavescens*, *Johnston* in *Jameson's Edin. Phil. Journ.* xiii. 219.

* *Cirratulus*—formed from *cirratulus*, curled.

HAB. Under stones between tide-marks ; abundant in Berwick Bay.

DESCRIPTION. Body from 3 to 6 and sometimes even 9 inches long, tapered a little towards each extremity, rather less than a quill in calibre, the ventral surface flattened and furrowed down the centre, of a dirty brown or yellowish colour much stained from the internal viscera : head somewhat flattened, biannular, small, naked, marked on each side with a curved black line, the two segments posterior to it without filaments or feet : segments numerous, rather narrow ; from the anterior margin of the fourth, which becomes suddenly larger, arises on each side, but dorsad, a bundle of filaments shorter, generally more tortuous and of a paler colour than the others, which arise from the sides of the following rings down about one-fifth of the length of the animal, and a few remote filaments are dispersed irregularly on the rest of the body : there are two rows of slightly protuberant small papillary feet on each side, with a considerable interval between the rows, each papilla armed with from 3 to 6 bristles, the bristles of the superior longer, slenderer and more acutely pointed than those of the inferior, which are few in number, stout and curved near the apex : no spines : anus terminal, forming a plain aperture with a dorsad aspect.

C. Medusa lurks under stones, in a somewhat muddy soil, in which it forms burrows similar to those of the earth-worm, and into which it retires slowly when disturbed. The filaments by which it is so remarkably distinguished, and which curl around it like as many parasitical worms, are the branchiæ, or organs through the medium of which the blood is exposed to the influence of the air, and fitted for the purposes of life. They take their rise from above the dorsal feet, some from the back itself, are about 20 in number on each side, tortuous or extended, unequal in their lengths, the shortest being placed anteriorly, but the gradation is not regular ; and they are very easily removed by handling or by immersion in fresh-water. They consist of a large central vessel carrying red blood, surrounded by a white gelatinous transparent membrane, and are consequently of a fine red colour ; but this is liable to variation, for some, particularly the anterior bundles, are often quite white, and others, again, are occasionally spotted, as from a partial stagnation of the blood in them. When magnified they appear to be crenulated, but are not fringed with cilia. Messrs Audouin and Milne-Edwards propose to restrict the term *branchiæ* to the paler kind which are inserted in fascicles on the margin of one of the anterior segments, and they call the scattered filaments *cirri*, but surely

their function and structure being acknowledged to be identical, a name expressive of any difference in either respect is liable to objection. They also describe the feet as composed of two branches, but this is a mere anatomical fiction, for there is really no common base and no bifurcation, the upper and lower papillæ being separate and divided by a considerable interspace; and on the posterior segments these papillæ are so slightly protuberant as to be scarce perceptible. The bristles are of two kinds: from the superior papillæ there issue about six, three of them long and slender, and three shorter and comparatively stout,—all of them simple, unjointed, and acute. The bristles of the inferior papillæ vary from three to one only in the caudal segments, and they are all stout and curved like the italic letter *f*.

Plate III. Fig. 7. *Cirratulus medusa* of the natural size. 8. Head and anterior segments much magnified. 9. A view of the mouth. 10. Transverse section of a segment from the posterior part of the body. 11. A side view of two segments from near the middle, shewing the spines greatly magnified. 12. The tail.

In the Linnæan Transactions, Vol. ix. p. 110, Montagu has described, under the name of *TEREBELLA TENTACULATA*, a second species of this genus; and to make our essay as complete as our materials will allow, his description is here given in his own words.

“ Body long and slender, composed of more than two hundred annulations, each furnished with two fasciculi of very minute bristles: no eyes: branchiæ obscure: from the sides issue very long, red, capillary appendages, most numerous near the anterior end, but the point or snout is destitute of them, and becomes more acuminate, the mouth is placed beneath: the posterior end is also obtusely pointed.

“ Length, eight or nine inches.

“ The colour of the upper part is olive-green, the under part dull orange.

“ The lateral filiform appendages are continually in motion, appearing like slender red worms contorting in all directions round the animal; after death these usually curl up, when they first become orange, and in a little time wholly lose their colour.

“ This curious species of vermes was taken from a piece of timber that had been perforated by *Pholades*, and was destitute of any natural covering.

“ It may be doubted whether the animal in question be nearest allied to the *Terebella* or *Nereis*, or even whether it strictly belong to either.”



REVIEWS AND CRITICAL ANALYSIS.

I.—*Icones Plantarum, or Figures with brief descriptive characters and remarks of New or Rare Plants, selected from the Author's Herbarium.* By SIR W. J. HOOKER, K. H. LL. D. &c. Parts I. and II. 1837.

THIS is a valuable publication; economical, and yet rich in the number and variety of its illustrations; and we sincerely hope it may receive such a portion of encouragement, as shall constitute it the first of a long series of works got up in a similar style. This "*Icones Plantarum*" is *par excellence* a useful work. The plates are executed in lithography, and although in point of beauty they cannot be compared with similar productions by our continental neighbours, they are evidently faithful and characteristic,—requisites of far higher importance to the real naturalist than artistic elegance of engraving. In regard to subjects, the author has wisely allowed himself the widest range; and we have in the two parts before us, Fungi, Mosses, and Ferns, besides the numerous phænogamous plants selected on account of their rarity, singularity or beauty.

Of the letter-press, it is needless to say—coming as it does from the pen of Sir W. J. Hooker—that it is accurate and scientific. Professing, however, to be brief, it is in our opinion too much so: brief, we think, rather to the disadvantage of the work. For example, of about sixty new species, (excluding mosses,) considerably more than one-half are unaccompanied by any observation upon specific affinity; a subject, in these days, of the greatest importance. There is another circumstance also, in connection with the letter-press, which we think it right to notice, and that is, the absence of all characters and descriptions whatever of the fifty-five species of mosses figured on plates xviii–xxiv. It is true, that the reader is informed in a note, that descriptions of these mosses will be found in the Companion to the Botanical Magazine. But there is nothing in the title-page of the "*Icones*" which can lead the purchaser to expect occasionally, figures without descriptions. In the present instance, the possessor

of the "Icones" must be content to go without descriptive letter-press to fifty-five species, or buy another and distinct work; to say nothing of the inconvenience of such an arrangement.

Sir W. J. Hooker has presented us with figures of such a host of interesting plants, that it is not possible to enter upon any detailed observations. There is a new genus of Cruciferæ established at t. xliii. the characters of which we transcribe.

TROPIDOCARPUM.

Sepala oblonga, concava, basi æqualia. *Petala* obovato-subspatulata. *Filamenta* nuda: *Antheræ* subrotundæ. *Germen* oblongum, in stylum attenuatum. *Stigma* obtusum. *Siliqua* lateraliter compressa, sessilis, polysperma, valvis acute carinatis. *Dissepimentum* nullum!—Herbæ parvæ, annuæ. Folia pinnatifida. Racemi foliosi. Flores parvi, albi. Silquæ erectæ, nunc breves, subsiliculosæ.

A second species of this genus is figured at t. lii. Both were collected in California by the late Mr Douglas.

Were we to fix on any *one* plant figured in the hundred plates before us, as pre-eminently interesting, we should select *Dendromecon rigidum*, Lindl. (t. xxxvii) a papaveraceous shrub! discovered by the same lamented botanist in California. Let persons who desire to encourage botanical science purchase this work. Its merit is not to be measured by its extraordinary cheapness.

II.—*Dr Lardner's Cabinet Cyclopædia. Natural History. Natural History and Classification of Birds.* By W. SWAINSON, Esq. Vol. i. 12mo. London, Longman & Co. 1837.

To complete our review of the series of volumes which have appeared in Dr Lardner's valuable Cyclopædia devoted to Natural History, we now proceed to notice the third, "The Natural History and Classification of Birds," forming the first of the second department of the Vertebrata, one in which the author has already distinguished himself, and which he has materially advanced by his numerous and valuable publications.

After noticing the station occupied by birds among the Vertebrata, viz. between the Mammalia and Reptilia, to the latter of which he conceives its union is effected by the fossil genus *Pterodactylus*, rather than to the affinity supposed to exist between the Penguins and Tortoises, he refers to the primary types, as designated in ornithology, and which take their titles from the five orders of the class, viz. the *Raptorial*, the *Inses-*

sorial, the *Rasorial* or scansorial, the *Grallatorial* or tenuirostral, and the *Natatorial* or aquatic. The pre-eminent type is the *Insessorial*, as it corresponds with the order *Insessores*, the most highly organized of the class. The *Raptorial* or subtypical is represented in its highest development by the *Raptores*, and corresponds to the *Feline* group among quadrupeds. Of the aberrant types, the *Natatorial* or aquatic is distinguished by the shortness and limited power of the feet, the broad obtuse form of the bill, and the head being always large in proportion to that of the other types. The *Grallatorial* or tenuirostral type is shown in birds, as in quadrupeds, by the length and slender shape of the bill or jaws: the opening of the nostrils is also long and slit-like, and it is further distinguished by great swiftness, either of wing or foot. The *Rasorial* type is inferior only to the *Natatorial* in bulk. "Birds," he adds, "belonging to it have the tail greatly developed, or of peculiar structure; the great size of the foot in all its proportions is another characteristic, and the groups which represent this type in some mode or other evince their attachment to man." A short review is then taken of the five orders and their peculiar characters, with a glance at the analogies they present with Quadrupeds. The three following chapters are entirely devoted to a useful and interesting exposition of the external anatomy of the class, as it is from the outward organization that he takes the characters of his groups, illustrated with a profusion of beautiful wood-cuts, which point out the various peculiarities of structure or form, in the different parts of the body, and render easily intelligible to the student what otherwise is frequently found difficult to explain, or convey a correct idea of, by language alone. After enumerating the terms by which the various external parts of the body are called, and which are easily understood by a reference to the figure, he commences with the peculiarities of the head as seen in the shape of horns, wattles, or crests, of each of which he cites various instances and examples. The peculiarities of the eyes and ears are then adverted to, followed by some interesting observations upon the tongue, which varies in form and structure according to the nature and quality of the food upon which the individuals subsist. Among those which have it of very small size, we are surprised he should have omitted the cormorants, in which genus it is very diminutive or rudimentary, and here also it is indicative of a peculiar habit, as these birds, like the nightjars and swallows, gulp or swallow their food entire. The form and position of the nostrils next claim attention, and the remainder of the chapter is occupied with the various aspects of the bills or jaws

of birds, each modification or peculiarity being illustrated by a characteristic wood-engraving. The various modifications of form, exhibited in the wings and tail, the great organs of aerial motion, occupy the greater portion of the next chapter. The principal varieties of the form of the wings are considered under the heads of *acuminated*, as in the Swallows, Terns, &c. ; *Falcate*, a form possessed by some of the Humming-Birds ; *Pointed*, as in the Crows, Flycatchers, &c. ; *Rounded*, as in the common Wren, and also in most of the Rasorial order ; *Ample*, as in the Heron, and in the genera *Rupicola*, *Promerops*, &c. The last are the *Abortive* or *Abbreviated* wings, as in the Cassowary, *Apteryx*, *Penguin*, &c. In the tail, the other great organ used in flight, the modifications are even more numerous than those of the wings ; he enumerates and describes no less than fourteen, under the titles of *Even*, *Rounded*, *Fan-shaped*, *Graduated*, *Cuneated*, *Arcuated*, *Spathulate*, *Slender*, *Forked*, *Lyre-shaped*, *Boat-shaped*, *Compressed*, *Plumed*, and *Scansorial*, all of which are minutely described, and contrasted with each other in a manner which cannot fail to be understood, on consulting the figures which accompany the text. The various modifications of those essential organs the feet are next considered, and to this part of the work we would direct the especial attention of the student, as it is in a great measure from the leading variations in their structure that the primary characters of the orders are derived, and besides natural groups are generally indicated by the subordinate modifications they undergo.

In the raptorial foot he points out some peculiarities in the relative position of the toes, which appear to have been overlooked, but which mark a striking distinction between the foot of birds belonging to this order, and that of the typical *Insessores*. Of the feet of this latter order he gives a detailed description, and shows how beautifully each change is in accordance with the economy of its members. We particularly direct attention to the gradations of the scansorial form of foot, which he has traced with a precision and minuteness that shows an intimate and thorough acquaintance with the subject. The remainder of this portion of the volume is taken up with observations on the voice and nests of birds. In regard to the voice, though agreeing with the author in many of his remarks, we think that the song of birds, or its equivalent, is more connected with the feeling of love or the reproduction of the species than he seems willing to allow. We believe it, in the first instance, to be given to the male for the especial purpose of attracting the females ; at the same time we do not deny its exercise, in such birds as possess it

in an eminent degree, as a solace to their mates during the tedious course of incubation. All male birds, we believe, in addition to what may be called their *ordinary* or *constant* notes, which may be supposed analogous to speech, and which seem to direct and regulate their general or ordinary movements, possess other intonations and powers of voice, apparently given for special purposes, and which are only called into action during a certain period of the year. In the majority of the feathered race, these additional or temporary powers of voice are limited in extent, and frequently confined to one or two notes, and it is only in a few groups of the Insectores that we find them developed in an extraordinary degree, or worthy the name of song. But whatever be the extent of this power, whether confined to a few monotonous notes, as in the Buntings, the Titmice, and various others, or embracing the varied intonations, as well as the sweetness and melody of the Nightingale, Mavis, &c. ; in all the species it answers a similar end, and the utterance is attended with a like effect, viz. the attraction of the opposite sex, in order to insure the reproduction of the species. During the late autumnal and early winter months, or from August to the beginning of January, in most birds it is entirely lost, or if attempted by song birds, is always imperfect in cadence and extent, and it is only fully regained when the turn of the year again invigorates their frame, and produces those remarkable changes in the constitution which every practical ornithologist cannot fail to have observed. In most if not all cases it is only regained by degrees. This is the case with all our native birds, and we have known weeks to elapse before a Chaffinch has been able to compass his short but sprightly lay. Of nidification our author seems to have little practical knowledge, and his observations are mostly drawn from the writings and descriptions of other authors. All the owls do not, as he says, "select a hole wherein to deposit their eggs, whether it be in a tree, or in a building, or upon the ground," for the long-eared owl, *Otus vulgaris*, almost invariably selects the deserted nest of the carrion crow, and the short-eared owl, *Otus brachyotos*, deposits her eggs upon the surface of the ground in wild moorland wastes. In speaking of pensile nests, he mentions that of the Bearded Titmouse, *Par. biarmicus*, as likely to exhibit a modification or approach to this form ; but adds, "that no British author has yet described it." Had he turned to the last edition of Selby's Illustrations of British Ornithology, he would have found a note in which the site and structure of the nest is described ; and which prove that it belongs to the ordinary form.

With the contents of the next chapter, which treats of Ornitholo-

gical Bibliography, we are not altogether satisfied. The lists of works he has given are certainly not so complete or so extensive as they ought to have been, although he professes to enumerate such only as are essential to the student, or eminently beautiful for their execution; nor do we think his estimate of their peculiar merits are always correct or altogether impartial. We do not object to Mr Swainson's introducing so many of his own works under their respective heads, to which he conceives they belong, but we do think that those of a similar character and import by other authors should have met with the same liberal treatment. Why has he not, under the head "Partial systematic works," where both series of his own Zoological Illustrations have been placed, also inserted another work as extensive, and, we believe, as useful to the ornithologist as his own. We mean the quarto work of Sir William Jardine and Mr Selby. Several continental works of eminence are also altogether omitted, or else merely glanced at. We perceive no mention of the names of Bechstein, Faber, Nilson, and various others, and though Kuhl's *Conspectus Psittacorum* is mentioned in laudatory terms, the able monograph of Wagler of the same family, published subsequently to that of Kuhl's, is passed over without notice.

From ornithological bibliography he passes to the consideration of those rules instituted by the most eminent naturalists of an earlier date, and which have since received the sanction of their followers, and been admitted as laws or aphorisms not to be violated, in the construction of generic, subgeneric, and specific names. Upon each of those he makes some pertinent observations, and we trust that what he has said on that law which announces that "the highest reward of a naturalist is to have a genus called after his name," will meet with the consideration it deserves, and tend to put a stop to a practice which of late years has rapidly been gaining ground to the detriment of science, viz., that of complimenting individuals, many of them altogether unknown in the records of ornithological science, by imposing their names upon newly discovered species, a practice which deprives the true naturalist of what has been proclaimed his highest reward, and brings into disrepute and contempt what was once esteemed a scientific honour. We also agree with Mr Swainson in the sentiments he has expressed in regard to vernacular nomenclature, a subject that of late has undergone considerable discussion, and though we have carefully perused the arguments of those who advocate what they consider a reformation in the system, we cannot perceive that the change they contemplate would be attended with the smallest possible advantage. To the

scientific naturalist it can be none, and it is not likely to be adopted by those for whom it is alone intended, viz. the unscientific, or great mass of our population. No further proof, we think, is wanted of the inutility and difficulty of substituting more appropriate vernacular names, for those now in general use, than in the lists we have already seen published, where similar objections may be urged against the new coined names as have been preferred against the old.

The next chapter, which concludes the introductory part of the work, treats of collecting, preserving, and arranging birds. Each of these heads, he discusses at considerable length; and we recommend the attentive perusal of the chapter to all who think either of collecting for themselves, or for the benefit of public institutions. Under the first head he shows not only what foreign birds are best worth collecting, (the most common,) but points out those countries whose ornithology has hitherto been least investigated, directing also the attention to certain groups, the knowledge of whose habits and economy would be of great importance to the science.

The Taxidermic directions are full and easily understood, but are restricted to what is now termed leaving the specimens in *their skins*, in contradistinction to those that are mounted or set up in the attitudes of life. This is a mode now generally adopted by scientific ornithologists who possess collections of their own, not only for the convenience of stowage and room, but for the facility it affords for comparative examinations, which can only be satisfactorily done by handling and close inspection.

We now come to the systematic part of the volume, commencing with the Raptorial order or Birds of Prey. Of this order he considers there are only three families now in existence, viz. the *Vulturidæ*, *Falconidæ*, and *Strigidæ*; for the genus *Gypogera*, which Mr Vigors thought might probably represent one of the primary divisions of the order, our author thinks more likely, from its structure and apparent affinities, to belong to the *Vulturidæ*, probably constituting its grallatorial type. The typical and subtypical genera of the *Vulturidæ* are represented, the first, by the true vultures, of which *V. fulvus* may be considered a type, the other by the American species or genus *Cathartes*. The principal distinction between these two groups consists in the opposite form of the nostrils, which in the genus vulture are placed transversely across the bill, whereas in *Cathartes* they are linear in form, and placed parallel with the margin of the bill. The caruncles and wattles observed in certain species of *Cathartes* he only considers in the light of secondary cha-

acters. The rasorial type of the family he considers to be that remarkable Australian bird, first described and called by Latham the New Holland vulture, but which some later writers have noticed as more closely allied to the rasorial order. This, in fact, is the opinion we arrived at after examining two perfect specimens of this bird, in which the bill appeared to have more of the rasorial than the raptorial form, and we recollect that the nostrils were partly covered with a protecting scale. The tail, which he acknowledges possesses more feathers than the true vultures, also exhibited that duplex or folded form possessed by many Gallinaceous birds, and the feet and legs were certainly as much akin to those of the Cracidæ and other Rasores, as to those of the rapacious order.* Much, no doubt, as to its real station in the ornithological circle, will depend upon its peculiar habits and economy, of which we are at present ignorant, but we think it is as likely to prove a Raptorial form of the Rasorial order, as the Rasorial type of the Raptores. The fissirostral type of the family is distinctly marked in the bearded vulture of the Alps, forming the genus *Gypæætus*, and which in its form and habits marks the direct passage to the eagles in the family of the *Falconidæ*. This division, he observes, exhibits the perfection of the order; its members are distinguished by a much shorter and sharper bill more or less toothed, and by very acute and strongly curved talons; they are lighter and more graceful in form, and more courageous than the vultures; they prey, also, almost exclusively upon living animals, and the geographic range of the family is almost universal. The primary divisions of the *Falconidæ* he considers typified by the following genera—*Falco*, *Accipiter*, *Buteo*, *Cymindis*, and *Aquila*, the two first constituting the typical and subtypical divisions, the remaining three, the aberrant. The analogies of the family with the tribes of the *Insessores* stand thus :

<i>Falco</i> ,	-	-	Conirostres,
<i>Accipiter</i> ,	-	-	Dentirostres,
<i>Buteo</i> ,	-	-	Fissirostres,
<i>Cymindis</i> ,	-	-	Tenuirostres,
<i>Aquila</i> ,	-	-	Rasores.

These analogies and relations he proceeds to trace with great skill, and we regret that our limits will not permit us to follow them in detail. He then enters into the examination of the five leading generic groups, commencing with the genus *Falco*, as the most typical of the whole family. The subgenus *Falco*, the first noticed,

* For a figure and description of this bird, see Vol. II. plate 66, Illustrations of Ornithology, by Sir William Jardine, Mr Selby, &c.

contains the true Falcons, distinguished by a single tooth on the upper mandible, with an incipient festoon or sinuation behind it; next to it he places the subgenus *Harpagus*, (the *Bidens* of Spix), with two small teeth in the upper mandible, the wings more rounded, and the scutellation of the tarsi different from that of *Falco*. The passage between *Harpagus* and *Falco* is effected by the *F. cærulescens* of Linnæus. The third group is marked by *F. lophotes* of Temminck, evidently an aberrant form, and probably the rasorial type. The fourth is his subgenus *Aviceda*, a bird with which we are not acquainted; and the fifth he thinks may probably prove to be the *Gampsonyx Swainsonii* of Vigors, which in some respects seems to unite the characters of *Buteo* and *Falco*. The circle of the genus, or division *Accipiter*, he commences with *Ictinia*, Vieill. as a form connecting *Lophotes* with the accipitrine falcons: this is followed by the typical subgenus *Accipiter*, well characterized by the sparrowhawk. The third is that of *Astur*, or goshawk group, and as a fourth form belonging to it, he proposes the Pondicherry eagle, (*Aquila Pondicerianus*, auct.) a bird which, in our estimation, has a nearer affinity to the aquiline group. The fifth form has not yet been recognized.

The genus *Aquila*, the first of the aberrant groups of the *Falconidæ*, contains four types, represented by *Pandion*, *Harpypia*, *Aquila*, and *Ibycter*, the second and third being the typical and subtypical groups, while *Pandion* represents the aquatic or fissirostral type, and *Ibycter* the rasorial: the fifth, or tenuirostral form, he thinks, may possibly be represented by *Asturina*, Vieill.

The Milvine or kite division, represented by the genus *Cymindis*, he enters by means of *Polyborus*, an American group nearly related to *Ibycter*; this is followed by the genus *Cymindis*, the pre-eminent type, all the members of which belong to South America. Next to it he thinks it likely that the genus *Elanus* will take its place, and this view we are inclined to adopt, looking at specimens of species now before us. The bill we perceive is as much hooked, and similar in form to that of *Cymindis*. The characters of the feet are peculiar, the interior toe being longer than the exterior, and the hinder toe shorter than either: the claws are sharp and strong, and all of them rounded beneath, as in *Pandion*; the under one in addition has a sharp projecting edge on its inner side. The wings are long, the feathers broad, with the first quill emarginate near the tip. The tail is nearly even, or very slightly forked. This form is immediately followed by Vigors's genus, *Nauclerus*, represented by the fork-tail kite of America, which, from its swallow like form and

powers of flight, evidently forms the fissirostral type of the Milvine circle, thus bringing it into immediate contact with the common kite of Europe, which we think he very properly excludes from this division, and places among the buzzards as its fissirostral form. The fifth form of *Cymindis* he thinks it is not improbable may be Vieillot's genus *Circæus*, but we know too little of this group to give an opinion as to the correctness of the supposition. The last division is that of the Buzzards, which, by some of its members, leads back again to the typical Falcons. This group, as he observes, might with more propriety have been called *Harriers*, as it is the genus *Circus* which exhibits the fissirostral type of the whole family in the greatest perfection. The subtypical form he considers to be represented by *Buteo lagopus*, in which subgenus he also leaves the common buzzard and other similar forms. In regard to the genus *Pernis* (honey-buzzard), had the author enjoyed the opportunity of examining the specimens now before us, he would, we think, have found little hesitation in pronouncing it to be the tenuirostral type of the division, as it exhibits the characters of a weak and slender bill, with feet and claws less raptorial in structure than any of its congeners. The common kite, *Milvus vulgaris*, Temm. as we have previously observed, is considered the fissirostral form of the division. The fifth or rasorial type is not indicated by Mr Swainson; may it not be represented by the *Falco cristatellus*, Temm. the *Spizæus cristatellus* of Jardine and Selby?

From the Falconidæ, he proceeds to trace the natural series of the Strigidæ or owls, confining his exposition to the primary divisions and genera only. The passage from the Falconidæ is well marked in the genus *Circus*, where we perceive the first indications of that peculiar ruff of tiled feathers, which surrounds the head, and is seen in its highest development in the Striginæ or typical owls. The formation of the ear, the eye, and facial disk, being the peculiar distinctions of this family, he naturally forms his primary groups upon the greater or less development of these organs. The first, or typical group is therefore, that in which the facial disk is very large and perfect, with large ears, and in general an ample operculum. The second or subtypical, with a large facial disk, but small or moderate sized ears, the head furnished with egrets. The third or aberrant group with the circle of the ear small and destitute of an operculum, the facial disk imperfect or obsolete, and the head without egrets. This group is as usual divisible into three, each of which possesses its distinguishing characters. The first group is typically represented by the common white or barn owl of this

country, (*St. flammea*) ; in it he also places, and we think very properly, our long and short-eared owls (*Otus vulgaris*, and *Ot. brachyotos*), considering them rasorial types. A third form is that of *Strix Tengmalmi* : to this group he gives the name of *Scotophilus*. A fourth is represented by the huge *Strix cinerea* of the northern zoology, for which he proposes the generic or subgeneric name of *Scotiaptex*. The fifth, which ought to represent the raptorial type, is not indicated: why should not the *St. stridula* or some of its nearly allied congeners supply the deficiency ?

The 2d division, or as he terms it genus, *Asio*, contains, 1st, the true horned-owls, of which the great European horned-owl, and the Virginian species may be considered representations. A second form is that of *Bubo arcticus* of the northern zoology, now made *Heliaptex arcticus*, and a third he thinks is represented by the Scops Owls. As the only type of the first aberrant group, stands the great white owl or genus *Nyctea*, distinguished by its very small ears, and without any ruff or series of stiff feathers encircling the head, the eyebrows also perfect like those of the falcons, and its habits are diurnal. His genus *Nyctipetes*, formed of the small South American owls, which possess no marginal ruff, with small ears destitute of an operculum, and which are perfectly separated from the small European owls, or his genus *Scotophilus*, form a fourth group ; and the fifth is composed of the hawk-owls or genus *Surnia* of Dumeril, possessing a small head, without a facial disk, a long cuneated tail, and diurnal habits. Such is his outline of the primary groups of this hitherto confused, and, we may add, neglected family of the order, and so far as we can judge from the forms we have been able to consult, they appear founded on the true affinities of the species. It will be seen that he has rejected some of the modern genera, as *Noctua*, *Ulula*, &c. at the same time he has found it necessary to institute others, such as *Scotiaptex*, *Scotophilus*, *Heliaptex*, and *Nyctipetes*. Much, however, remains to be done to fill up the details of the various groups, which can only be effected by a strict analysis of the species, a matter not easily accomplished, as there are few collections which contain a sufficient number of forms belonging to this family, wherewith to institute the necessary comparison and examination.

The concluding chapter enters upon the consideration of the Insectorial order ; but as the exposition only extends to one of its primary divisions, viz. the Dentirostral tribe, we shall merely observe, that he traces the whole of its analogies with the other tribes and families of the order, in a manner that intimates a thorough acquain-

tance, and a deep analytical investigation of the subject. Any further observations we must postpone till after the publication of another volume, in which the subject is pursued; having already extended our analysis to a length we fear both tedious and tiresome, and only to be justified or excused by the importance of the work.

III.—*An Analysis of the British Ferns and their Allies. With Copper-plate engravings of every Species and Variety.* By GEORGE W. FRANCIS. Lond. 1837. 8vo.

A WORK we can honestly and heartily recommend,—which ought to be in the hands of every student of the British Ferns, if he desires to have a safe and interesting guide in the investigation of this peculiarly attractive family, and if he is anxious to encourage the labours of an enthusiastic fellow-botanist.

In the “Introduction” the author enters with some detail into the characters, structure, reproduction, geographical distribution, and virtues of the families in which British species occur,—following which there is a synopsis of the genera. The species are then described one by one. Here we have a very copious list of Habitats, a selected number of Synonyms derived from personal study of the respective authors, and a good description, embracing a regular specification of all the variations and varieties, evidently deduced from an extensive comparison of specimens from many and distant localities. There is, however, a singular variety of *Aspidium Filix-mas* which does not seem to have come under Mr Francis’ notice,—where the frond, not above a span in height, is simply pinnate with undivided oblong crenated leaves. It is something like *Grammitis ceterach*; and that the peculiarities are not dependent on immaturity is obvious from the fact that the plant is loaded with fruit. We are assured that this variety is frequent in some parts of Ireland, although not mentioned in the “*Flora Hibernica*.”

The figures are miniatures, but, with scarcely an exception, happily express the habit and character of the species, and will, we are confident, answer every purpose that a figure is intended to answer. They are vastly creditable to the talent and skill of the author, by whom they are all drawn and etched; and when we are told that they are his first essays in these arts, we view them with a considerable portion of admiration, for their neatness and elegance is really remarkable.

Were we inclined to find any fault with the work it is that there is less of popular matter than there might have been: illustrations

from our poets would have been ornamental, and not incompatible with scientific accuracy or pretension. Our poets—old and living—have sung of Ferns many a time and oft; they were plants of power in the superstitions of our forefathers, who also drew from them more copiously than we now do for a supply of some little wants, as indeed, the author has told us, but we should have been pleased to have seen some quaint quotations interwoven with the text in illustration of them. Perhaps too the author would have done well to have given a short separate chapter indicating the distribution of our Ferns in relation to their latitudes, peculiar soils and sites; and we could have wished that, in giving the *habitats*, the classification of them into English, Welsh, Scottish, Irish and Insular had been more systematically attended to than it has been.

PERIODICALS.—*British.*

Loudon's Magazine of Natural History. New Series. March and April 1837.

I. *Zoology.*

BLYTH on the Psychological Distinctions between Man and all other Animals, p. 131.—STRICKLAND on the Inexpediency of altering established Terms in Natural History, p. 127.—WESTWOOD on Generic Nomenclature, p. 169.—STRICKLAND'S Rules for Zoological Nomenclature, p. 173.—Dr MOORE on the Birds of Devonshire, p. 113 and 176.—HOY'S Notice of two species of *Tringa* new to the British Islands, with a list of the rarer Birds killed in Suffolk, and the adjoining borders of Norfolk and Essex, from the autumn of 1835 to December 1836, p. 115.—W. L. on the breeding of Woodcocks in Selkirkshire, with observations on the Habits of the Black and Red Grouse, and Carrion Crow in Scotland, p. 118.—BLYTH on the Habits and Peculiarities of the common Bottletit or Muffin (*Parus caudatus* of Linnæus,) p. 199.—G. W. on the supposed different species of Viper, p. 183.—Observations upon the Salmon in Loch Shin in Sutherland, by JAMES LOCH, M. P. p. 208.—GRAY'S Description of some singularly formed Orthopterous Insects, p. 141.—STUTCHBURY on *Cypræcassis*, a new genus of univalve shells, p. 214. *Cassis rufa* of Bruguiere is the type of this well-defined genus.—On *Nematura* of Benson, a new genus of univalve shells, by G. B. SOWERBY, p. 217.—CHARLESWORTH on a new Fossil Shell from the Coast of Suffolk, p. 218.—RICHARDSON'S Observations upon the Chronologi-

cal Arrangement of fossiliferous Deposits, by a reference to their organic contents, p. 122.

II. Botany.

Letter from GOLDING BIRD, Esq. in Reply to some observations published in the "Edinburgh Journal of Natural History" upon the cause of Vegetable Divergence, p. 180.

The SHORT COMMUNICATIONS relate to—(1.) Preservation of Zoological Specimens. (2.) Variation in the Plumage of Birds. (3.) The Cross-bill. (4.) The Robin. (5.) *Sphinx atropos*. (6.) *Helix virgata*.

Companion to Botanical Magazine. By SIR W. J. HOOKER, Professor of Botany in the University of Glasgow. (Continued from page 578 of Vol. i.)

THE number for February last contains an interesting paper by Dr Graham, Professor of Botany in the University of Edinburgh, on "the Gamboge tree of Ceylon." Specimens of the tree have been forwarded to Dr Graham and other scientific persons in Scotland, together with the pure gamboge, by their invaluable correspondent, Mrs Colonel Walker. The result has been, that the tree of Ceylon producing the gamboge is different in species and genus from any of those which were supposed to produce the drug. The gamboge yielded by it is equal in quality to that imported from Siam, but regarding this there seems to exist no authentic record from what plant it is produced. Dr Graham has formed a new genus from the Ceylon plant, *Hebradendron*. He refers it to the class and order *Monæcia* (or *Diæcia*) *Monadelpia*, and places in it two species; 1. *H. cambogioides*, having for synonyms *Garcinea morella*, *Stalagmitis cambogioides*, Morris, Cat.—2. *H. ellipticum*, *Garcinia elliptica*, Wallich. The paper will be found worthy of perusal.

Notes upon some genera and species of Orchidæ in the collection formed by M. Drege at the Cape of Good Hope, by J. Lindley, Ph. D. F. R. S. &c.—A brief Biographical Sketch of the late Richard Cunningham, Colonial Botanist in New South Wales. This botanist, whose untimely end we had to record in an early number of this Magazine, succeeded as Colonial Botanist to the late Mr Frazer in 1832, on the recommendation of Mr Brown. His career has been a short one, and we can now only hope that the discoveries he had so successfully commenced will be wrought out by his brother, who has been appointed to the vacant office. The next paper will be now read with interest—*Flora Insularum Novæ Zelandiæ* precursor, or a specimen of the botany of the islands of New

Zealand, concluded by "those interesting discoveries which Richard Cunningham made during his excursions on the northern island in the portions of the years 1833-4," (arranged and edited by Allan Cunningham.) This paper commences with the discoveries of Sir J. Banks and Solander, during the first voyage of Captain Cook, and brings them down through the various voyages of discovery, including those of the Coquille and Astrolabe, to 1834.—*The number for March* begins with a continuation of the last paper, which is still further to be continued.—On the Sources and Composition of Gamboge, with an examination of some analogous concrete juices, by R. Christison, M. D., Professor of Materia Medica in the University of Edinburgh, a worthy and important supplement to Dr Graham's paper in the former number. Dr Christison has analysed the varieties of gamboge, including that sent from Ceylon by Mrs Walker. The principal ingredients in all are resin and arabin, in proportions not varying very greatly, and the conclusions arrived at are, that the proportions of the essential ingredients vary in the same species where the situation of the tree is different; that the gamboge tree of Ceylon may be made to yield a pigment as fine and perfect as that of Siam, while in its medicinal qualities it also possesses properties in the fullest perfection; and it is finally recommended that our Government, and the settlers at Ceylon, should use a little enterprise in the culture of this tree.—Illustrations of Indian Botany, principally of the southern parts of the Peninsula, by Dr Wright and G. A. W. Arnot, continued.—A description of *Spartina alternifolia* of Loiseleur, a new British species, by William Arnold Broomfield, M. D. concluded in the number for April. There seems to be considerable confusion in the synonyms, and also with some species which have been sent from America as the true *S. stricta*. The banks of the river Itchen, near Southampton, seem to be the great locality. "These *Spartina* swamps extend along each side of the river, beginning just above the village of Itchen, to within a few hundred yards of Norham Bridge, beyond which I have never met with either kind."—Account of a botanical excursion into Brittany, by Joseph Wood, Esq. F. L. S.—Description of some new Cistaceæ, chiefly found by Mr Drummond in the southernmost regions of North America, by E. Spach; not concluded.

PERIODICALS.—Foreign.

Annales des Sciences Naturelles. Zoologie, MM. AUDOUIN et MILNE-EDWARDS. Botanique, MM. AD. BRONGNIART et GUILLEMIN. Crochard & Co. Paris, Septembre 1836.

I.—Zoology.

Notes sur les caractères zoologiques des Pulex penetrans, par M. DUGES. The differences between it and the common flea are too slight to be considered of generic importance.—*Recherches sur l'Anatomie du Pentastoma tænioides*, par M. MIRAM.—*Observations sur les genres Gerboise et Gerbille*, par M. F. CUVIER.—*Observations sur les Aranéides*, par A. DUGES.—*Analyse des travaux anat. physiol., et zoolog. présentés à l'Acad. des Sciences pendant le mois de Septembre 1836*: viz. RETZIUS sur la structure des dents: BODICHON sur une espece du genre *Canis*: THOMPSON sur le tissu dartoïde: DOMBRE FIRMAS sur la pression atmosphérique: DONNE sur les animalcules contenus dans le pus: VANBENEDEN sur les caractères des Cétacés.

II.—Botany.

DURIÆI Iter asturicum botanicum, anno 1835 susceptum, auctore J. GAY.—*Observations sur l'ascension de la sève dans une Liane, et description d'une nouvelle espèce de Cissus*, par C. GAUDICHAND.—*Muscorum Chilensium species novas descripsit*, W. P. SCHIMPER.—*Extraits du Botanical Register pour l'année 1835 et le mois de Janvier 1836*.—A notice of DE CANDOLLE'S, *Prodromus*, Vol. v.—*Du réveil et du sommeil des Plantes*, par M. DUTROCHET.—“Nova genera ac species Plantarum quas in regno Chilensi, Peruviano et in terra Amazonica, annis 1827 ad 1832, legit Edouard Pœppig et cum Stephano Endlicher descripsit iconibusque illustravit, volumen primum.” A short notice.—“*Mantissa Muscorum ad Floram Pedemontanam*, auct. J. de Notaris.” Another short notice.—*Rhisobotrya, genre de plante nouveau de la Flore d'Allemagne*, par J. C. TAUSCH.—“*Plantæ Indicæ quas in montibus Coimbaturisticis cæruleis, Nilagiri s. Neilgherries dictis, collegit Rev. BERN. SCHMID. Illustravit Dr JON. CAR. ZENKER. Decas secunda.*” A series of extracts descriptive of the new species described in this work.

Annalen der Physik und Chemie. VON POGGENDORF.

Vol. xxxviii. pt. 2.

On the Structure and Chemical properties of Cartilage and Bone, by J. MULLER. This paper may be considered as a sequel to that upon the Comparative Anatomy of the Myxinoidea, of which we gave

an analysis in our fourth number. It chiefly relates to the Chemical Structure of Cartilage, and the varieties of it which occur in different animals. The analysis of the cartilage of *Squalus peregrinus* by Chevreuil, has been followed up with great accuracy by Purkinje, and Deutsch.* The bony cartilage of the higher animals was examined by them in the form of microscopic lamella, the tissue having been previously expelled by means of acid. They then found that this substance contains many minute oval bodies dispersed through it, which, according to † Miescher, not only occur in that situation, but also in the callus of re-united bones, in bones imperfectly developed, &c. The dimensions of these bodies are estimated in English lines, at from 0.0048 to 0.0072 in length, by 0.0017 to 0.0030 in breadth. These minute bodies generally lie lengthways in the direction of the layers of cartilage, and are somewhat more opaque than the surrounding substances. It is not easy to determine whether they are hollow or solid. They seem to admit of great variety in their structure, in different parts, especially those which occur in the cartilage of the ribs, in which situation they are often found lying confusedly together, and contain apparently a sort of kernel. In the cartilaginous fishes, the contents of these bodies are more fluid, and in the cartilage of *Petromyzon*, they vary in different parts, in one place presenting the above-mentioned oval form, in another, cells, divided by thin cartilaginous partitions, and in a third, an intermediate state between these conditions. These bodies frequently also occur in the external, as well as the internal cartilage of certain animals, as for instance in the cuirass of the armadillo; in cartilaginous bones they are often wanting. They are not met with in the Ostracion, in the tubercular cartilage of the sturgeon, nor in the skeletons of many cartilaginous fishes. They are identical when they are found in the cartilaginous bones of man, of the Mammalia, and of fishes, but in the other cartilage of the two former classes, they present great variations, which are arranged under three distinct heads by Miescher. The glutinous matter contained in the different cartilages is divided by the author into two classes, to which he applies the terms *colla* and *chondrine*, and he also gives the results of various analysis of cartilage in different states of ossification, and taken from various parts of the body. The structure and chemical properties of the bones of the higher animals is next described, followed by a similar detail of those of the cartilaginous fishes. M. Marchand

* Deutsch de penitioni ossium structura. Vratisl. 1834.

† Miescher de ossium genesi, structura, et vitâ. Berol. 1836.

has also extended his researches to the latter class, and finds that the ossified cartilage does not contain a materially less quantity of lime than the bones of the higher vertebrata. The spine of *Squalus cornubicus*, after being exposed to a white heat, till all the animal matter was consumed, left in one instance 41.55, in another 42.068 per cent. of ashes. The following is the result of his analysis.

Combustible animal matter,	57.07	Sulphate of soda,	... ..	0.80
Phosphate of lime,	... ..	Muriate of do,	... ..	3.00
Sulphate of lime,	... ..	Phosphate of magnesia,	... ..	1.03
Carbonate of lime,	... ..	Siliceous earth, argillaceous do.		
Fluate of lime,	... ..	iron, and loss,	... ..	1.20
				100.00

The Tubercular cartilage of a large ray gave

Combustible animal matter,	... ..	78.46 per cent.
Carbonate of lime,	... ..	2.67
Phosphate of do,	... ..	14.80
Sulphate of do,	... ..	0.83
Fluate of do,	... ..	a trace.
Muriate of soda,	... ..	2.46
Sulphate of do,	... ..	0.70
Phosphoric acid, magnesia, and loss,	0 14	
		100.00

No. 11, Vol. xxxix. contains a brief statement of the results of several experiments upon the electric rays, by M. Matteucci, who thinks that the Natural History of these animals is far from being understood, and is therefore still occupied in its investigation. M. Francis Schulze of Berlin has also communicated a preliminary statement of his experiments upon equivocal generation, and upon the metamorphoses of *Amylum*.



ZOOLOGICAL.

Bank Vole, Bell.—*Arvicola pratensis*, Baillon, *A. riparia*, Jenyns. It is likely that this species is not very local in its distribution, as I have lately detected it in Northumberland. Two specimens, a male and female, were taken at the same time in a hang trap baited with oat-meal, in the garden at Twizell. Their appearance at once attracted my attention, as I perceived, even while they remained half concealed in the holes of the trap, that their tail was longer than that of the common vole, and yet very much shorter than that of the long-tailed field-mouse, to which, however, the colour of the back nearly approached. Upon comparing them with the descriptions given by Yarrell and Jenyns, and Bell of the *A. pratensis*, I found them to agree in every essential particular with that species. In form, the bank vole is scarcely so thick and short as its congener, *A. agrestis*, the muzzle more elongate, and the ears longer, and more distinctly seen above the fur. The hairs at the end of the tail, and which extend considerably beyond the bony part, are stiff and elastic. The crown of the head and upper parts are of a reddish-brown intermixed with black, the sides were inclined to grey, the under parts yellowish-white, the yellow more strongly indicated on the mesial line of the abdomen. The length of the head and body $3\frac{1}{4}$ inches, of the tail $1\frac{5}{8}$ inches. These are the only individuals I have yet seen, or at least that have attracted my attention as differing from the common vole. It is likely, however, that it will be found upon investigation a plentiful species.—P. J. S.

Arvicola pratensis.—My friend R. M. Lingwood, Esq. captured a specimen of this little animal, in my presence, at his house, Highlands, near Uckfield, Sussex, on the 16th of January 1837. This adds another county to those of which it is recorded as being a native.—C. C. BABINGTON.

Rhea.—Mr Darwin has brought home among his other zoological treasures, specimens of a new or second species of Rhea, which appears to take the place of the old species in Patagonia. It is distin-

guished from the *R. Americana* in being about one-fifth less, and in the tarsi being reticulated and feathered below the knee.

Sivatherium.—M. Geoffroy St Hilaire and M. De Blainville have laid before the Royal Academy of Sciences at Paris, the results of their inquiries regarding the nature of this interesting fossil animal, discovered in the valley of the Markonda, in the southern district of the Himalaya. The first is of opinion that it is a species of antediluvian giraffe, and has proposed the title of *Cameleop. primigenus* for it. M. De Blainville, again, although he allows it to belong to the group of the ruminants, considers it far removed from the giraffes, and enters into a lengthened detail of his reasons for this difference of opinion. If his arguments are correct, these remains will belong to an animal which cannot be ranked in any of the known genera of Mammalia.

Surnia Nyctea, Dumeril.—On the 13th of February last a fine male snowy owl was shot three miles below Selby-on-the-moor, where it had been observed by the miller, at a mill adjoining, for a day or two previous. The moor is well stocked with rabbits, and the owl was most probably preying upon them : it appeared very shy, and when pinioned by the shot was extremely fierce. It was ultimately got into a sack and killed by pressure, when it came into the possession of my friend A. Clapham, Esq. of Potternewton, near Leeds.
—H. DENNY.

Cepola rubescens, Linn.—Mr P. W. Maclagan informs us that he has lately procured a specimen of this fish, which was caught off Dunure, seven miles south of Ayr, on a whiting line baited with a mussel. Its length is $15\frac{1}{2}$ inches. The fisherman who brought it had seen another about six weeks ago.—*March 20, 1837.*

MISCELLANEOUS INTELLIGENCE.

BOTANICAL SOCIETY OF EDINBURGH, Nov. 10, 1836.—The first meeting of the winter session was held this evening. Professor Graham in the chair. The following members were elected :—*Resident*, Dr Andrew Douglas Maclagan ; *Non-Resident*, Mr Robert Ball, Dublin ; The Rev. George Gordon, Birnie, Elginshire ; Mr Edwin Lees, Worcester ; Dr D. C. Macreight, London ; Mr M. J. F. Sidney, Morpeth ; Mr W. A. Stables, Park, Nairnshire ; Mr W. Thompson, Belfast ; Mr H. C. Watson, Thames-Ditton, Sur-

rey. Mr Edwin Lees of Worcester was appointed Local Secretary for Worcestershire.

Specimens were stated by the Secretary to have been received since last meeting from Dr Tyacke, Mr Shuttleworth, Dr R. C. Alexander, Rev. Mr Rutherford, Mr Leighton, Dr Dewar, Mr Watson, Mr Carpenter, Dr Greville, Mr Cruickshank, Mr Lees, Mr Bell, Dr Barry, Mr Spencer Thomson, and Mr Maughan. Donation: "Letter by N. B. Ward, Esq., to Sir W. J. Hooker, on the growth of plants without open exposure to air," from the author.

Mr Carpenter directed the attention of the Society to the advantages which might result from their endeavouring to form a collection of vegetable monstrosities, the study of which is now so essential to the philosophic botanist,—since it is from them that the theory of structure is principally deduced, and upon them also that we may expect to find some definite laws regarding the limits of variation in each species. He then alluded to some remarks he had formerly made, on the nature of parasitic *Fungi*, with reference to Verger's researches, and stated that he considered it still an open question in general physiology, whether a plant or animal might not, by a morbid process, give origin to one lower in the scale; and, he pointed out the distinction between this view and the old doctrine of equivocal generation.

Dr Balfour exhibited a *Carex* which had been sent to him by Dr Murray of Aberdeen, found by Messrs Dickie and Templeton in August last, on rocks in Glen-Callader, and which on examination Sir William Hooker had pronounced to be *C. rupestris*, All. (*petraea*, Wahl.) Dr Graham gave a short summary of what had been done since last meeting in the way of botanical discovery, during the various excursions of the season; and particularly mentioned the following additional localities for several rare plants. *Malaxis paludosa*, found by Mr James Dewar; *Acinos vulgaris*, *Silene Anglica* and *S. noctiflora*, by Dr Dewar, the two latter abundantly; *Trifolium ornithopodioides*, by Miss Robertson,—all in the neighbourhood of North Queensferry.—*Linnaea borealis*, by Mr M'Nab and Dr Graham, near Dalmahoy Hill. *Tulipa sylvestris*, by Dr Graham, neighbourhood of Edinburgh. *Oenanthe pimpinelloides* and *Juncus obtusiflorus*, by Mr Campbell, near Dunbar. *Saxifraga hirculus*, by Mr Hunter, on the Pentland Hills, near the source of the Medwyn. *Veronica Buxbaumii*, by Dr Dewar, Mr Roberts, and Mr Bell, in various localities near Edinburgh, on both sides of the Forth.—*Carex fulva*, not unfrequent in several stations near Edinburgh. *Hieracium umbellatum*, by Dr G. M'Nab, in Glen-Clova.

Ajuga pyramidalis, pointed out by Dr Duguid to Dr M^cNab in Orkney. *Erodium maritimum* and *Jungermannia Mackaii*, found in Galloway, both new to the Scottish Flora. *Polygonum Raii*, abundantly, and *Lamium intermedium* were also observed in Galloway. *Cladium mariscus* was looked for in vain in Galloway, a station assigned for it on the authority of Mr M^cKie, (not M^cKay, as mentioned in Hooker's British Flora.) The Sutherland station for this plant must, therefore, be regarded as the only well authenticated one for it now in Scotland. *Hieracium aurantiacum* was seen by Mr Brand in Banffshire, apparently quite wild. Dr Barry mentioned having this year observed *Thlaspi alpestre* near the head of Caenlochen, in the Clova mountains, in a different spot from that where it was first discovered; *Pinguicula grandiflora*, near the top of Mount Mangerton, Killarney; and *Rhynchospora fusca*, abundant near Oughterarde, Cunnemara.

Dr Graham then alluded to a recent excursion to Ben-Lawers, in company with Sir W. J. Hooker, which, owing to the badness of the season, and its effects upon alpine vegetation, had proved a most unproductive one. On that occasion, Dr Graham stated that he had an opportunity of examining the oaks on the banks of Loch-Lomond; and after comparing them with specimens from other parts of the country, and with the figures of Martyn, in the *Flora Rustica*, he was satisfied that we have in Britain three distinct forms of oak, whether species or not is a different question. The most common is that figured at Tab. 10 of *Flora Rustica*;—the next, scarcely less common on Loch-Lomond, is that represented at Tab. 11;—and the third, by much the least common in the country, though by no means unfrequent at the lower end of Glen-Falloch, is extremely well represented in Tab. 12. The first is what has been called *Quercus pedunculata*, its acorns being numerous, on a long common peduncle. The second nearly resembles this in the habit of the tree, but has a fruit either sessile, or on a short, stout, and abrupt peduncle. The third differs very much in the habit of the tree, its much more acutely serrated chesnut-like leaves, and its absolutely sessile fruit. There is little difficulty, even at a distance, in distinguishing this tree from the two former, by its general appearance, and its long slender free growing branches.

Dec. 8th.—Professor Graham in the chair. The following members were elected:—*Resident*, Mr W. F. Lindsay Carnegie, and Mr William Reid. *Non-Resident*, Miss Bailey, Dublin; Dr J. Coulter, Dublin; Dr C. P. Croker, Dublin; Mr Simon Foot, Dublin; Mr George Stephens Gough, Dublin; The Rev. Thomas Dix

Hincks, LL.D. ; Mr J. T. Mackay, Dublin ; Mr Ninian Nevin, Dublin ; Dr Jonathan Osborne, Dublin ; Captain Portlock, R. E. Dublin ; and Dr Robert J. N. Streitin, Worcester. Dr Thomas Bell Salter was appointed Local Secretary at Poole, Dorsetshire. Specimens were stated by the Secretary to have been received since last meeting from Mr W. Thompson, Dr Hincks, Mr Atkin, Dr Balfour, Mr A. H. Balfour, Dr Maclagan, Mr Fraser, Mr Reid, Dr Hunter, Mr Steuart, The Rev. W. S. Hore, Mr J. Ward, Mr Leefe, Mr Campbell, Mr Forbes, Mr Scott, Mr Lloyd, and Mr Macaulay.

The following office-bearers were elected for the ensuing year :—

President—Professor Graham.

Vice-Presidents—Dr Greville and Dr Balfour.

Secretary—Mr Campbell.

Joint Foreign Secretaries—Mr Forbes and Dr Charlton.

Treasurer—Mr Brand.

Curator—Mr James M'Nab.

Councillors.

Dr Neill, Mr Falconar, Dr Barry, Dr Maclagan, and Dr Pollexfen.

In consequence of various representations having been made to the Society, pointing out the difficulty of specimens being sent from the Continent earlier than January, as well as on account of several urgent requests from members for delay in sending in specimens, it was agreed that the distribution should in future take place in January and February each year, instead of the period mentioned in the prospectus.

The Secretary read a communication transmitted to him by Mr Forbes, "On a supposed new British *Polygala*," observed by him in the Isle of Man and on Dalmahoy Hill, near Edinburgh. Mr Forbes describes it as follows :—" *Polygala foliis imis (parvulis) obovato-spathulatis, reliquis lanceolatis seu lineari-lanceolatis ; sepalis lateralibus ellipticis, obtusis, corollâ fimbriata brevioribus, capsulâ subrotundâ demum brevioribus angustioribusque.*

"Plant depressed, branchy and diffuse ; flowers small, crowded, purplish blue or greenish-white ; raceme when in fruit elongated and bilateral. From *P. vulgaris* it is distinguished by its habit, the smallness of its flowers, and the comparative size of the sepals and the capsule,—the sepals in the common species being longer and broader than the capsule. In general habit and the appearance of its blossoms, it bears a striking resemblance to *P. alpestris* ; but the relations of the sepals to the flowers and fruit separate it from that species also." Specimens of the plant accompanied the paper.

Mr Percy read a short notice of an excursion he had made last

summer by way of Fontainbleau and Lyons to Vaucluse, with particular reference to the botany of the districts through which he passed, and in the vicinity of the celebrated "Fontaine" and "Château de Petrarque."

Dr Charlton gave a short account of a tour he had made last autumn in Denmark, stating that his present object was chiefly to point out the facilities for visiting that country, and the inducement it holds out to the botanist. The expense of living and travelling he described as being extremely moderate, the language as interposing but few difficulties—and the botany, particularly the Flora around Christiania, as being singularly attractive and interesting.

Dr Barry incidentally mentioned that the following plants, so interesting to the British botanist, had been observed by him when travelling amongst the Alps:—*Sonchus alpinus*, by the side of the glacier at the source of the Rhone, on the Furca side; *Gentiana nivalis* in the ascent from the Grindlewald to the Faulhorn; and *Astragalus alpinus*, in the Valley of Rosen-Lai. Mr Percy had also observed *Sonchus alpinus* on the Brezon, about twenty miles from Geneva, at an elevation of about 3500 feet.

W. H. CAMPBELL, Sec.

BOTANICAL SOCIETY OF LONDON.—April 22, 1837. J. E. Gray, Esq. F. R. S., President, in the Chair.—Several presents were announced, and Members elected; after which Mr Chatterley, the Secretary, proceeded to read the continuation of his paper, translated from the French of M. Decandolle, on the geographical distribution of plants used for food. The facts adduced tended to show, that cold had little influence in retarding the extension of agriculture, and that by artificial cultivation and temperature any one country might be made to produce nearly all the plants of the earth. The paper contained several important facts, and the original may be found in the 5th Number of the *Bibliothèque Universelle de Genève*. The President explained the discovery, by a French botanist, of cells or little membranous cylinders in the leaves of *Kyanium*, which are filled with little spiculæ, and gradually ejected.—A paper was afterwards read from Mr Thomas Hancock, on *Lamium maculatum* and *album*, and on the propriety of their being considered as distinct species. The author was led to investigate the subject, from having seen many specimens of the former species entirely destitute of the longitudinal white patches on the leaves, so particularly insisted on by most authors as its most important specific character; as well as from having witnessed several with *white* flowers (although Hooker and Lindley say that they are *constantly*

purple), and approaching so closely to *L. album* as to be scarcely distinguishable from it. The author considers that Reichenbach, in his figure and description of what he considered to be the true maculatum, and Dr Hooker, in his adoption of the same as such, had fallen into an error,—and that their plant was doubtless a variety of *L. purpureum*. Mr H. considers the number of the whorls not alone sufficient to found a specific character upon; and after detailing a *series of characters common to both album and maculatum*, and the *points of difference* between them, with other subjects having a connection therewith, concluded by stating, that these two plants should be considered only as varieties of one species, and he would propose the adoption of Dr Lindley's specific name *vulgatum*. The President then adjourned the Society to May 4.

Mr Hewett Watson's New Botanist's Guide, Vol. ii.—We are requested by Mr Hewett Watson to mention, that the whole impression of the second volume of the *New Botanist's Guide* has been destroyed by an accidental fire, when just ready for publication; and Mr Watson fears that other engagements will prevent him reprinting the volume for a considerable period. He is desirous of making known this accident, lest his friends, who have so largely contributed to the volume, should misunderstand the long delay which must now unavoidably occur in publishing their communications.

Ornithological Society.—A society with the annexed title is about to be established in London, and the following has been sent to us as the plan which the Provisional Committee of the St James's Ornithological Society recommend the members to adopt. "TITLE.—The Ornithological Society of London. MANAGEMENT. A Council with the usual Officers.—HONORARY MEMBERS. Limited to Five. Eminent Scientific Ornithologists, or Liberal Patrons of the Society. Elected by the Council.—ORDINARY MEMBERS. Elected by Ballot. Gentlemen will subscribe, annually, Two Guineas; Ladies, One Guinea. Entrance fee for Gentlemen, Two Guineas; for Ladies, One Guinea. Members of the St James's Ornithological Society will have the option of being Original Members of the Ornithological Society of London, at the annual Subscription of One Guinea.—FOREIGN MEMBERS. Elected by Ballot. Eminent Foreign Ornithologists.—FOREIGN CORRESPONDENTS. Elected by the Council. Residents abroad, desirous of assisting the Society; exempt from all pecuniary Contributions.—THE OBJECTS OF THE SOCIETY are to be attained by the exhibition of living Birds: the propagation and dispersion of the domesticated races: a Museum:

Library : Periodical Meetings : Ornithological Lectures : the Publication of Ornithological Works—Scientific and Practical : Prize Shews. **LIVING SPECIMENS.**—The Rasorial Genera, and their Types, will be particularly attended to, as being most beautiful and attractive, pre-eminently domestic and practically useful. The hardy birds will be gratuitously exhibited in the parks ; those for which buildings are required will be seen by the public on payment of a small admission fee. **THE DUPLICATES.**—Birds and Eggs will be distributed among the Members. **THE MUSEUM.**—The specimens will be accurately named according to the Natural System ; and so arranged as to convey to the student, through the eye alone, a general and accurate knowledge of the affinities and analogies of birds, and to exhibit examples of the different organizations which are known to accompany different habits and modes of life. The Museum will include stuffed Birds, Bird Skins, Skeletons, and parts of Birds, Nests and Eggs ; and will be open, without restriction, to Scientific Persons and Artists. **LIBRARY.**—The Library will contain, ultimately, every Ornithological Work of merit ; British and Foreign Ornithological Periodicals will be taken in, and circulated among such of the Members as subscribe an additional Half-guinea for this advantage.—**PERIODICAL MEETINGS**, or **CONVERSATIONES**, will be held for the exhibition of living and dead Specimens, Drawings, Books, Nests, &c.—for reading Ornithological Papers, and for oral observations. **LECTURES.**—Competent Ornithologists will be invited to deliver Lectures. **PUBLICATIONS.**—The Society will publish, or patronize the publication of, a general Ornithological Work at an accessible price : the proceedings will be published concisely and cheaply : and the Society will collect and publish all the information they can obtain as to the best modes of rearing Foreign Birds adapted for the Park, the Preserve, the Poultry Yard, and the Aviary. **PRIZES.**—A Prize of the value of L. 15 or L. 20 will be given annually for the best Paper on Systematic Ornithology, in elucidation of the power, wisdom, and goodness of God. Another of the value of L. 10 for the breeding of Foreign Birds : and a third of the value of L. 5 for the best method of keeping alive in this country such Foreign Birds as will not breed. Application will be made to Government for a Locality for the Society's Museum, Library, and Housed Collections : if the application be successful the Museum will be freely open to the Public three days a week. The ordinary Funds, arising from Subscriptions and Entrance Fees, will in the first instance be applied solely to the construction of Aviaries, and the purchase, rearing and breeding of Birds : and an extraordinary Fund will be raised by the creation of

100 Shares of L. 25 each, (to be paid, if desired, in two half-yearly instalments,) which will be applied exclusively to the purchase of Books, Specimens, and Cabinets, to lay a broad and solid foundation for a worthy Museum and Library. The Property thus acquired will be vested in the Shareholders ; and will not, unless specially conveyed by donation, form part of the general property until the funds shall be sufficient to pay off the shareholders. The duplicates will, at first, be distributed among the shareholders only, and, in addition to the ordinary privileges of personal admission to Housed Collections, Museum, Library, and Meetings, they will be entitled to give a certain number of free admissions daily to Strangers.

Tamus communis.—This is, perhaps, one of the most common plants in Somersetshire. On the south west border, near the Bristol Channel, it lines almost every hedge for miles around. On comparing its characters with other diœcious plants, I have been surprised to find its near identity with *Dioscorea*; so much so, indeed, as to make it a point of discussion, whether it and *D. cajanensis* can, with propriety, be arranged in different genera, or even in distinct *species*. It is also very like *D. brasiliensis* and *D. sativa*; and, from the similarity in their fructification, foliation, and farinaceous root, it may well be termed the *European yam*. The root I have found to be very acrid, viscous, and replete with starch ; and is with the berries, very largely and successfully employed by the country people in chilblains, rheumatism, and as a suppurative cataplasm.—*Thomas Hancock*.

Silene maritima.—I have discovered what I believe to be a new locality for this plant. In August last, while in Somersetshire, I found on the banks of the Bristol Channel, between the towns of Watchet and Minehead, an abundance of it in a state of flowering : in fact, the whole shore was almost overgrown with it. Although a *maritime* plant, it appeared to predominate in gravelly soils, and bearing no definite number of flowers on the panicles;—fully justifying Dr Hooker's observation, as to its intermediate gradations into *S. inflata*.—*Thomas Hancock*.

Pæonia officinalis.—This plant, regarded as having been introduced into England, has been found by my friend Mr Rootsey, in an excursion which I made with him last year near Bristol, growing apparently wild, in a thicket of bushes near that city.—*Thomas Hancock*.



MAGAZINE

OF

ZOOLOGY AND BOTANY.

ORIGINAL COMMUNICATIONS.

I.—*Notes on the Land and Fresh Water Mollusca of Great Britain, with a revised list of Species.* By JOSHUA ALDER, Member of the Nat. Hist. Society of Newcastle-upon-Tyne.

MUCH as has lately been done in the investigation of the British land and fresh water Mollusca, there is yet wanting a good history of our native species, which, like that of Draparnaud in France, or of Pfeiffer in Germany, may claim to rank as a national work. Several local catalogues have appeared, each adding something to our knowledge of these tribes, and it has been still further increased by two valuable monographs,—I allude to the Synopsis of the Testaceous Pneumonobranchous Mollusca of Great Britain, by J. G. Jeffreys, Esq. in the Linnean Transactions, and the Monograph of the British species of Cyclas and Pisidium in the Cambridge Philosophical Society's Transactions, by the Rev. L. Jenyns. Hitherto the only general account of the British species that has been published in a separate form is the Manual of British Land and Fresh Water Shells by Dr Turton. Considering the unpretending and cheap form in which this little work appeared, we cannot expect to find in it a complete history of these tribes; and it has the still farther disadvantage of being an account of the shells only, without taking the animals into consideration. There are also to be found in it several errors in the introduction or omission of species. It is therefore much to be desired that some of our naturalists would undertake to give us a complete and scientific history of our native land and fresh water Mollusca on a plan somewhat similar to that of Pfeiffer's

work above alluded to. The increasing taste for natural history now abroad warrants the conclusion that such a publication would be favourably received, and the materials for it might be readily obtained. In the absence of such a work, it has occurred to me that this Magazine may afford a medium for recording a few observations, made with the view of ascertaining, as far as the present state of our knowledge admits, what are the species of land and fresh water Mollusca really indigenous to these islands. I am far from thinking that I have accomplished this completely; but I shall be satisfied if, by clearing away some difficulties, a ground-work shall be laid for others to pursue the investigation with success. It is not by the contributions of one but of many that complete information is at length to be obtained. In making this attempt, it has been found necessary to discard many species that have hitherto swelled our catalogues. Possibly some of these may be British: all we can say at present is, that there is not sufficient proof to warrant our considering them as natives. As to those Mollusca whose claims to rank as species have been a matter of dispute among naturalists, a few of these will certainly be found in the present list, but they have been generally spoken of with hesitation, in order to induce persons favourably situated for the purpose to make further observations upon them.

It may be necessary to say something concerning the names that have been adopted in the following catalogue. So great is the multiplication of synonyms in this department of natural history, that it has become a difficult matter to decide, in each case, which name ought to be adopted. If we look into three of our latest publications treating of molluscous animals, those, namely, of Fleming, Jeffreys, and Turton, we shall find that, in many instances, the same species has a different name in each. *Helix lackhamensis* of Montagu, for instance, is called by Dr Fleming *Bulimus lackhamensis*, by Mr Jeffreys *Bulimus Montacuti*, and by Dr Turton *Bulimus montanus*. *Turbo tridens* of Montagu is *Azeca tridens* of Fleming, *Carychium politum* of Jeffreys, afterwards changed in his supplement to *Cionella Goodalli*, and *Azeca Matoni* of Turton. Should we wish to trace this species in continental works, we shall find it to be the *Helix (Cochlodonta) Goodalli* of Férussac, *Pupa Menekeana* of Pfeiffer, and *Pupa Goodalli* of Michaud. Thus are we lost in a labyrinth of names, from which it is high time that we should make an attempt to extricate ourselves. It will be said, and is indeed true, that naturalists (with the exception of a few injudicious reformers) are pretty well agreed as to the rule by which the choice of a name is to be governed,—namely, priority of publication. This

rule is applicable, with few exceptions, to all recent cases, where the species described can be properly made out; but it so happens that it cannot conveniently be brought to bear upon names established by long use. Any attempt to change these for such as, though really prior, have not been generally adopted, has usually proved a failure, and only tended to increase the confusion it was meant to avoid. Extent of use, therefore, must be taken into account in judging of established names. I am afraid that on this account we shall be obliged to give up some of the names of Montagu which English authors have hitherto retained on the ground of priority. The "Testacea Britannica" was published in 1803, and the "Histoire Naturelle des Mollusques terrestres et fluviatiles de la France" in 1806. There was thus a priority of publication in the English work over that of France; but notwithstanding this, the authority of Draparnaud has been so thoroughly established, that, though Montagu's book has now been known on the continent of Europe for upwards of twenty years, and his synonyms pointed out in the "Concordance" of Férussac, yet not one of his names has been adopted in preference to those of Draparnaud by a single continental author. Would it not be better, therefore, for the sake of uniformity of nomenclature, that British authors should give up a point which they cannot carry, and agree in adopting the more generally received names of Draparnaud? In conformity with this view, the names of a few species of *Helix* have been altered in the following list, from those usually given in British catalogues.

Another circumstance which has greatly increased the number of synonyms is the difficulty of making out the species of some of the older writers, particularly those of Linnæus, whose descriptions are often very short and unsatisfactory. Much labour has been in vain bestowed in attempting to ascertain many of the land and fresh water shells of this naturalist, and different authors have referred them to so many different species, that there are instances in which two, three, and even four species have been alternately called by the same Linnæan name, according to the peculiar views of the authors who described them. *Turbo muscorum* of Linnæus may be taken as an example. The shell called *Turbo muscorum* by Montagu, and *Pupa muscorum* by Fleming, under the belief that it is the Linnæan species, is *Pupa umbilicata*, Drap. Lamarck, Férussac, and others, think differently, and give that name to *Pupa marginata*, Drap. Draparnaud himself refers it to a third species, *Vertigo cylindrica*, Fer. which he consequently calls *Pupa muscorum*. But Dr Turton gives it as his opinion that *Pupa edentula*, Drap. is the true *Turbo muscorum* of Linnæus. Thus to understand what

Pupa muscorum means in any catalogue, it becomes necessary, in the first place, to know what authority the writer follows. Some species of *Helix*, *Planorbis*, and *Limneus* are in a similar predicament. It is certainly better in such a case to drop the disputed name altogether, and adopt another about which no doubt exists. A great preponderance of authority may, however, sometimes induce us to retain it.

Important as uniformity of nomenclature is on all hands acknowledged to be, it would be no easy matter to establish it. The days are past when the authority of one great name was sufficient to carry with it the acquiescence of admiring followers. Science is now a republic, and were Linnæus himself to rise from the dead, he would fail to accomplish such an object. It is worth while considering, however, whether a congress of the leading naturalists in each department might not, by mutual concessions, be brought to agree upon adopting a uniform set of specific names. If this were done a great deal would be accomplished towards inducing succeeding writers to adopt the same convenient plan. I mention specific names only, because it is clear that those of general and higher groups, being founded upon our knowledge of nature, must be left to be modified as that knowledge increases; but specific names are mere conventional and arbitrary signs; more or less valuable, indeed, according to their indication of character, yet such as when once adopted it is not necessary afterwards to change. The subject is well worthy the attention of the natural history section of the British Association. I have been led further into the consideration of this subject than is altogether necessary for my present purpose; but the evil complained of is a serious one. Were this obstruction to our progress once removed, and a set of well digested rules agreed upon, we have a guarantee in the increased and increasing facilities of communication now established between naturalists of all countries, and the greater accuracy of description now adopted, that such a barrier would not again arise to obstruct our path, or deter the youthful inquirer from entering upon the fair field of natural history.

It has been attempted, as far as practicable, in the following list, to give, after the name of the genus, that of the author who first instituted it; but where it has been afterwards restricted, a second name is given, indicating the author who used it in the restricted sense in which it is at present taken. In like manner, after the specific name is placed that of the author who imposed it, without any reference to the genus in which it is now used; but where the generic appellation has been changed, the name of the author first applying it in that genus is also added.

MOLLUSCA, Cuv.

1st Section. MOLLUSCA CEPHALA, Fér.

Class. GASTEROPODA, Cuv.

Order. PULMONIFERA, Flem. (Les Pulmones, Cuv.)

† Terrestrial.

Fam. LIMACIDÆ, Flem. (Les Limaces, Cuv.)

Gen. 1. ARION, Férussac.

1. *Empiricorum*, Fér.

Limax ater, Linn.

L. Subrufus, Linn.

2. *Hortensis*, Fér.var. β . Pfeiffer. Griseus, unicolor, fasciâ utrinque nigrâ.

Limax fasciatus, Nilsson.

Arion circumscriptus, Johnston, Edinb. New Phil. Journ.

I follow the opinion of M. de Férussac in making *L. fasciatus*, Nils. a variety of *A. hortensis*, Fér. The variety only, if such it be, has yet been noticed in this country, and is common in gardens, woods, &c.

Gen. 2. LIMAX, Linnæus, Férussac.

1. *Cinereus*, Linn.—Shell: Limacellus Parma, Turt.2. *Variiegatus*, Fér.—Shell: Limacellus variegatus, Turt.

Not uncommon in cellars.

3. *Agrestis*, Linn.—Shell: Limacellus obliquus, Turt.4. *Carinatus*, Leach.—Shell: Limacellus unguulatus, Turt.5. *Sowerbii*, Fér.

Gen. 3. TESTACELLUS, Cuvier.

1. *Haliotoideus*, Drap.var. *T. scutellum*, Sowerby.

In addition to the localities in the neighbourhood of London, Dr Turton informs us that this species is found in gardens at Plymouth and Bideford. There is good reason, therefore, to suppose that it is a native species. The case is different with *T. Maugii*, which belongs to a warm climate, and has evidently been introduced along with exotic plants into the nursery where it is now found.

Fam. HELICIDÆ, Jeff. (Les Escargots, Cuv.)

Gen. 4. VITRINA, Draparnaud.

1. *Pellucida*, Mull. Flem.*V. Mulleri*, Jeff.Var 1. *V. Draparnaldi*, Jeff.2. *V. Diaphana*, Jeff.

Mr Jeffreys having kindly favoured me with specimens of his *V.*

Draparnaldi, I have compared them carefully with specimens of *Helicolimax Audebardi*, Fér. collected on the continent, and have come to the conclusion that they are not of that species. I am afraid that *V. Draparnaldi* can only be classed as a variety of *V. pellucida*, (*Helicolimax pellucidus*, Fér.) Mr Jeffreys now considers his *V. Diaphana* to be also a var. of the same. *V. Dillwynii* appears to be something different, but being founded upon a single dead specimen, it is to be hoped that Mr Jeffreys may be able to obtain additional specimens, and in a living state, in order fully to establish it.

Gen. 5. *SUCCINEA*, Draparnaud.

1. *Amphibia*, Drap.
2. *Gracilis*, Alder.
- S. *oblonga*, Turt.

It may require a further investigation to decide whether or not this be really distinct from the foregoing. I have found them plentifully within 100 yards of each other, each retaining its characteristic marks in the colour of the animal and shape of the shell, and unmixed with the other sort. Some foreign species of this difficult genus, quite as nearly allied as this to *S. Amphibia*, are nevertheless considered to be distinct.

3. *Oblonga*, Drap.

Besides the locality mentioned by Mr Jeffreys, who was the first to introduce this desirable species into the British list, it has been found at Bathgate near Glasgow. Specimens obtained from that place were sent me by Mr Kenyon of Preston a few years ago.

Gen. 6. *HELIX*, Linnæus, Lamarck.

1. *Pomatia*, Linn.
2. *Arbustorum*, Linn.
3. *Aspersa*, Mull.
4. *Nemoralis*, Linn.
5. *Hortensis*, Linn.
- var. *H. hybrida*, Leach.
6. *Limbata*, Drap.

Found in the neighbourhood of London by Mr G. B. Sowerby, from whom I have specimens.

7. *Carthusiana*, Drap.
- H. pallida*, Jeff.
8. *Carthusianella*, Drap.
- H. rufilabris*, Jeff.

The var. α of Mr Jeffreys, which he makes synonymous with *H. Olivieri*, Fér., M. de Férussac considered to be erroneously referred to that species. Both vary very much in size.

9. *Obvoluta*, Mull.

No other locality appears to have been observed for this, since its discovery in Hampshire by Dr Lindsay.

10. *Glabella*, Drap.

H. rufescens, Mont.

11. *Depilata*, Pf.

H. circinata, Fér.

This species is not uncommon on the banks of the sea near Upper Clapton, Middlesex, where I observed it in 1833. The specimens there collected agree perfectly with those of Pfeiffer in Férussac's cabinet. It is not hispid in any stage of growth, but in other respects is scarcely to be distinguished from the following.

12. *Concinna*, Jeff.

This may be a variety of *H. hispida*, as now supposed by Mr Jeffreys, but is stronger and with the hairs more deciduous than the usual form of that species. It is very generally diffused, commonly taking the place of *H. glabella* in situations where the latter is not found.

13. *Hispida*, Mull.14. *Sericea*, Mull.

It is difficult to say whether or not this is the *H. sericea* of Muller. Having introduced it as such on the faith of the Baron de Férussac, I leave it for further investigation.

15. *Granulata*, Ald.

H. hispida, Mont.

It is needless to repeat here the observations given on this and the foregoing species in another place. The present is surely distinct.

16. *Fusca*, Mont.17. *Excavata*, Ald.18. *Lucida*, Drap.

There can be no doubt of this being the *H. nitida* of Muller, but the name has been so often misapplied, that I feel great reluctance to use it. *Lucida*, though not altogether free from the same fault, is less liable to be misunderstood.

19. *Radiatula*, Ald.

var. *H. vitrina*, Fér. Tab. des Moll.

20. *Nitidula*, Drap.

var. *H. Helmii*, Gilbertson, MS.

Mr Gilbertson points out some peculiarities in the habits of the animal, together with the white colour of the shell, as a reason for considering his *H. Helmii* to be distinct from *H. nitidula*. Mr G. would do well to publish his observations upon it.

21. *Alliaria*, Miller.var. *H. glabra*, Studer ?

Mr Gilbertson finds what he considers to be a variety of this species, much larger than the usual size. This variety appears to be the *H. glabra* of Studer (Férussac, Tab. des Moll. No. 215,) judging from specimens in M. de Férussac's cabinet.

22. *Cellaria*, Mull.

Continental specimens of this shell are larger and rather more open in the umbilicus than British ones, which induced M. de Férussac to think that they might be distinct. The same remark is applicable to *H. nitidula*, but in both cases, I think, amounting to nothing more than a variety. *H. nitens*, Fér. Tab. des Moll. is only the English variety of this species in a small state. *H. nitens* of Michaud, if we may judge from the figures, is *H. nitidula*, Drap. I suspect his *H. nitidula* is, like that of Pfeiffer, the var. β . of Drap., and *H. radiatula* of this catalogue.

23. *Pura*, Ald.var. *H. nitidosa*, Fér.

Much confusion has arisen in the attempt to ascertain the *H. nitidosa* of Férussac, Tab. des Moll. of which neither figure nor description has been published. This arises from his quoting *H. nitidula*, var. α . Drap. as a synonym. There happens to be no var. α ; but the var. β , which, from his reference to the figures, Férussac must have meant, is our *H. radiatula*. His specimens are undoubtedly the horn-coloured variety of our *H. pura*.

24. *Crystallina*, Mull.

H. hyalina? Fér. Tab. des Moll. No. 224, appears to be a variety of this.

25. *Fulva*, Drap.var. *H. Mortoni*, Jeff.

A difference of opinion exists between English and continental naturalists, as to whether this species is the *H. Trochulus* or *H. fulva* of Muller. This it is impossible now to decide. It is certain, however, that the species now under consideration is the *H. trochiformis* of Montagu, and *H. fulva* of Draparnaud. Férussac has called another shell *H. trochiformis*, and as Draparnaud's name is more generally adopted, it is better to acquiesce in it. *H. Mortoni*, Jeff. is, I think, only a depressed variety of this. There is a small variety, not uncommon, darker coloured, and with very delicate and beautiful concentric striæ on the base, only visible with a high magnifier, which I at first considered distinct, but on closer examination, slight traces of these striæ are also visible on full-grown and decided specimens of *H. fulva*. I have therefore not ventured to separate them.

26. *Scarburgensis*, Ald.

H. lamellata, Jeff.

The name of *Scarburgensis* was given to this elegant little species by its discoverer, Mr Bean of Scarborough, who has done so much for this department of zoology that I feel anxious to retain it in compliment to him. It is to be regretted that Mr Bean had not at once published his discoveries, rather than have left them for others to record. Mr Jeffreys's name is in other respects a better one, and had so far the priority of publication, that the part of the Linnæan Transactions which contained his Synopsis appeared, while the first part of the Newcastle Natural History Society's Transactions was in the press. It may be objected to *H. lamellata* that Féruce has a *H. lamellosa*, to which it approaches rather too closely.

27. *Aculeata*, Mull.28. *Pulchella*, Mull.var. *H. costata*, Mull.29. *Pygmæa*, Drap.

Notwithstanding the information communicated by M. D'Orbigny to Mr Jeffreys, I still hold the opinion that this is the true *H. pygmæa* of Draparnaud. Many naturalists have erroneously considered it to be the young of *H. rupestris*.

30. *Rupestris*, Drap.

H. umbilicata, Mont.

31. *Rotundata*, Mull.32. *Striata*, Drap.

H. caperata, Mont.

I have not seen any British variety of this shell similar to *H. candidula*, Studer.

33. *Variabilis*, Drap.

H. virgata, Mont.

A very small variety of this, found on the coast of North Devon, is probably the *H. maritima*, Drap.

34. *Pisana*, Mull.

H. cingenda, Mont.

35. *Ericetorum*, Linn.

Gen. 7. CAROCOLLA, Lamarck.

1. *Lapicida*, Linn. Lam.

Gen. 8. BULIMUS, Bruguière.

1. *Acutus*, Mull. Brug.2. *Montanus*, Drap.3. *Obscurus*, Mull. Drap.

Bulimus Clavulus, Turt. cannot be considered a native species. It appears, however, to have spread beyond the limits of Mr Miller's nursery at Bristol, as Mr Williamson of the Manchester museum, showed me specimens obtained from a garden in that neighbourhood. *B. Decollatus*, Drap. is similarly situated, and has even less claim to be considered as British. Dr Turton introduces *B. articulatus*, Lam., and *B. ventricosus*, Drap. into his Manual, and informs us that they were sent to him "from the plains about Penzance, in Cornwall;" but by whom found or transmitted to him we are not informed. *B. articulatus*, Lam. is, according to M. de Férussac, a variety of *B. acutus*; and if he was right, which there is no reason to doubt, in the specimens he gave me under that name, it is certainly an inhabitant of this country, but not a species. Dr Turton's shell, however, now in the cabinet of William Clark, Esq. of Bath, is of another and very distinct species, not known, I believe, to inhabit Europe. Some more satisfactory information must, therefore, be obtained before admitting this, or the *B. ventricosus*, into the British list. *Bulimus tuberculatus*, Turt. appears to have been introduced by some mistake of Captain Blomer, who, I am afraid, was not sufficiently careful in keeping his English and Foreign specimens separate from each other.

Gen. 9. *ACHATINA*, Lamarck.

1. *Acicula*, Mull, Lam.
2. *Lubrica*, Mull. Mich.

Most modern authors (Férussac, Michaud, Mencke, Jeffreys, and Bouillet,) agree in detaching this species from *Bulimus*. Its close affinity to *Achatina foliculus*, Lam. points out its place in this genus, but it forms a link between the two. Perhaps Mr Jeffreys's genus *Cionella* ought to be adopted for this section of *Achatina*.

A. *Octona* has no real claim to be considered as British.

Gen. 10. *AZECA*, Leach.

1. *Goodalli*, Fér. Ald.

Gen. 11. *CLAUSILIA*, Draparnaud.

1. *Bidens*, Mull. Drap.

Turbo laminatus, Mont.

The specific name of *Bidens* has become rather ambiguous on account of having been applied by Linnæus and Muller, to two distinct species. The weight of authorities, however, is so much in favour of retaining it for this species, that I hesitate not to do so.

2. *Ventricosa*, Drap.

T. biplicatus, Mont.

Férussac originally referred *T. biplicatus*, Mont. to *C. ventricosa*, Drap., but he afterwards adopted the opinion that they were distinct. The British shell is more slender and spindle-shaped than the continental one, but the difference scarcely amounts to any thing more than a variety.

3. *Roiphii*, Leach.

Distinct from *C. plicatula*, Drap., to which it has been referred.

4. *Dubia*, Drap.

Found in several places in the north of England.

5. *Rugosa*, Drap.

var. *C. parvula*, Turt.

The *C. parvula* of Dr Leach, (specimens in the British Museum,) of Mr Jeffreys, and of Dr Turton, all belong, I think, to the same variety of *C. rugosa*, and not to *C. parvula* of Studer.

Turbo labiatus, Mont. (*Clausilia solida*, Drap.) has long stood in our British catalogues. It is stated to have been found in the neighbourhood of London about fifty years ago. The localities named are Hyde Park and Battersea Fields, but it is not now to be found in either of those places, and as the shells of this genus resemble each other very closely, it is probable that there may be some mistake in the species noticed. *C. ventricosa* is not uncommon at the roots of willows in Battersea Fields. The only specimens of *C. solida*, Drap. now in collections of British shells, appear to have come from the cabinet of Mr Humphreys, but the evidence of their native origin is not very satisfactory. *C. papillaris*, Drap. (*C. hidens*, Turt.) has also obtained a place among our native species. On this subject Mr Forbes has favoured me with the following very satisfactory information. He says, "I have lately obtained a manuscript copy of Lasky's North British Testacea, written by himself, which fully explains the history of the *British Clausilia papillaris*. He states that it was found by him in Granton Park, near Edinburgh, and that it was imported from abroad in moss round the roots of some exotics."

Turbo (*Clausilia*) *Everetti*, Miller, is a variety of *C. rugosa*.

Gen. 12. *BALEA*, Gray.

1. *Fragilis*, Drap. Gray.

Gen. 13. *PUPA*, Draparnaud.

1. *Umbilicata*, Drap.

2. *Marginata*, Drap.

3. *Anglica*, Fér., Ald.

4. *Secale*, Drap.

Gen. 14. VERTIGO, Muller.

1. *Edentula*, Drap. Pf.

V. nitida, Fér.

2. *Cylindrica*, Fér.

Pupa muscorum, Drap.

Since Mr Jeffreys's discovery of this beautiful little species on Durdham Downs, Mr Forbes has met with it near Edinburgh, and has also had it sent him from the west of Scotland.

3. *Pygmæa*, Drap.4. *Alpestris*, (Fér.) Ald.

Found at Clithero, Lancashire, by Mr Gilbertson ; and in Northumberland by Mr J. Thompson.

5. *Substriata*, Jeff.

Pupa sexdentata, Ald., Turt.

6. *Palustris*, Leach.

Pupa antivertigo, Drap.

7. *Pusilla*, Muller.8. *Angustior*, Jeff.

The difference between this species and the preceding appears to be more in the number of teeth than the contour of the shell, and if the former is permanent, it is undoubtedly the better character of the two.

Fam. CARYCHIADÆ, Jeff.

Gen. 15. CARYCHIUM, Muller.

1. *Minimum*, Mull.

Gen. 16. ACME, Hartmann.

1. *Lineata*, Drap., Hart.

Fam. CYCLOSTOMIDÆ. (Cyclostomacea, Mencke.)

Gen. 17. CYCLOSTOMA, Lamarck.

1. *Elegans*, Mull., Lam.

C. Productum, Turt. is a foreign shell picked up in Ireland.

C. subcylindricum, Flem. is a marine species (Truncatella Montagu, Lowe, Zool. Journ.) C. truncatum, Jeff. I take to be the same in a different stage of growth.

†† Fluviale.

Fam. LIMNEADÆ, Jeff. (Les Limnéens, Fér.)

Gen. 18. PLANORBIS, Muller.

1. *Corneus*, Linn., Drap.2. *Marginatus*, Drap.

var. Pl. rhombæus, Turt.

A variety of this shell, found near Edinburgh, is entirely without keel. *Pl. turgidus*, Jeff. is also a variety of this.

3. *Carinatus*, Mull.

4. *Disciformis*, Jeff.

I am not very sure, even after the examination of Mr Jeffreys's specimens, that I perfectly understand the distinction between this and the preceding species. The degree of carination is so very variable in different individuals of the same species, that it is rather fallacious as a distinguishing character. Further observations on this species are desirable.

5. *Vortex*, Mull.

6. *Spirorbis*, Mull.

7. *Lævis*, Ald.

Besides the localities in Northumberland mentioned in the Newcastle Natural History Society's Transactions, this species has been found in Ireland by W. Thompson, Esq. of Belfast, and there are specimens (unnamed,) in the Museum of the Jardin des Plantes at Paris from Granville; so that, though it has remained so long unnoticed, its range is considerable.

8. *Deformis*, Lam.

Pl. Spirorbis, Drap.

Pl. Draparnaldi, Shep. Jeff.

Pl. complanatus, Turt.

First introduced into our Fauna by the Rev. R. Sheppard, who found it in Suffolk. A specimen in my cabinet, from the rejectments of the sea near London, was submitted to the inspection of Dr Turton, who pronounced it to be of this species, and only the third he had seen, the two others being in his own cabinet. These latter I do not recollect to have seen in the possession of Mr Clark. Concerning my own specimen, there is considerable doubt whether it be in fact anything more than a variety of *Pl. albus*. It is a dead and unbleached shell, with a slight marginal keel, but exhibiting faint traces of spiral striæ under a magnifier. Mr Jeffreys has two specimens, also dead shells, which he refers to this species. They are from the rejectments of the river Taaf, near Cardiff. *Pl. complanatus* of Turton's Manual appears to be this species, though he makes no reference either to Draparnaud or Lamarck. It is rare in the collections of French naturalists. Pfeiffer makes *Pl. deformis*, Lam. a variety of *Pl. albus*; but Ferussac considered it distinct, and called it *Pl. acronicus*. It is desirable that it should be observed in a living state.

9. *Albus*, Mull.

Var. *Pl. glaber*, Jeff.

An examination of Mr Jeffreys's specimens of *Pl. glaber* confirms

me in the opinion that it is a variety of this species. In some specimens of *Pl. albus*, the spiral striæ are scarcely discernible, even in a living state, and become quite obliterated in dead shells.

10. *Contortus*, Linn. Mull.

11. *Lineatus*, Walker, Jeff.

P. clausulatus, Fer.

Segmentina lineata, Flem.

The tripartite partitions in this shell, though remarkable, are scarcely sufficient to raise it to the rank of a genus. The animal is exactly that of a *Planorbis*.

12. *Nitidus*, Mull.

Pl. complanatus, Drap.

As the *Pl. nitidus* of Muller evidently includes both this and the last species, authors differ much in opinion as to which of them should bear the name. To avoid the confusion that has hence arisen, it would be better to drop it entirely, and take for this species the name of *lenticularis*, which is given to it by some continental authors, and is very characteristic.

13. *Imbricatus*, Mull.

Var. *Pl. cristatus*.

Gen. 19. *PHYSA*, Draparnaud.

1. *Fontinalis*, Linn. Drap.

2. *Hypnorum*, Linn. Drap.

The difference between the animals of this and the former species perhaps justifies Dr Fleming in establishing the genus *Aplexa* for the present. A better knowledge of the other animals of this genus would enable us to separate them with more confidence.

Three other species of *Physa* have been described as British. Two of these, *Bulla (Physa) rivalis*, Maton, and *B. fluviatilis*, Turt. Mr Jeffreys supposes, with some probability, to be varieties of *P. fontinalis*. There is every reason to believe that *Physa alba*, Turt. is a foreign species.

Gen. 20. *LIMNEUS*, Draparnaud.

1. *Stagnalis*, Linn. Drap.

Var. *H. fragilis*, Linn.? Mont.

Young, *L. Scaturiginum*, Turt.

2. *Palustris*, Linn. Drap.

This is a very variable species, and has been divided into three or four by continental authors, upon the propriety of which division it is not easy to decide. There is a reputed variety inhabiting this country (var. β . Jeff.) which seems to have some claim to the rank of a species. It is found on the margins of rivers in different parts

of England, frequently within tide-way. It never grows to half the usual size of the species found in ponds, and is intermediate between that and the following.

3. *Minutus*, Drap.

A variety of this, much smaller in size, is also found on the margins of rivers. It is the var. γ . of Draparnaud, concerning which he says, "J'ignore si ce n'est pas une espèce distincte." The small variety is also found in mountain streams. A careful examination of this genus may enable malacologists to discover more definite characters to distinguish this species than those already employed.

4. *Elongatus*, Drap.

5. *Pereger*, Drap.

Var. 1. *L. ovatus*, Drap.

2. *L. lineatus*, Bean.

3. *Helix lutea*, Mont.

4. *Gulnaria lacustris*, Leach.

6. *Acutus*, Jeff.

This species is intermediate between *L. pereger* and *L. auricularius*, and, if not distinct, may, Mr Jeffreys observes, lead us to unite them all into one. It comes very near *L. lineatus*, Bean.

7. *Auricularius*, Linn., Drap.

8. *Involutus*, Thompson, MS.

Mr Thompson of Belfast announced the discovery of this beautiful new species to the Linnæan Society in 1834, and we shall no doubt be gratified with a description of it in his promised catalogue of Irish land and fresh water Mollusca. It would be interesting to know if the animal corresponds with that of *L. glutinosus*, as this circumstance, taken in conjunction with the shape of the shell, would go far to establish Nilsson's genus *Amphipeplea*.

9. *Glutinosus*, Mull., Drap.

Amphipeplea glutinosa, Nils.

Concerning *L. detritus*, which has so long appeared on our lists, I can add nothing to what has already been said by Dr Turton and Mr Jeffreys. Since the former gentleman withdrew his statement of having found this species in Ireland, Mr Bryer remains our only authority for considering it as British; but whatever the original shell found by Mr Bryer may have been, the specimens now in English cabinets appear all to belong to the genus *Bulimus*, and are most likely foreign. Captain Blomer sent me a foreign *Paludina* for this shell a few years ago.

The genus *Auricula* has not been included in this catalogue, though one of the species, *A. denticulata*, may be considered to be more fluviatile than marine. I found this species last summer on

the muddy margin of the river Wye, four miles from its junction with the Severn, generally out of the water, but within tide-way. Its habits are somewhat similar to those of some species of *Limneus*; indeed, a little further up the same river, nearly opposite Tintern, its place is taken by the small variety of *L. palustris* before-mentioned as common in such situations.

Fam. ANCYLIDÆ, (Ancylea, Mencke.)

Gen. 21. ANCYLUS, Geoffroy.

1. *Fluviatilis*, Mull.
2. *Lacustris*, Mull.

Ord. PECTINIBRANCHIA. (Pectinibranches, Cuv.)

Fam. TURBINIDÆ. (Les Sabots, Cuv.)

Gen. 22. PALUDINA, Lamarck.

1. *Vivipara*, Linn., Lam.
2. *Achatina*, Drap., Lam.
3. *Impura*, Drap., Lam.
4. *Similis*, Drap.
5. *Anatina*, Drap. Mich.

This species has been found in Greenwich marshes by J. E. Gray, Esq. to whom I am indebted for specimens. Though living so far inland, it appears to belong to a littoreal genus, rather than to *Paludina*, from which it differs in having a spirally grooved operculum.

Cyclostoma acutum, Drap. (*Paludina muriatica*, Lam.*) is now well known to be a marine species, allied to *Turbo Ulvæ* of English writers, and abundant on many of our sandy coasts. *P. Viridis* of Turton's Manual I take to be the young of *P. similis*, judging from specimens in Mr Clark's cabinet. His *P. stagnorum* is probably a more slender variety of the same; but in the absence of specimens it is impossible to decide. Dr Turton does not give any localities for either of these species.

Gen. 23. ASSIMINEA, Leach.

1. *Grayana*, Leach.

Allied to the littoreal tribes.

Gen. 24. VALVATA, Muller.

1. *Piscinalis*, Mull., Lam.

Var. *V. depressa*, Pfeiffer.

* Lamarck refers his *P. muriatica* to *C. anatinum*, Drap., but I follow Férussac in considering it to be the *C. acutum*. Michaud places these two in a separate division of the genus, which he calls "Espèces des eaux saumâtres."

Specimens of *V. depressa*, Pf. were sent me from Lancashire some years ago by Mr Kenyon. They are exactly similar to those in Férussac's cabinet, received from Pfeiffer himself; but it can scarcely be considered more than a variety of *V. piscinalis*.

2. *Cristata*, Mull.

V. spirorbis, Drap.

Dr Turton has introduced two other species, *V. planorbis*. Drap. and *V. minuta*, Drap. into his Manual, but no specimens of them are now to be found in his cabinet. I took some pains to investigate these two species when in Paris. On examining three of the principal collections there, those of the Jardin des Plantes, the Baron de Férussac, and the Prince Rivoli, in the latter only I found anything under the name of *V. planorbis*. The specimens were *V. cristata*, Mull. M. de Férussac had specimens under the name of *V. minuta* from two different individuals. Those from Pfeiffer are, I think, the young of *V. cristata*; and the others (I forget from whom, but with the name of Draparnaud,) the young of *V. piscinalis*. Mr Miller introduced *V. minuta* into his Catalogue of the Land and Fresh water Shells of the environs of Bristol, but no specimen of it is preserved in the Bristol Museum. Dr Turton says that his *V. minuta* is the *Helix serpuloides* of Montagu. This is well known to be a marine shell, referable to the genus *Skenea* of Fleming. Mr Thompson of Belfast has, however, favoured me with the examination of a shell, which may possibly turn out to be the *V. minuta*, Drap., though I suspect it to be marine.

Fam. NERITIDÆ, Turt. (Les Nérites, Cuv.)

Gen. 25. NERITINA, Lamarck.

1. *Fluviatilis*, Lin. Lam.

2d Section. MOLLUSCA ACEPHALA, Fer. (Les Acéphales, Cuv.)

Class.—CONCHIFERA, Lam. (Acéphales testacés, Cuv.)

Ord.—LAMELLIBRANCHIA. (Lamellibranches, Cuv.)

Fam.—MYTILIDÆ. (Les Mytilaces, Fér.)

Gen. 26. DREISSENA, Vanbeneden.

1. *Polymorpha*, Pallas, Vanb.

This species, being found in three localities in England, and one in Scotland, seems now to have regularly established itself in our island.

Fam. NAIADÆ. (Les Nayades, Fer.)

Gen. 27. ANODON, Oken. (Anodonta, Lam.)

1. *Cygnæus*, Lin. Lam.

2. *Cellensis*, Pf.
3. *Intermedius*, Lam.
4. *Anatinus*, Lam.
5. *Ventricosus*, Pf.

Gen. 28. UNIO, Bruguiere.

1. *Margaritiferus*, Lin. Nils.
2. *Tumidus*, Nils.
 Mysca solida, Turt.
 ovata, Turt.
3. *Pictorum*, Linn. Lam.
4. *Rostratus*, Lam.
5. *Batavus*, Lam.

The foregoing is given as the nearest approximation to a correct list of the British species of *Anodon* and *Unio* (according to the views of Pfeiffer) which the present state of our knowledge will allow ; but so various are the opinions of authors on these difficult genera, and so little have the British species been investigated, that we are much in need of further information on the subject.

Fam. CYCLADÆ, Flem. (Les Cyclades, Fér.)

Gen. 29. CYCLAS, Bruguiere.

1. *Rivicola*, Leach.
2. *Cornea*, Linn., Lam.
3. *Calyculata*, Drap.
 Var. *C. lacustris*, Turt. Ald.

The *Cyclas lacustris* of Draparnaud is certainly unknown to British naturalists ; but as the species is described by most of the continental authors, we might naturally conclude that they were well acquainted with it. The contrary, however, appears to be the fact. M. de Férussac, who, from his extensive correspondence, might have been expected to possess the best information on the subject, gave me a variety of *C. cornea* (frequently found in this country) as the supposed *C. lacustris*, Drap. This, though slightly rhomboidal in outline, does not agree very well with Draparnaud's description. Mr Clark has a shell obtained in Devonshire which comes nearer to it. It is to be hoped that this gentleman will shortly lay before the public the store of very valuable information on British Molluscous animals of which he is possessed.

Gen. 30. PISIDIUM, Pfeiffer.

1. *Obtusale*, Pf. ? Jen.

2. *Pusillum*, Turt. ? Jen.
3. *Nitidum*, Jen.
4. *Pulchellum*, Jen.
5. *Henslowianum*, Shep. Jen.
6. *Cinereum*, Ald.
7. *Amnicum*, Mull., Jen.

The excellent monograph of the Rev. L. Jenyns has been implicitly followed in this family, with the single exception of the introduction of an additional species of *Pisidium*, described in the second volume of the Newcastle Natural History Society's Transactions.

II.—*On the Botany of Erris, County Mayo, and a notice of several additions to the Flora Hibernica.* By CHARLES C. BABINGTON, M. A., F. L. S., &c.

As the western part of Ireland is not well known to English naturalists, a short account of my botanical observations, made during a tour in the counties of Mayo and Galway, but more particularly the former, may perhaps be acceptable. Had this district been even moderately known, I should not have presumed to introduce so very imperfect a sketch of its native flora, but when I find that it is scarcely noticed in Mr Mackay's *Flora Hibernica*, I cannot avoid thinking that even these cursory observations may be interesting to British botanists.

It was about the middle of the month of July 1836 when I arrived at Westport, a small town at the head of Clew Bay, county of Mayo, and determined upon visiting the wild district of Erris. But, during a morning walk, previously to starting for that country, I noticed the following plants, most of them, indeed, very common, yet considered worthy of notice, as showing one of the most westerly points of their range. It may perhaps be as well to add, that this is the nearest land to America, although this is not the most westerly part of Ireland.

On the cultivated land the following plants occurred: *Scrophularia nodosa*, *Sonchus oleraceus*, *S. asper*, *Circeæ lutetiana*, *Veronica agrestis*, *V. polita*.

In a bog upon the north side of the harbour, and which is probably sometimes overflowed by the tide: *Plantago maritima*, *Triglochin maritimum*, *Linum catharticum*, *Glaux maritima*, *Spergula nodosa*, *Samolus valerandi*, *Rumex hydrolapathum*, *Anagallis tenella*, *Carduus pratensis*, *Ranunculus hederaceus*, *Hypericum humifusum*, *Phalaris arundinacea*.

I also noticed, in the same bog, a species of *Rumex* differing very

materially from *R. crispus*, and which I referred, upon the spot, to *R. pratensis*. It was unfortunately in too young a state for me to obtain any ripe fruit, and my friend, Mr Borrer, was therefore unable to determine it with certainty from my specimens. It is much to be wished that some botanist, who may visit that county in the autumn, would pay attention to it. I shall point out several other stations for it before concluding this paper.

At a distance of forty-three Irish miles from Westport, and at the upper end of Black Sod Bay, is situated the little town of Bellmullet. This place is the capital and only town in the barony of Erris. For the greater part of that distance, the road to Bellmullet passes over uncultivated and almost uninhabited bogs and mountains.

At Lough Clunon, a few miles from Westport, I gathered *Carduus pratensis*, which is common throughout the counties of Mayo and Galway, and also the following plants: *Eriophorum angustifolium*, *Erica tetralix*, *E. cinerea*, *Potentilla comarum*, *Myrica gale*, *Lobelia dortmanna*, *Habenaria chlorantha*, *Hieracium paludosum*, *Hypericum pulchrum*, *Polypodium vulgare*, *Blechnum boreale*.

A few miles farther on by the side of Lough Beltra, a beautiful lake surrounded by mountains, I noticed *Polygonum persicaria*, *Chrysanthemum leucanthemum*, *Raphanus raphanistrum*, *Pedicularis palustris*, and upon the ledges of some fine rocks near to the police station, I found the reflexed form of *Aspidium dilatatum*, which is mentioned in Sir W. Hooker's *Brit. Flora*, p. 451, (note;) and also a very curious variety of *Asp. filix-fœmina*, having its pinules very broad and deeply inciso-serrate, the teeth sharp, and sometimes again serrated. A very few specimens occurred, but they were full of fruit.

We stopped for the night at a farmer's cabin, close to the foot of the lofty mountain called Nephin, and having a few hours of daylight remaining, I ascended to nearly its highest point. It consists of a lofty ridge, sloping down gradually at both ends, but very steep upon its sides. The summit is bare, and I only noticed the following plants: *Solidago virgaurea* β . *cambrica*, *Saxifraga umbrosa*, *Vaccinium vitis-idaea*, *Empetrum nigrum*, *Melampyrum sylvaticum*.

In the bogs at its foot were the following: *Rhynchospora alba*, *Drosera anglica*, *D. rotundifolia*, *Schoenus nigricans*, *Gnaphalium sylvaticum*, β . *rectum*, *Peplis portula*.

A small quantity of natural wood occurs upon the lower slope of the mountain, and by the side of a neighbouring river. It consists of *Ilex aquifolium*, *Pyrus aucuparia*, *Quercus robur*, *Alnus glutinosa*, *Betula alba*, and *Corylus avellana*. They must be considered as

little more than bushes, few of them forming trees. In this wood I noticed *Carex extensa* and *Valeriana officinalis*.

The road from Nephin towards Erris now passes, for many miles, over an extensive bog, bounded, both towards the north-east and south-west, by lofty mountains. The latter range is of extraordinary beauty; it includes the lofty and rugged summits of Nephinbeg and Curshleve. These mountains would, no doubt, well repay the botanist, but they are nearly inaccessible from the total want of accommodation, even of the poorest kind, within many miles of their base. Their unfrequented recesses are still inhabited by a few red-deer.

A large portion of these bogs might be brought into cultivation at a comparatively small expence. They are seldom perfectly flat, and in many parts their slope is considerable. The subsoil is often of a sandy nature, being apparently formed of the decomposed mica slate and quartz rock from the neighbouring mountains. There is frequently good natural pasture upon the banks of the rivers. This is probably occasioned by the annual supply of sand brought down by the winter torrents.

After passing this dreary country, we enter Erris by crossing the large river Owenmore. The road follows its course for some miles, descending a fine valley denominated Glan Co. This valley is seldom more than a mile in width, usually much less, and, in almost all parts, might easily be brought into cultivation. It is bounded by hills, which are steep but of moderate elevation, and, but for its total want of trees, would be one of the most beautiful spots in the kingdom. I here noticed *Habenaria chlorantha*, *Potentilla comarum*, *Myosotis repens*, *M. cæspitosa*, *Carex ovalis*, *Hypericum quadrangulum*.

At the further end of Glan Co is the small village of Bangor. This is a poor place, consisting of a few cabins, and two or three moderate houses. The remaining ten miles to Bellmullet is perhaps the most interesting part of the whole road from Westport, being much varied with bog and mountain, passing near the large sheet of water, Lough Garrowmore, through a narrow pass, denominated Glan Castle, and commanding a succession of grand and extensive views of the Erris mountains, the Isle of Achill and the broad expanse of the Atlantic. The entrance to Glan Castle is so narrow as only to admit the road which is cut out of the rock, and a small river to pass between the steep declivities by which it is bounded. Just at its entrance there is a fine basaltic dike, which stands out from the hill side like a stone-wall. In this pass I noticed *Hypericum androsæmum*, *Scirpus Savii*, *Aspidium dilatatum*, and its con-

cave variety mentioned before ; also *Asp. filix-fœmina* with fronds of more than five feet in length. I may mention that I captured here a single specimen of *Carabus clathratus*.

The valley of Glan Castle gradually widens into an open undulating country, which extends on all sides as far as the ocean. From the top of a slight eminence, a most extensive view is obtained, including Broad Haven, Black Sod-Bay, the whole extent of the Mullet, and the distant summits of the mountainous island of Achill.

Black Sod Bay and Broad Haven are separated by a very narrow neck of land ; in one place it is not more than 100 yards from sea to sea. The little town of Bellmullet is built upon this neck of land, so that its main street extends to the high-water-mark of both those deep inlets. It has not been many years in existence, and is now in a flourishing state.

The northern part of the Mullet is an extensive boggy moor, on which I gathered *Drosera rotundifolia*, *Schœnus nigricans*, *Helosciadium nodiflorum*, *Myosotis repens*, *Cenanthe crocata*, *Osmunda regalis*.

On a few patches of cultivation *Carduus pratensis* and *Senecio viscosus* abound, and in flax-fields, *Camelina sativa* is frequent.

On the western shore I noticed *Scirpus Savii*, *Arenaria peploides*, *Glaux maritima*, *Plantago coronopus* in a very diminutive state, *Spergula nodosa*, *Anthyllis vulneraria*, *Orchis latifolia*, *O. maculata*, and *Papaver dubium*. At the distance of about a mile south of Binghamstown, in a lane leading from Drumrhe to Crosslake, I found *Callitriche pedunculata* in plenty, and, at a short distance to the north of the same place, *Lathyrus pratensis* and *Vicia cracca* are common in the pastures. I here noticed the *Rumex* mentioned before as closely resembling *R. pratensis*. I may add that it also occurs upon the waste ground below Sir R. O'Donnel's house at Newport, county Mayo.

The southern part of the Mullet is being gradually overwhelmed by drifting sands, and the extreme point consists of a hill of granite. In this sandy district *Achillæa millefolium* puts on a peculiar appearance, becoming quite dwarfy, and extremely woolly. From the top of the granite there is a splendid view of the Isle of Achill, the lofty mountains of Erris, and the Atlantic ocean.

After returning to Westport, I again visited Cunnamara. I need say little of that interesting district, having elsewhere given a detailed account of it.* I visited several parts of that country on the present occasion, which I had been unable to inspect during my

* In Vol. ix. page 119, of Loudon's Mag. of Natural History.

previous tour, and was still more impressed with the peculiar grandeur of its mountain scenery. I certainly do not know of any spot in the British Islands which will so well repay a visit.

In Cunnamara I made numerous inquiries concerning the bog timber, and was informed that two very distinct kinds of deal are found in great plenty. One of them has a twisted stem, burns with a clear flame and fine scent; it is used for torches, and is called Corchep by the people. The other is not twisted, is far better for the ordinary purposes of timber, and is said to have a much larger root in proportion to its stem than the *Pinus sylvestris*. I have reason to think that the true Scotch fir (*P. sylvestris*) has *not* been found in a wild state in Ireland, nor have I seen any proof of its occurring in the bogs. From its being the only fir known to be a native of Great Britain, it has been taken for granted that it was also the only one in Ireland. I am sorry to see that my friend Mr Mackay has adopted this idea in his valuable *Flora Hibernica*. He says that the roots of the Scotch fir, obtained from the bogs, are used as torches. This is worthy of experiment, and since the old roots must be plentiful in the Scotch pine forests it may very easily be ascertained.* I need hardly add that several different layers of bog timber are found, and that therefore there is no reason to doubt that the trees grew upon the bog itself. As no trees are now growing naturally upon the bogs, it is a point of great interest to ascertain what species are best suited for so peculiar a situation. I had great hopes of being able to determine at least one of these species, by obtaining some of its cones, but although I was informed by several intelligent men that they were often found, and that they would undertake to obtain them for me, I have recently learned that they have been disappointed in their researches.

Eriophorum polystachion is frequent in Cunnamara, and may always be distinguished from *E. angustifolium*, by its broad, flat, and keeled leaves. At Roundstone I gathered *Arabis ciliata*, growing in the chinks of granite rocks, and again visited the stations of *Eri-*

* The roots of pine which are found in the Scotch bogs are dug up, split, and used for torches instead of candles, and appear to possess all the qualities of ready and bright combustion ascribed to the Irish bog timber by Mr Mackay. (See Lightfoot, Hooker, &c., and the writings of other botanists of Scotland.) The roots of the Scotch fir (*Pinus sylvestris*), which form our modern plantations, are in many parts dug out, split, and dried, and are used as lights for spearing salmon. The splinters are placed in a narrow grating fixed in the boat, give a clear and brilliant flame, which by keeping the fire supplied may be kept up for hours. Trees that have been blown down are generally preferred for this purpose.—EDS.

ca Mediterranea and Mackaiana. The former has now been gathered in several other parts of Mayo and Galway, and, although the latter is still only known to occur in one spot, yet I am more and more confirmed in the opinion that it is a truly distinct species.

Upon a wooded hill that projects into Lough Corrib, called Drumsna, I noticed *Hymenophyllum Tunbridgense* and *H. Wilsoni*, *Rubus idæus*, *Hieracium umbellatum*, *Scolopendrium vulgare*, and the concave variety of *Aspidium dilatatum*. Near to Flinn's house there is a great quantity of *Osmunda regalis*.

In conclusion, I would point out the two following plants as new to the Irish flora, *i. e.* *Callitriche pedunculata*, found in the Mullet, and *Myosotis repens*, which is common in Cunnamara, at Westport, and in Erris. I carefully examined Cushtrower Bay, but was unable to find *Atriplex pedunculata*.

My friend, E. Hill Esq. of Oxford, informs me that he gathered *Eriophorum pubescens* at Woodlawn, near Killconnel, county Galway. This is its second Irish station. He also mentions that Miss Trench has discovered *Euphorbia peplis* at Garreries Cove, near Tramore, county Waterford. This is not contained in my friend Mackay's *Flora Hibernica*. Mr Hill was so good as to show me specimens of both these plants. From the accidental loss of a specimen, *Fedia auricula* was omitted by Mr Mackay. I gathered it, as mentioned in Loudon's Magazine, at Oughterard, county Galway, in the month of August 1835.

St John's College, Cambridge,
March 20, 1837.

III.—*Notes upon Subaquatic Insects, with the description of a New Genus of British Staphylinidæ.* By J. O. WESTWOOD, F. L. S. &c. Plate IV.

THE economy and physiological peculiarities of those species of insects and other annulose animals, which, although organized for aerial respiration, are enabled to abide in situations, which are indeed their natural habitats, where they are for a very considerable period of time entirely submerged beneath the surface of waters, are extremely interesting, and well worthy of a more scientific investigation than has hitherto been given to them. The habits of the diving water spider (*Argyroneta aquatica*, Latr.) have been long ago observed by De Geer and others, but up to the present time, as we learn from Mr Kirby's Bridgewater Treatise, the precise manner by which this spider is enabled to envelope itself in a dome of air, and

to descend with its miniature diving-bell to the bottom of the water in which it resides, has not yet been discovered. The observation of spiraculated aquatic imagines will not very greatly assist us in this inquiry, because we find no uniformity existing in their mode of inspiration; thus, when the perfect Dyticideous beetles ascend to the surface of the water, they expose the extremity of the body, and thus admit air into the space which exists between the upper surface of the abdomen and the closed elytra; whereas in the Hydrophilidæ the head is brought to the surface of the water, and then one of the clavate antennæ is projected, the club of these organs being covered with fine hair. This club is, however, so twisted that whilst the base is exposed to the air the extremity is brought in contact with the breast, which, as well as the whole under side of the insect, is covered with short silky pubescence. "By this means," observes Burmeister, "a communication is made with the external air and that beneath the water covering both the clava of the antennæ and the whole under surface of the insect, to which it adheres by means of the coating of down; and by this communication fresh air is transmitted to the venter of the insect, and by the same means the expired air is also removed, and the air is likewise transmitted from the ventral surface beneath the elytra, where it is in, and expired by the spiracles there situated."*

This distinction appears to me to result entirely from the presence or absence of the coating of plush or fine down, with which the bodies of some of these insects are provided, because in the Dyticidæ, which do not respire by means of a supply of air coating the underside of the body, we find the body not externally covered with this coating of plush.

The genus *Nepa* offers a still more remarkable modification in the structure of its respiratory organs and mode of respiration. On examining an insect of this genus, the spiracles appear at first sight to be in the ordinary position and of the ordinary form; but we learn from M. Dufour's admirable *Recherches Anatomiques sur les Hemipteres*, that these spiracles have no orifice and are quite useless, the only spiracles being two, which are placed at the base of the anal setæ. Thus it is only by thrusting these setæ out of the water that the insect can obtain a supply of air.†

The insects to which we have directed our attention are enabled to swim with greater or less facility, and hence it is that they can obtain fresh supplies of external air at pleasure; moreover, for

* Manual of Entomol. p. 392, Shuckard's translation.

† See Brit. Cyclop. Nat. Hist. Vol. ii. p. 870. fig. 150.

the most part, they frequent still waters, and their movements are not influenced by the agitated state of the fluid in which they reside.

But there are other insects which pass a great portion of their lives under water without possessing the power of swimming about, and thus obtaining at will due supplies of air ; and there are others which, in addition to this deficiency, are inhabitants of situations which for hours, days, and even weeks are entirely covered by the rolling tide of the sea, it being only at the period of neap-tides that the spots where they are found are left uncovered by water.

M. Dutrochet has endeavoured to explain the manner in which respiration is effected in the first of these cases, in a memoir upon the larva of a moth, *Hydrocampa potamogeta*, read before the Académie des Sciences, which, as well as the pupa, resides constantly, although provided with spiracles and not with branchiæ, beneath the surface of stagnant water. " Il arrive pour cette chenille," according to this author, " qu' épuissant par l'act de la respiration l'oxygène de l'air atmosphérique qui l'environne l'azote restant se dissout dans l'eau et en extrait du gaz oxygène. Mais en même temps le gaz acide produit par la respiration se dissout aussi dans l'eau et en extrait l'air atmosphérique, dont l'oxygène sert naturellement à la respiration et dont l'azote répare la perte du gaz azote dissous." This may indeed perhaps be considered as the real solution of the chief inquiry, but there are so many differences both of economy and structure in the subaquatic insects, that it must be evident, that by minutely investigating each, we may arrive with greater certainty at the general truth. Moreover, as in the case of those natatorial species which from time to time come to the surface of the water for fresh supplies of air, the respiratory process is probably different from those which are constantly beneath its surface, as in the larva of the water moth above-mentioned. We may consider those species which, at certain periods, do obtain supplies of fresh air, but in such small quantities as not to last for their consumption for the long space of time they may be submerged, as occupying an intermediate station between these two groups breathing fresh air at one period, and oxygen disengaged from water at another.

Of this latter class one of the most interesting species is the *Aëpus fulvescens*, a minute carabideous insect found upon the shores of France and England, and whose economy has been traced by M. Victor Audouin in his " Observations sur un insecte qui passe une grande partie de sa vie sous la mer," published in the *Nouvelles Annales du Museum d'Histoire Naturelle*, Vol. iii. p. 117. This insect is not clothed with a coat of plush on its underside ; but when examined with a lens its head, thorax, legs, antennæ, and abdomen

are found to be furnished with long hairs ; and M. Audouin observes that when the insect is plunged into water each of these hairs “*retient une petite couche du fluide élastique qui, réuni d’abord en petits sphéroïdes, forme bientôt un globule lequel entoure son corps de toutes parts et qui malgré l’agitation qu’il se donne en courant dans l’eau, au fond ou contre les parois du vase où on la placé ne s’échappe jamais.*” But this bubble of air is so small that, from the length of time that the insect remains submerged, it must soon become unfitted for respiration. And it is only by adopting the views of M. Dutrochet that we can explain the manner in which the *Aëpus* is enabled to remain beneath the surface of the water. M. Audouin has noticed the large ungues with which this insect is provided, enabling it to cling firmly to the stones, &c. amongst which it is found ; but in addition to these, the penultimate joint of the anterior tarsi is furnished with a long and curved bristle, meeting the ungues, which, together with the strongly developed jaws and under jaws, indicates very rapacious habits, the former being evidently serviceable in securing its prey. We can indeed easily perceive the necessity for activity in an insect situated, as the *Aëpus* must be, beneath the rolling tide, both in its ordinary motions, and in obtaining its supply of food.

In a subsequent note, published in the *Annales des Sciences Naturelles*, M. Audouin has pointed out the identity between this insect and the *Cicindela marina* of Strom, published in the *Nouv. Mémoires de la Société Royale de Danemark*, for 1783.

Mr Spence, in a short memoir published in the third part of the *Transactions of the Entomological Society of London*, has collected notices from the *Transactions of the Old Entomological Society* and the *British Entomology of Mr Curtis*, of two other Coleopterous insects having similar habits, namely, *Pogonus Burrellii*, Haw. the habitation of which is entirely covered with water during the winter, and part of the summer months, and *Bledius tricornis*, which inhabits the sand hills near the sea at Cley in Norfolk.

In the *Entomological Magazine*, Number 7, April 1834, is contained an interesting memoir by the Rev. G. T. Rudd upon the habits of *Hesperophilus arenarius* and *Dyschirius*—? the former of which was observed by him in great flights settling on the sand below high-water mark. Mr Rudd inquires “*what would become of the multitudes that dropped many yards below high-water mark, and burrowed in the sand? Would they again take wing? or would they perish as the flood covered their hiding place? I waited to see the event. The tide rolled on—covered the sands—with all their inhabitants—and again receded. I disturbed my friends from*

their retreat—they were as lively as if they had been sporting in the sunshine, instead of having been under water for more than half an hour! One point was clear, (confirmed by repeated observations subsequently,) that these Brachelytrous insects have the power of enduring submersion and under salt water for at least half an hour. But why did they leave their burrows at a lower part of the sand? I had previously often collected on this spot, at different periods of the year, during the neap-tides, and on the most brilliant days, without having seen a single *Hesperophilus* on the wing. It is fair, therefore, to suppose either that the extraordinary flight I witnessed was a mere casual occurrence, or that, in some way or other, it is to be accounted for by the state of the tide. (It was the first of the spring tides.) On this latter supposition these insects must have been warned by some peculiar instinct to move higher up the sands, and thereby to avoid submersion for a period that probably would have exceeded their power of endurance.”

Now the observations of MM. Dutrochet and Audouin, and the perfect analogy between the habits of the *Hesperophili*, *Bledii*, and *Aëpus fulvescens*, prove that the immersion of these insects was not a circumstance to which they were unused. And hence, I think, we must look for some other solution to the inquiry why these insects were on the wing in such swarms, than that suggested by Mr Rudd.

In a later number of the same work, (No. 18, January 1837,) Mr Haliday states that he found *Cillenum laterale* under stones near low-water mark. “They prey upon sandhoppers, (*Talitrus Locusta*, Leach.) The tide retiring has scarcely uncovered the sand when these little depredators are abroad from their hiding-places, and alert in the chase. A great part of their existence is passed under the sea, and the mode in which they obtain the necessary supply of oxygen during their prolonged submersion, when the small quantity in the air bubble which they convey with them is exhausted, seems to deserve a more particular investigation.” As in *Aëpus* we find the mouth of this insect strongly developed, and the fore-legs are constructed in a peculiar manner, (somewhat analogous to those of *Aëpus* noticed above,) the upper edge of the tibial notch being furnished with two deflexed spines, between which the end of the moveable spine arising from the opposite angle is received. The spines attached to the basal joints of the anterior tarsi are also very strong. Thus the structure of this insect is equally adapted for its depredatory habits, whilst the strong bristles with which the limbs and body are furnished are similar to those of *Aëpus*. In company with the *Cillenum*, Mr Haliday discovered a new and

singular minute brachelytrous insect, which he has described under the name of *Diglossa mersa*, and in which the powerful structure of the tarsi, tarsal claws, and mandibles, as well as the ciliation of the legs, indicate a mode of life similar to that of *Aëpus*.

My friend, Dr Johnston of Berwick, whose investigations upon the submarine invertebrated animals have led him to explore the sea coast in his neighbourhood with so much success, has also met with the *Aëpus* near that town. And in the same situation he discovered several specimens of another brachelytrous insect, together with several small coleopterous larvæ and pupæ, which he has been so good as to place in my hands. These were all taken from under rocks within tide mark, fully 200 feet below high-water mark, and within 50 feet of low water mark, and where at each tide the rocks are covered for four hours or thereabouts.

The perfect insects in question prove to be undescribed, belonging to none of the genera hitherto established in the sub-family *Omalides*, to which they are referable. The very minute size of the elytra are quite characteristic of the insect, distinguishing it from all the other *Omalides*, in some of which the elytra nearly cover the abdomen, being of a larger size than usual in this group.

Genus, *MICRALYMMMA*,* Westw. (Plate IV.)

Corpus oblongum, depressum, lateribus abdominis marginatis. *Antennæ* mediocres, extrorsum crassiores. (Fig. 1 *c.*) *Palpi* maxillares articulo ultimo præcedenti longiori, elongato-conico. *Thorax* posticè angustior, capite paulo latior, lateribus rotundatis. *Elytra* minuta, segmentum primum abdominis vix tegentia. *Pedes* graciles. *Tibiæ* extrorsum inermes. *Tarsi* simplices, longè ciliati, articulis ultimis elongatis, reliquissimulsumptis æqualibus. (Fig. 1, *f.*) *Ungues* simplices, haud basi recurvati.

Structura oris.—*Labrum* transversum, margine antico ciliato et trilobato lobis fere æqualibus et rotundatis. (Fig. 1, *a.*) *Mandibulæ* elongato-trigonæ, acutæ, marginibus externis nonnihil arcuatis, setigeris, interno fere recto impressione sub apicem. (Fig. 1, *b.*) *Maxillæ* (Fig. 1, *c.*) elongatæ, curvatæ, bilobatæ, lobo interno gracili apice acuto intus setoso, externo majori sub apicem articulo. *Palpi maxillares* maxillis fere duplo longiores, 4-articulatæ, articulo 1mo brevissimo, 2do triplo longiori ad apicem crassiori, 3tio præcedenti duplo breviori, obconico; ultimo longitudine secundi elongato-conico. (Fig. 1. *g.*) *Mentum* transversum, antice paulo angustius, lateribus subrotundatis, angulis setâ longâ instructis. *Labium*

* *Μικρός*, parvus, et *Καλυμμα*, tegmen.

mento vix angustius, apice profundè emarginato et ciliato. *Palpi labiales* labio vix longiores 3-articulati, articulis magnitudine sensim decrescentibus. (Fig. 1, *d.*)

Species unica.

Micralymma Johnstonis, Westw. (Plate IV. Fig. 1.)

Tota nigra, subpubescens, haud nitida, sublævis.

Long. corp. $1\frac{1}{2}$ lin.

Habitat in arenosis ad littora prope villam "Berwick-upon-Tweed" dictam.

In honorem Dominæ Johnstonis, rerum naturalium pictoris elegantissimæ uxoris Domini G. Johnstonis, et rerum maritimarum obscurarum naturæ scrutatoris eximii, indefessique.

This insect is most nearly allied to the genera *Anthobium*, *Omalium* and *Coryphium*. From all these, however, it is at once distinguished by the minute size of the elytra. In *Anthobium*, moreover, the body is broad and ovate; in *Omalium* the body is also much shorter and broader than in this insect; whilst in *Coryphium* the head is much broader than the thorax, and the palpi clavate. The trophi are not very different from those of *Coprophilus* (*Elonium*, Leach.)

In company with these insects were found specimens of the coleopterous larvæ and pupæ from which the accompanying sketches (Fig. 2 and 3) have been taken. The former (Fig. 2) is very long and narrow, with an oblong flat head, armed with acute sickle-shaped jaws (Fig. 2, *m.*) having a single very strong external tooth about the middle of the interior margin. The maxillæ are represented by an elongated stem supporting two articulated lobes, the exterior four-articulated, the two basal joints very thick, and the two terminal joints slender, and the interior two-jointed, the joints of nearly equal length (Fig. 2, *mx*): the lower lip and its appendages (*instrumenta labialia*) are represented by a square basal joint supporting two thick detached cylindrical scapes, each terminated by a slender two-jointed palpus (Fig. 2, *l.*) The antennæ (Fig. 2, *A*) are four-jointed, the first, second, and fourth joints of nearly equal length, the third twice as long, and irregularly shaped, having a lateral appendage. These organs, as well as the different parts of the mouth, are furnished with long curved hairs. Eyes — ? Prothorax larger than the following joints, which are nearly equal in size, except the terminal one, which is smaller, and terminated by a cylindrical proleg, having on each side a slender two-articulated and setose filament. The legs (Fig. 2, *b*) consist of three pairs, attached in pairs to the three anterior segments of the body. Length of the larva a line and three-quarters.

The pupæ (Fig. 3 and 3 a) are small, broadly ovate, flattened, with the head concealed beneath the shield-like prothorax; the antennæ cases short; the legs arranged on the breast, not extending beyond the centre of the under side of the abdomen. The wing-cases are very short, not extending beyond the sides of the body; the front margin of the prothorax is furnished with two very long curved and several shorter bristles. The sides of the abdominal segments are also furnished with very long curved bristles, and this part of the body is terminated by two minute and narrow lobes.

It is unquestionable that both these larvæ and pupæ are those of a species of Staphylinidæ. The similarity of the former with the larvæ of several species of this family figured by myself in the *Zoological Journal*, and by Mr Waterhouse in the *Transactions of the Entomological Society*, Vol. i. leaves no doubt that this is the case with respect to the larva, whilst the minute size of the elytra and the shortness of the antennæ in the pupa, also prove that this is also brachelytrous. Hence I feel but little hesitation in regarding these larvæ and pupæ as those of *Micralymma Johnstonis*. In all these insects we see the same provision made for occasional respiration and abode beneath the surface of the water. The long hairs with which the legs of the imago are furnished, and the strength of the organs of the mouth, are analogous to what has been noticed in *Æpus*, whilst a reference to the figures, both of the larvæ and pupæ, will show that the same circumstances exist also in those states.

There still remain to be noticed some coleopterous insects, which, although unable to swim, reside at great depths beneath the surface of the water, although unprovided with the long hairs which we have seen are of so much service in *Aëpus*, &c. in retaining the globe of air. To these M. Audouin appears at first to have been inclined to apply the theory of M. Dutrochet, observing, “ Je citerai encore plusieurs espèces de Coléoptères du genre *Elmis*, que l'on trouve sous les pierres au fond des ruisseaux et que jamais on n'a vu respirer l'air à leur surface. Il en est (a) de même des *Dryops* des *Macroniques* et des *Georisses* qui appartiennent à le même famille.” It appears, however, that, in printing this memoir, the words “ à quelques égards ” were omitted at the place where I have placed (a). In the copy of this memoir, which the author was so kind as to send me shortly after it was printed, the equivalent words “ à peu pres ” were introduced with a pen. This is the more requisite to be noticed, because my friend, M. Wesmael of Brussels, has attacked M. Audouin upon this point, observing, that, as the surface of the body in *Elmis* is unfurnished with long hairs, it is unable to retain a bubble of air, whilst on the underside there is observed on

each side a broad longitudinal band, contiguous to the lower margin of the Elytra, formed of a silky plush, which is most probably serviceable in retaining the necessary supply of air. The body of *Parnus* (*Dryops*) is entirely covered with this plush, but in *Georyssus* it is quite naked, and hence M. Wesmael thinks that it is not sub-aquatic, as supposed by M. Audouin, being, indeed, always found upon damp earth. (*Annales Soc. Entomol. de France* 1835, p. xl.) The genus *Elmis* and some others constitute a small tribe, which has been appropriately termed *Macroductyle*, from the large size of the claws, which enable these insects to retain their stations in the most violent streams. I once found many specimens of several species of *Elmis* under stones in a mill stream, a yard and a half deep, close to the mill-wheel, where the water must have been constantly in agitation. The entire structure of these insects, and especially of the mouth, exhibits a striking contrast with that of *Aëpus*, &c, originating in the difference of their habits and motions, the *Elmidæ* feeding upon minute aquatic vegetable matter, and their movements being exceedingly slow.

The habits of the *Enicoceri*, as detailed in Mr Wailes' interesting paper in the *Entomological Magazine*, No. 3, are somewhat different from those of *Elmis*; but as I have not recent specimens of those insects, I am unable to institute an examination of the clothing of the body, &c. which would doubtless satisfactorily elucidate the cause of such difference.

IV.—*The Natural History of the British Entomostraca.* By WILLIAM BAIRD, Surgeon, H. C. S. Plate V. (Continued from Vol. i. p. 526.)

Sp. III.—*Cypris strigata.* “*Testa reniformi, fusca, fasciis tribus albis.*”

Habitat.—Pool on sea shore, a little above high water-mark, at Thornton Loch, East Lothian.

Synonimes.—*Cypris strigata*, *Muller*, *Zool. Dan. prodrom.* p. 199, No. 2387. 1776.

Cypris strigata, *Muller*, *Entomostraca*, p. 54, tab. iv. fig. 4-6. 1785.

Monoc. strigatus, *Gmelin*, *Lin. Syst. Nat.* 3002, No. 37. 1788.

M. strigatus, *Manuel*, *Encyc. Method. Hist. Nat.* Tom. vii. p. 726, No. 31. 1792.

M. strigatus, *Fabricius*, *Entomol. system*, Tom. ii. p. 496. 1793.

Cypris strigata, *Latreille*, *Hist. Nat. gen. et part. des Crust. &c.* Tom. iv. p. 245. 1802.

Cypris strigata, *Randohr*, *Beyt. zur Naturg. einig. deut. Monoc. arten*, pp. 14-17, tab. iv. fig. 1-14. 1805.

Mon. strigatus, *Rees' Cyclopædia*, Art. *Monoculus*. 1819.

Mon. bistrigatus? *Jurine*, *Hist. des Monoc.* p. 177, pl. 19, fig. 12-13. 1821.

Cypris strigata, *Desmarest*, *Cons. Gen. sur les Crust.* p. 386. 1825.

“Shell $\frac{2}{3}$ subovate, glabrous, ciliated at the margin, sublinear at aperture. Valves rather convex, brown, with three white fasciæ—the posterior one lunated, middle one oblique, anterior one arched—or, it may be described, valves white on dorsal margin, bound by a brown belt, with two oblique brown spots in the disc.”—*Muller*.

Sp. IV. *Cypris vidua*, Plate V. Fig. 1. Testa subglobosa, fasciis tribus nigris transversis instructa.

Habitat. Pond at Greenwich. Canal at Rugby, Warwickshire.

Synonymes, *Cypris vidua*, *Muller*, Zool. Dan. prod. p. 199, No. 2384. 1776.

Cypris vidua, *Muller*, Entomost. p. 55, tab. iv. fig. 7–9. 1785.

Mon. *vidua*, *Gmelin*, Syst. Nat. 3002, No. 42. 1788.

Mon. *vidua*, *Manuel*, Encyc. Method. Hist. Nat. Tom. vii. p. 726, No. 36, pl. 264, f. 24–6. 1792.

Mon. *viduatus*, *Fabricius*, Entom. Syst. Tom. ii. p. 496. 1793.

Cypris vidua, *Latreille*, Hist. Nat. Gen. et Part. des Crust. &c. Tom. iv. p. 245. 1802.

Mon. *vidua*, *Rees*' Cyclopedia, Art. Monoculus. 1819.

Mon. *vidua*, *Jurine*, Hist. des Monoc. &c. p. 175, pl. 19, fig. 5–6. 1821.

Cypris vidua, *Desmarest*, Cons. Gen. sur les Crust. p. 385. 1825.

Neither the figure given by *Muller*, nor that by *Jurine*, is quite correct. The shell is of a somewhat globular form, a little sinuated on under margin; beset all round with dense, fine, short hairs; of a dull white colour, very distinctly marked by having three black, somewhat zig-zag fasciæ, running transversely across the shell, the most anterior of the three being the smallest. The posterior margin is rather narrower than the anterior, (though *Muller* makes it the contrary,) but not so much so as is represented by *Jurine*. Anterior feet provided with long filaments.

Sp. V. *Cypris Monacha*, Plate V. Fig. 2. Testa antice truncata, albo et nigro notata.

Habitat.—Old Canal near Rugby, Warwickshire.—Newham Loch, Northumberland.—*Dr Johnston*.

Synonymes, *Cypris monacha*, *Muller*, Zool. Dan. prod. p. 199, No. 2390. 1776.

Cypris Monacha, *Muller*, Entomostraca, p. 60, tab. v. fig. 6–8. 1785.

Monoc. *Monachus*, *Gmelin*, Syst. Nat. 3003, No. 44. 1788.

Mon. *Monachus*. *Manuel*, Encyc. Method. Hist. Nat. Tom. vii. p. 727, No. 41, pl. 266, f. 34–6. 1792.

Mon. *Monachus*, *Fabricius*, Entom. Syst. Tom. ii. p. 497. 1793.

Cypris Monacha, *Latreille*, Hist. Nat. Gen. et Part. des Crust. &c. Tom. iv. p. 247. 1802.

Monoc. *Monachus*, *Rees*' Cyclop. Art. Monoculus. 1819

Monoc. *Monachus*, *Jurine*, Hist. des Monocles, &c. p. 173, pl. 18, f. 13–14. 1821.

Cypris Monacha, *Desmarest*, Cons. Gen. sur les Crust. p. 384, pl. 55, f. 7. 1825.

The figure given by Muller is much better than that of Jurine. Shell somewhat of a rhomboidal form; rounded at posterior, and truncated as it were at anterior margin; glabrous, with a few hairs on posterior margin; surface of shell as it were reticulated, or, as Muller says, marked with small points impressed into, or as it were excavated out of shell. Upper part of shell is nearly of a white colour; lower portion, anterior margin, and part of posterior one, of a black colour, shaded with a yellowish green; filaments of anterior feet long. A very pretty and well-marked species.

Sp. VI. *Cypris Candida*.—Plate V. Fig. 3. Testa subovata, candidissima, lucenti.

Habitat.—Berwickshire; Roxburghshire; neighbourhood of London, &c. common.

Synonimes, &c.—Poisson nommé Deteuche, *Joblot*, *Observ. d'Hist. Nat. faites avec le Micros.* part 2, p. 104, pl. xiii. fig. 0. 1754.

Cypris Candida, *Muller*, *Zoolog. Dan. prodrom.* p. 199, No. 2385. 1776.

Cypris Candida, *Do.* *Entomostraca*, p. 62, tab. vi. fig. 7-9. 1785.

Monoc. Candidus, *Gmelin*, *Lin. Syst. Nat.* 3002, No. 40. 1788.

Mon. Candidus, *Manuel*, *Encyc. Method. Hist. Nat. Tom. vii.* p. 726, No. 34. 1792.

Monoc. Candidus, *Fabricius*, *Entomol. Syst. Tom. ii.* p. 497. 1793.

Cypris Candida, *Latreille*, *Hist. Nat. Gen. et Part. des Crust. &c. Tom. iv.* p. 248. 1802.

Mon. Candidus, *Rees' Cyclopedia*, Art. *Monoculus*. 1819.

Mon. Candidus, *Jurine*, *Hist. des Monocles, &c.* p. 176, pl. 19, fig. 7-8. 1821.

Cypris Candida, *Desmarest*, *Consid. Gen. sur les Crust.* p. 385. 1825.

Cypris lucens, *Baird*, *Trans. Berw. Nat. Club*, p. 100, pl. iii. fig. 15. 1835.

The figure given by Joblot, referred to above, appears to me to be undoubtedly the *Candida*, though, curiously enough, Muller himself refers it to his *pubera*, while Straus again refers it to his *fusca*. The figure given by Muller is not good, that of Jurine is much better. The shell is smooth and shining, but fringed round the margins with fine hairs of a pure white-colour, with a pearly lustre, nearly opaque, ventricose: anterior extremity narrower and flatter than posterior, which is arched; upper margin raised, lower somewhat reniform; filaments of anterior feet consist of only three or four short hairs; animal generally creeps near the bottom of the vessel in which it is kept.

Sp. VII. *Cypris fusca*.—Plate V. Fig. 4. Testa ovata, reniformi, fusca.

Habitat. Neighbourhood of London.

Synonimes. *Cypris fusca*, *Straus*, *Mem. de Mus. d'Hist. Nat. Tom. vii.* pl. i. fig. 16. 1821.

Cypris fusca, *Desmarest*, Cons. Gen. sur les Crust. p. 384. 1825.

Shell oval; of a brown-colour, reniform; anterior extremity narrower than posterior, which is rounded and broad; shell covered with fine hairs; anterior feet provided with three long filaments; the rounded posterior extremity and brown-colour sufficiently distinguish this species from Muller's *Candida*.

Sp. VIII. *Cypris reptans*.—Plate V. Fig. 5. Testa elongata, stricta, maculis magnis viridibus notata.

Habitat.—Yetholm Loch, Roxburghshire.—Newham Loch, Northumberland, *Dr Johnston*. New river, London.

Synonimes—*Cypris reptans*, *Baird*, Trans. Berw. Nat. Club, p. 99, pl. iii. fig. 11.

“Shell long, narrow, almost elliptical, nearly plane on upper, and slightly sinuated on under margin; rather ventricose; hairy; densely ciliated on anterior extremity; the ciliæ on posterior extremity fewer, but much longer; of a light colour, with dark-green markings, which appear to be rather irregular; both extremities have a large broad green spot, which send out processes as it were towards the centre of shell; antennæ and feet short in comparison with size of shell. I have never seen this species swimming about in the vessel in which I have kept it, but always creeping on the bottom,”—hence its name.—Filaments of anterior feet few and very short.

Sp. IX. *Cypris hispida*.—Plate V. Fig. 6. Testa ovata, fusca, hispida.

Habitat.—At Yetholm, Roxburghshire. Ditch near Surrey Zoological Gardens, London.

Synonimes—*Cypris hispida*, *Baird*, Trans. Berw. Nat. Club, p. 99, pl. iii. fig. 14.

“Shell almost elliptical; anterior extremity a little broader than posterior; rather ventricose; very roughly and densely hairy; of a brown-colour all over, with one or two dark brown marks running across the centre of shell; both extremities of a darker colour than other parts of shell; the whole shell is very hispid, spines rather than hairs covering the shell; antennæ slender; setæ seldom much divaricated.” Filaments of anterior feet, if any, consist only of two or three short hairs, as in *Candida* and *Reptans*; and like them, this insect is generally to be found at the bottom of the vessel in which it is kept. This circumstance would seem to favour Jurine's opinion of the important use the anterior feet serve for progressive

motion, as we seldom see those species which have not the filaments long so active in swimming as the others.

Sp. X. *Cypris Compressa*.—Plate V. Fig. 7. Testa plano-rundata, fusco-grisea, compressa.

Habitat. Yetholm Loch, Roxburghshire; Rugby, Warwickshire; neighbourhood of London, very common.

Synonimes. *Cypris Compressa*, *Baird*, Trans. Berw. Nat. Club, p. 100, pl. iii. fig. 16.

“Shell round-shaped, compressed, rather narrower anteriorly than posteriorly; of a brownish gray colour more or less deep; semitransparent; at either extremity beset with fine hairs—in general the surface of the shell is spotted, as if little pieces were hollowed out of it. Anterior feet provided with three long filaments; eye large; from the flat compressed shape of shell, its motion through the water is very much like that of some species of *Lynceus*.”

Sp. XI. *Cypris minuta*.—Plate V. Fig. 11. Testa ovato-globosa, sub-fusca, parva.

Habitat. At Yetholm, Roxburghshire; Pond near Copenhagen Fields, London.

Synonimes. *Cypris minuta*, *Baird*, Trans. Berw. Nat. Club, p. 99, pl. iii. f. 9. *Monoculus ovum?* *Jurine*, Hist. des Monocles, &c. p. 179, pl. 19. f. 18–19.

“Shell broader posteriorly than anteriorly; elevated and rounded on upper margin; slightly sinuated on under margin; hairy all around; of a light brown colour with a tinge of green; body of shell smooth, shining; anterior feet furnished with a pencil of long filaments.” This is the smallest of all the species I have met with, and approaches very near to the *Mon. ovum* of *Jurine*, except that he says his species is perfectly smooth, whereas this one is beset densely all around shell with short hairs.

Sp. XII. *Cypris Joanna*.—Plate V. Fig. 12. Testa ovato-globosa, fusca, hirta.

Habitat. Pool at Abbey St Bathans, Berwickshire.

Synon. *Cypris Joanna*, *Baird*, Trans. Berw. Nat. Club, p. 99, pl. iii. fig. 8.

“Shell roundish-ovate; narrower anteriorly than posteriorly; of a brown colour, with an orange mark across back of shell and lower margin; shell beset all round with rigid hairs, and covered with minute black points or dots; setæ of antennæ numerous. Differs from *Cypris pilosa*, *Muller*, in smaller size, orange mark across shell, and in not being glabrous, but marked all over with black roughish-looking points.” A little larger than *C. minuta*.

Sp. XIII. *Cypris elongata*.—Plate V. Fig. 13. Testa alba, cuneiforme, elongata.

Habitat. Yetholm, Roxburghshire.

Synon. *Cypris elongata*, Baird, Trans. Berw. Nat. Club, p. 99, pl. iii. f. 10.

“Shell much broader at anterior than posterior extremity, which is narrow and much elongated; elevated on upper margin towards anterior extremity, and sinuated on under margin more towards the posterior extremity: white; transparent; hairy; setæ of antennæ five or six; anterior feet furnished with setæ.”

Sp. XIV. *Cypris Westwoodii*.—Plate V. Fig. 14. Testa reniformi, viride, conica.

Habitat. Yetholm Loch, Roxburghshire.

Synon. *Cypris Westwoodii*, Baird, Trans. Berw. Nat. Club, p. 99, pl. iii. f. 12.

“Shell much elevated and rounded on upper margin, and reniform on under—a little broader at anterior extremity; green coloured; semitransparent; densely covered with pretty long hairs all over; second last joint of anterior feet furnished with a pencil of long hairs; posterior feet furnished with a setæ at each articulation.”

Sp. XV. *Cypris gibbosa*.—Plate V. Fig. 15. Testa rotundovata; reniformi, gibbosa.

Habitat. Ditch near Surrey Zoological gardens, London.

Shell roundish ovate: elevated on upper margin, with a gibbosity or hump; reniform on under margin; body of shell smooth, of a light-green colour, paler on anterior extremity; beset with short fine hairs all round the edges of shell; nearly opaque; filaments of antennæ and anterior feet beautifully plumose. Double the size of *C. Westwoodii*, to which it approaches somewhat in shape of shell.

Sp. XVI. *Cypris clavata*.—Plate V. Fig. 16.* Testa oblonga, clavata, lævi.

Habitat. Pond near Copenhagen Fields, London.

Body of shell smooth and shining, but beset round margin with short hairs; of a light grey colour, with an obscure dark-coloured ray running from centre towards posterior extremity, which again is distinctly marked with an orange-coloured spot, oblong, narrower at posterior than anterior extremity, which is rather flattened, middle of valves ventricose; antennæ and feet rather short in comparison with size of shell, filaments of both plumose. This species ap-

proaches near to *Cypris crassa*, Muller, in his description of that species, but differs *in toto* from the figure which he gives of it.

A species of fossil *Cypris* occurs in the limestone of Burdiehouse quarry, near Edinburgh, but which I have not had opportunities of sufficiently examining.

2d Genus, CYTHERE.

Bibliographical History.—Otho Fridericus Muller is the first naturalist that has taken notice of this genus of insects. Before his time they were perfectly unknown, not the slightest mention of their existence having been made by any previous writer. As it is to him that we are indebted for the first information, so it is to him alone that we owe all that we do know, with the exception, I believe, of what few additional particulars will be found in the following pages. Upon a slight inspection, the *Cytheres* might be mistaken for *Cyprides*; but their antennæ being simple, and free from the pencil of long hairs with which these organs in the *Cypris* are endowed; their possessing eight feet; the want of the long tail, and their inhabiting salt water, sufficiently distinguish the two genera. It is in his "Entomostraca" that Muller first established this genus, and the above marks of distinction between it and the *Cypris*, constitute almost all the knowledge that he imparts to us concerning it. Meager as it is in details, it has not been enlarged by any succeeding author. Gmelin, in the "Systema Naturæ," 1788; Fabricius in his "Entomologia Systematica," 1793; Manuel in the "Encyclopedie Methodique," 1792; and Latreille in his "Hist. Nat. Gen. et Part. des Crustacés," &c. 1802; either merely give the species alone, or repeat the few remarks made by Muller, without making any comment or original observations of their own. Lamarck, in his "Hist. Nat. des Animaux sans Vertèbres," 1818, changes Muller's name, and gives the genus the appellation of *Cytherina*; while Desmarest, in his "Consid. Gen. sur les Crustacés," 1825, in repeating the observations made by Muller, and giving merely his species, adds, that it may turn out that some of the eight feet may be particular organs, and that the number of true feet may be found to be the same as in the *Cypris*, a conjecture which Latreille also makes in the last edition of "Cuvier's Règne Animal," 1829. Desmarest moreover says, "reasoning from analogy, there is reason to believe that the *Cytheres* like the *Cyprides* have their branchial plates attached to the mandibles and jaws, and that their feet are

solely destined for locomotion."* In both these suppositions we shall find he is quite correct.

Anatomy.—The shell in almost every respect strictly resembles that of the *Cypris*, but from their general opacity and minuteness, it is exceedingly difficult to examine with precision the body of the inclosed animal. After repeated attempts, however, to break down the horny opaque shell, I succeeded so far as to discover that, like the *Cypris*, the body of the insect is divided into two parts, connected with each other by a narrow space, the anterior half containing the eye, antennæ, anterior feet, organs of mouth, and two pairs of intermediate feet; the posterior half containing the posterior feet, and a short appendix or tail. The eye resembles in appearance and situation that of the *Cypris*, being single, fixed, and in the form of a black sessile point. Antennæ two, (Plate V. Fig. 16. *a, a*. Fig. 18.) composed each of five articulations, furnished with one or two short setæ at the base of each of the three last articulations, and terminated by three or four rather longer hairs at the extremity of the last joint, differing very much in this respect from the same organs in the *Cypris*. As the *Cythere* has never been seen to swim, these organs may be thus considered as true antennæ. The feet are decidedly eight in number; the anterior pair are inserted immediately beneath the antennæ, and are by far the strongest of all, (Plate V. Fig. 16., *b, b*. Fig. 19.) They differ in shape from the other pairs, being flatter and falcated in appearance. They consist of four articulations; the first and third being very short. The last gives off from internal edge three spines, and is terminated by two or three short hooks as in the *Cypris*, while from the base of the second joint there springs a long stiff seta, equalling in length the two last joints, and being divided into three articulations, of which the middle is the longest. This seta is mentioned by Muller as occurring in his *Cythere lutea*, but is taken notice of by him as being peculiar to it, or at least as not having been seen in any other species. It occurs, however, in all I have examined, and seems to take the place of the pencil of long hairs that is to be found on the penultimate joint of the corresponding pair of feet in the genus *Cypris*, but the precise use of which I do not understand. The three other pairs of feet (Plate V. Fig. 16, *c*. Fig. 20.) are exactly like each other, except in length; they are round and slender, and consist each of four articulations, the first of which is the largest, and gives off a short spine at its base; the last is the shortest, and is terminated by a long curved hook. The first or anterior pair are, as in the *Cyprides*, di-

rected backwards, whilst the other three are directed forwards. The first of these three pairs are very short, the second a little longer, whilst the third or last pair are the longest of all, being longer than the anterior pair, though much more slender. This last or posterior pair appears to arise from near the junction of the two halves of the body, and may supply, as Muller says, the want of the tail. The mouth is situated in the inferior surface of the anterior half of the body, as in the *Cypris*, and appears to consist of exactly the same organs as in the insects of that genus, though from their extreme minuteness, and want of lengthened opportunities for examination, I have not been able to make out all the parts. The palpiferous mandibles, and the first pair of jaws with their branchial plates, are the only parts I have been able clearly to make out, and they resemble in almost every respect the corresponding organs of the *Cyprides*. The mandible (Plate V. Fig. 21.) is formed of two pieces, the larger of the two, or proper mandible, as in the *Cypris*, being terminated at the superior extremity by a sharp point, and at the lower or incisive extremity by about six pretty strong teeth, while the other part or palpus consists of three joints plentifully supplied at the extremities of the articulations with numerous setæ. I failed, however, in making out the small branchial plate which occurs in this organ in the *Cypris*. The first pair of jaws, (Plate V. Fig. 22.) as in the *Cypris*, consists also of two parts; the square plate with the four fingers, (Fig. 22, a.) the superior of which has two joints, whilst the others have only one, and all terminated by a tuft of hairs; and the branchial plate (Fig. 22, b.) attached of an elongated oval form, furnished with fourteen long setæ, which are given off from both sides. As these organs are so very similar to the corresponding organs in the *Cypris*, I have no doubt that the other parts (the lips and second pair of jaws) are also the same, and that therefore the supposition of Desmarest with respect to some of the intermediate feet being *particular organs* is incorrect; and that, as their use and situation indicate, they are all true feet, and used solely for locomotion; the posterior or fourth pair perhaps serving in addition one of the uses of the tail, that of cleaning the inside of the shell, for which they are well calculated from their length, and the great degree of mobility they possess. The appendix or short tail is of such an irregular figure, that, until better opportunities occur for examination, I shall not attempt a minute description. The internal anatomy I have not been able to make out at all; neither have I ever seen any individuals with ova, though this may be ac-

counted for from the specimens which I have examined being dissected in the winter months.

Habits and Manners.—These insects are only to be found in sea water, and may be met with in all the little pools amongst the rocks on the sea shores. They live amongst the fuci and confervæ, &c. which are to be found in such pools; and the naturalist may especially find them in abundance in those beautiful clear little round wells which are so often to be met with hollowed out of the rocks on the shores of our country, which are within reach of the tide, and the water of which is kept sweet and wholesome, by being thus changed twice during every twenty-four hours. In such delightful little pools, clear as crystal when left undisturbed by the receding tide, these interesting little creatures may be found often in great numbers sporting about amongst the confervæ and corallines, which so elegantly and fancifully fringe their edges and decorate their sides,—and which form such a glorious subaqueous forest for myriads of living creatures to disport themselves in. Sheltered amongst the “umbrageous multitude” of stems and branches, and nestling in security in their forest glades, they are safe from the fury of the advancing tide, though lashed up to thunder by the opposing rocks which for a moment check its advance; and weak and powerless though such pigmies seem to be, they are yet found as numerous and active in their little wells, after the shores have been desolated by the mighty force of the tide which has been driven in, in thunder, by the power of a fierce tempest, as when the waves have rolled gently and calmly to the shore in their sweetest murmurs. These insects have never been seen to swim, invariably walking amongst the branches or leaves of the confervæ or fuci—amongst which they delight to dwell; and when shook out from their hiding-places into a bottle or tumbler of water they may be seen to fall in gyrations to the bottom, without ever attempting to dart through the watery element, as in the case with the *Cyprides*. Upon reaching the bottom, they open their shells and creep along the surface of the glass; but when touched or shook they immediately again withdraw themselves within their shell and remain motionless. This inability to swim is no doubt owing to the want of the pencils of long hairs or filaments which adorn the antennæ and anterior part of the *Cyprides*, and which we have already seen are the organs by means of which they swim through the watery element in which they live. My opportunities for observing these insects have been so limited, and the difficulty of keeping them alive, from the rapidity with which sea water becomes putrid when kept in a room in a small vessel, is

so great, that I cannot say any thing further with regard to their economy or habits. The species, however, I have no doubt, are numerous, and the labours of any inquirer after them would, I have no doubt, be soon rewarded with great success.

Species.

Sp. I. *Cythere flavida*.—"Testa oblonga, glabra." Muller.

Habitat. Amongst confervæ in pools of sea water amongst the rocks on the shore at Cockburnspath, Berwickshire.

Synonymes. *Cythere flavida*, Muller, Entomost. p. 66, tab. vii. fig. 5-6. 1785.

Monoculus flavidus, Gmelin, Syst. Nat. 3001, No. 33. 1788.

Mon. flavidus, Manuel, Encyc. Method. Tom. vii. p. 725, No. 27, pl. 266, f. 10-11. 1792.

Mon. flavidus, Fabricius, Tom. ii. p. 494. 1793.

Cythere flavida, Latreille, Hist. Nat. &c. Tom. iv. p. 253. 1802.

Mon. flavidus, Rees' Cyclop. Art. Monoculus. 1819.

Cythere flavida, Desmarest, Consid. Gen. &c. 1825.

"Shell oblong, of a yellowish colour, smooth, obtuse at each extremity, narrower anteriorly; antennæ scarcely setiferous." Muller.

Sp. II. *Cythere reniformis*.—Plate V. Fig. 16-22. Testa reniformi, hirta, valvulis crusta calcarea obductis.

Habitat. Coast of Berwickshire, common.

Synon. *Cythere reniformis*, Baird, Trans. Berw. Nat. Club, p. 98, pl. iii. fig. 5.

Shell reniform, rough with hairs; both extremities of nearly equal size; anterior extremity a little flatter than posterior. Centre of valves covered with a calcareous-looking crust, which is of rather a darker colour than rest of shell, and appears studded all over with short spines; colour of shell a light brownish yellow. It approaches the *Cythere lutea* of Muller in shape, but differs somewhat in colour, in being roughly hairy, and having the valves covered with the hard crust.

Sp. III. *Cythere albo-maculata*.—Plate V. Fig. 23. Testa oblonga, sinuata, valvulis crusta calcarea albo-maculata obductis.

Habitat. Berwick Bay—not very common.

Shell oblong, a little flatter at anterior extremity; slightly rounded on upper margin, and deeply sinuated on lower, near anterior extremity. Each extremity and lower margin densely hairy; middle portion of valves covered with a calcareous-looking crust, as in last species, which is studded all over with short spines, except where it is marked with two white smooth shining spots of considerable size. Shell altogether of a dull-brown colour.

Sp. IV. *Cythere alba*.—Plate V. Fig. 24. Testa alba, translucida, obovata.

Habitat. Sea-shore at Dunbar, East Lothian.

Syn. *Cythere alba*, *Baird*, Trans. Berw. Nat. Club, p. 98, pl. iii. fig. 6.

Shell white, transparent, showing the dark body of insect through it; hairy round edges; acute at posterior extremity, and broader at anterior; a margin round the outer edge of the shell whiter than the rest. Having only once met with this curious species, and an accident happening to the vessel in which it was kept, I am unfortunately unable to give a fuller description of it.

Sp. V. *Cythere variabilis*.—Plate V. Fig. 25, *a b*. Testa ovale, glauca, glabra.

Habitat. Coast of Berwickshire, common.

Syn. *Cythere variabilis*, *Baird*, Trans. Berw. Nat. Club, p. 98, pl. iii. fig. 7, *a. b.*

Shell glaucous, without any hairs, perfectly oval-shaped, anterior extremity narrower than posterior; anterior legs falcate, and furnished with pretty strong claws; antennæ slender, without setæ. This species varies much in colour, and markings; some specimens are white, with two black fasciæ running transversely across shell, one at posterior margin, the other across the centre of the shell, while the posterior extremity is marked besides by a beautiful reddish or bright bronze spot. (Fig. 25, *a*.) Other specimens are of a light flesh-colour, with the edges of shell slightly greenish, and the body of shell marked with dark streaks running across. Some are altogether of a fine flesh-colour, without any marks upon the shell, while others again are of a uniform dark-brown or almost black. (Fig. 25, *b*.) All the varieties, however, agree in shape of shell, in size, &c. merely differing in colour and marks.

Sp. VI. *Cythere aurantia*.—Plate V. Fig. 26. Testa ovata, reniformi, glabra, aurantia.

Habitat. Berwick-Bay, not uncommon.

Shell rounded and rather prominent on upper margin; slightly reniform on under; rather broader posteriorly than anteriorly; smooth, glaucous, of a bright orange-colour; very minute in size; antennæ setiferous; anterior feet falcated.

Sp. VII. *Cythere nigrescens*.—Plate V. Fig. 27. Testa extremitate postrema acuminata, glabra, sub-nigra.

Habitat. Berwick-Bay, not uncommon.

Shell rounded on upper margin and anteriorly ; terminating posteriorly in an acute point, with a gibbous projection on the lower margin, near posterior extremity ; shell quite smooth and free from hairs, of a dirty black-colour, translucent, showing the body of the animal shining through, which is very dark-coloured ; antennæ setiferous ; anterior feet falcated.

Explanation of Plates.

Plate XVI. Vol. I. Fig. 1 to 13, Body of *Cypris pubera* ; the shell removed ; *a.* anterior lobe ; *b.* posterior lobe ; *c.* eyes ; *d.* antennæ ; *e. e.* anterior or first pair of feet ; *f. f.* second pair of feet ; *g.* third pair ; *h.* mandible and palpus ; *i.* first pair of jaws with branchial plate ; *k.* tail. Fig. 2, one of the antennæ. Fig. 3, one of the anterior legs. Fig. 4, one of the second pair do. Fig. 5, one of the third pair. Fig. 6, the lip (*a*) and sternum or lower lip (*b.*) Fig. 7, mandible ; *a.* mandible proper ; *b.* palpus ; *c.* small branchial plate. Fig. 8, first pair of jaws ; *a.* base, with its fingers ; *b.* branchial plate with its pectiniform spines. Fig. 9, second pair of jaws. Fig. 10, tail. Fig. 11, egg. Fig. 12, young. Fig. 13, adult *Cypris pubera*.

Plate V. Vol. II. Fig. 1, *Cypris vidua*. Fig. 2, *C. Monacha*. Fig. 3, *C. Candida*. Fig. 4, *C. fusca*. Fig. 5, *C. reptans*. Fig. 6, *C. hispida*. Fig. 7, *C. Compressa*. Fig. 8, one of the antennæ of *C. Compressa*. Fig. 9, one of the anterior feet of do. Fig. 10, one of the third pair of feet of do. Fig. 11, *C. minuta*. Fig. 12, *C. Joanna*. Fig. 13, *C. elongata*. Fig. 14, *C. Westwoodii*. Fig. 15, *C. gibbosa*. Fig. 16, * *C. clavata*. Fig. 16, Body of *Cythere reniformis*, the shell removed. Fig. 17, *Cythere reniformis*. Fig. 18, one of the antennæ of do. Fig. 19, one of the anterior feet of do. Fig. 20, one of the posterior pair of feet of do. Fig. 21, mandible. Fig. 22, first pair of jaws. Fig. 23, *Cythere albo-maculata*. Fig. 24, *C. alba*. Fig. 25, *C. variabilis*, *a.* and *b.* Fig. 26, *C. aurantia*. Fig. 27, *C. nigrescens*.

(*To be continued.*)

V.—*Directions for the preservation of Sea Plants, with Miscellaneous Remarks on a number of species collected at Cairnlough Bay, on the Coast of Antrim, in the months of May and June 1836.* By JAMES S. DRUMMOND, M. D. President of the Belfast Natural History Society, &c.

THE first object to be attended to in preserving marine plants is to have them washed perfectly clean before spreading. There should not be left upon them a particle of sand or other foreign body, unless

in some rare instances a parasitic species may be thought worthy of keeping, on account of its rarity, or because it may add an additional beauty to the chief specimen. It is a good practice to wash them before leaving the shore either in the sea, or in a rocky pool, or, as is sometimes more convenient in some localities, in a rivulet discharging itself into the ocean, though, as will be afterwards explained, the last practice proves very destructive to the beauty of some species.

The foreign bodies to be got rid of are fragments of decayed seaweeds, sand, gravel, and sometimes portions of the softened surface of sandstone or argillaceous rock on which the specimens may have grown, together with the smaller testacea, and the *Corallina officinalis*, &c. At Cairnlough Bay I experienced most trouble in this respect from the *Ectocarpus*, which confervæ were so generally diffused, as to be entangled with almost every other species of sea-plant.

After the greatest pains which we may take to clean our specimens at the shore, there will generally be found much to do before they can be properly committed to paper, since foreign substances will continue attached to them with much pertinacity even after we may have been satisfied that they are perfectly clean. It is therefore necessary to prepare each specimen by examining it in fresh or sea water in a white dish or plate, so that every thing foreign may be detected and removed.

The next thing to be attended to is the quality of the paper on which the specimens are to be spread; and here a great error is generally committed, in using it thin and inferior, by which, if the specimen be worth preserving, it has not proper justice done to it. Much of the beauty, indeed, of many species depends on the goodness of the paper, exactly as a print or drawing will appear better or worse, as it is executed on paper of a good or an inferior kind. Some species, too, contract so much in drying as to pucker the edges of the paper, if it be not sufficiently thick, for example *Delesseria laciniata*, and this has a very unsightly appearance. That which I have from experience been led to prefer is a thick music-paper. It closely resembles that used for drawing, and the sheet divides into four leaves, of a most convenient size, each being about an inch and a-half longer and broader than a leaf of this Magazine. These, again, divided into halves answer for small species, and for large specimens we may use the entire folio. We have thus three regular sizes of paper, and this serves to give a uniformity and neatness to a collection not to be obtained by using papers at random, and of casual dimensions.

Whatever pains we may have taken to clean the recent specimens, we shall often find, when spreading them, that some foreign particles

continue attached, and for the removal of these a pair of dissecting forceps, and a camel hair pencil of middle size, will be found very convenient. These, indeed, are almost indispensable, and will be found useful on more occasions than can here be specified. A silver probe, with a blunt and a sharp end, is the most convenient instrument for spreading out, and separating branches from each other, but any thing with a rigid point, such as a large needle, or the handle of the camel-hair pencil sharpened, will answer. A large white dinner-dish serves perfectly well for spreading the specimens in, and all that is farther necessary is a quantity of drying papers, and some sheets of blotting-paper, with three or four flat pieces of deal-board. Nothing answers better for drying than old newspapers, each divided into eight parts, but it is necessary to have a large supply of these.

The beautiful and common *Plocamium coccineum* is one of the most easily preserved species, and may be taken as an example of the mode of proceeding with most of the others. The steps to be pursued are as follows,—

1. The specimen is to be perfectly well cleaned.
2. A dinner-dish to be filled about two-thirds with clean fresh water.
3. The paper on which the specimen is to be spread, to be immersed in the water in the dish.
4. The specimen to be then placed on the paper, and spread out by means of the probe and camel-hair pencil.
5. The paper with the specimen on it to be then slowly withdrawn from the dish, sliding it over its edge.
6. The paper with the specimen adhering to it, to be held up by one corner for a minute or two, to drain off the water.
7. To be then laid on a paper, or cloth, upon a table, and the superfluous water still remaining to be removed by repeated pressure of blotting-paper upon the specimen, beginning this operation at the edges, and gradually encroaching towards the centre till the whole can be pressed upon without danger of any part adhering to the blotting-paper, which probably would be the case, were the latter applied at once to the whole specimen.
8. The specimen then to be laid on a couple of drying papers placed on the carpet or a table; two more papers to be laid *over* it, and then the piece of board, on which latter a few books are to be put, to give the necessary pressure.
9. These papers to be changed every half hour or oftener, till the specimen is sufficiently dry. (A number of specimens with drying papers interposed, may be pressed at once under the same board.)

Though the above method is in general the best, yet there are various species, and among these the *Plocamium coccineum* itself, which dry perfectly well by simple exposure to the open air without pressure being had recourse to at all; and some can only be preserved in the latter way, being so glutinous that they will adhere as strongly to the drying paper laid over them as to that on which they are spread. Pressure, however, is necessary after they have dried, for the purpose of flattening them.*

After these general remarks, I will now offer some observations relating to several genera and species, following the order in which they are arranged in the English Flora.

I believe all the species belonging to the Fucoideæ are to be dried in the manner of land plants, after having been previously steeped for some time in fresh water to extract their salt and mucilage. *Cystoseira granulata*, which I have repeatedly found on the Larne shore, will adhere imperfectly if spread in water, but it is best treated as a land plant, to be afterwards fixed with mucilage. *Halidrys siliquosa*, *Fucus vesiculosus*, and *F. nodosus* require very heavy pressure. The air-vesicles of the first may be in part cut longitudinally to show the internal partitions, and of the two last, to diminish their diameter, but this must be done *after* they are dried, for if done in the recent state they contract and become disfigured.

Himanthalia lorea.—Very common on the Antrim coast. It is observed in the English Flora, that the peziza-shaped fronds of this species have been observed “on exposed rocks in the Orkneys swollen into a large hollow, exactly spherical, smooth black ball, probably in consequence of the heat of the sun rarifying and expanding the air within.” I have seen them this summer in a similarly inflated state, not on exposed rocks, but in pools of water where they could never have been uncovered; they were not black, but of a bright yellow colour, and looked exactly like a parcel of hard-boiled yolks of eggs. I suspect this inflation to be the effect of disease.

Alaria esculenta.—Common on the Antrim coast. Adheres very well to paper when young, more imperfectly when old. It becomes

* An indispensable requisite in the drying of marine or fresh water algæ is a portion of old rag, neither of a quality too fine or too coarse. When the specimen has been spread, as directed, upon the paper on which it is to remain, a piece of rag sufficient to cover it should be laid over, and then it may be interleaved under the boards for pressure. The rag prevents the necessity of so much care in taking up the moisture as Mr Drummond requires, never adheres to the specimens, but when dry, leaves them, while most of the plants themselves stick firmly to the sheets on which they have been spread.—EDS.

very transparent in drying, and is a great ornament to the herbarium. In the north of Ireland it is called *murlins*, and is often gathered for eating, but the part used is the leaflets, and not the midrib, as is commonly stated. These have a very pleasant taste and flavour, but soon cover the roof of the mouth with a tenacious greenish crust, which causes a sensation somewhat like that of the fat of a heart or kidney. These leaflets or *pinnæ* are quite membranaceous when young, but in full-grown plants are fleshy, and at their middle a quarter of an inch or more in thickness. Some of my specimens are of a fine light-green colour, others mottled with rich brown, and some are of a golden-yellow. Young specimens in general are of a uniform colour throughout.

Laminaria digitata.—This common plant is highly prized on many parts of the Antrim coast as a manure. Every kind, indeed, that is thrown up is used for the same purpose, and in some places it is a common saying, that a sack of sea-wrack will produce a sack of potatoes. After a fresh in-blowing wind, I have seen Cairnlough Bay almost as populous as a fair, from the number of persons that had collected from several miles around with horses and cars to carry off the wrack. In calm or moderate weather the inhabitants of the coast wade in amongst the rocks at low-water with reaping-hooks, and cut away the *F. vesiculosus* and *nodosus* with the same object. They often also go out in boats, and cut the tangle with crooked knives fastened to the end of long poles, by which large quantities are obtained. On parts of the shore which are too rugged for a wheeled vehicle, the wrack is carried off in creels attached to the backs of ponies, and where these cannot have access, both men and women may be seen toiling from the shore with bagfuls on their backs, or basketfuls on their shoulders. An almost universal opinion prevails, not only at Cairnlough, but on every part of the coast, so far as I have been informed, that a much larger quantity of wrack is thrown ashore during rain than at other times. I inquired from many farmers, and from gentlemen living on the coast, respecting this, and they all considered it a thing perfectly ascertained. I first heard this opinion some years ago from a friend who lives at Donaghadee, in the county of Down, who stated, that it was quite a common thing for farmers in that neighbourhood to yoke their horses, and go to the beach for wrack as soon as rainy weather came, though, allowing the wind to be the same, they would not think of doing so if the weather were dry, thinking that this trouble would be useless. I have had a precisely similar account from a gentleman in the neighbourhood of Carrickfergus; but yet with all this evidence I have not been able,

from my own observation, to find the least colour for believing that there is any truth in the assertion, though I am puzzled to account for the prevalence of the opinion in places so distant from each other. That there may occasionally be the *appearance* of more wrack on the shore during rain it is easy to conceive, as plants which are thrown high up during a spring tide in dry weather may continue beyond the reach of the sea-water, shrivelled up, but on the coming of rain will expand and make a show, when before they were undistinguishable; but it can scarcely be supposed that this forms the foundation of the opinion I have mentioned.

The desire to procure wrack at Cairnough has increased much of late years, in proportion as its utility has become better known; and I have at times been somewhat inclined to suspect that cutting the tangle in such quantities as is done, may have had some influence in diminishing the number of fishes in the bay, which are every year becoming more and more scarce, so that where they used to be plentiful, the fishermen now say they are scarcely worth the trouble of looking after. They uniformly attribute this failure to the steam-boats passing along the coast.

As a manure for potatoes, the sea-wrack is not favourable to their dryness, but it greatly increases their produce, and the ground affords good crops of oats the following year without farther manuring.

The stem of *L. digitata* is round, but at Larne and also at Cairnough, I have often found it very much compressed, and remarkably smooth throughout, but without any apparent specific difference.

L. bulbosa does not adhere to paper, and therefore is to be treated as a land plant.

Laminaria saccharina.—Very common, adheres to paper very well when young.

Laminaria phyllitis.—Common on the Antrim coast. I can scarcely consider this as distinct from *L. saccharina*. I have repeatedly seen the bullated appearance in the centre of the frond even in very young plants, but this nearly disappears in the dried specimen. Dr Greville states, Alg. Brit. p. 34, that it only adheres partly to paper in drying, but I believe that this will depend much on circumstances, for if the specimen be allowed to remain only a short time in fresh water, and be spread before it has lost its mucus, it will adhere pretty well, but less perfectly if permitted a longer stay, unless perhaps that it have remained so long that incipient decomposition has come on. Most of my specimens adhere closely.

Desmarestia aculeata. Common. I found many specimens at Cairn-lough Bay in May, and a few in June, in its young state, with the tufted fringes. When old, it is very frequent lying in large masses on the shore. Dr Greville accurately remarks, that "old plants do not adhere to paper in drying, and become a little darker. Young plants, still furnished with the pencils of filaments, adhere, and do not change colour at all."—Alg. Br. p. 38.

I must here remark, that because species are found at the extremities of a kingdom, it may be very erroneous to suppose that they are common to all the intermediate parts of the coast. In the Flora Hibernica, for instance, it is stated that *Desmarestia ligulata* is "not uncommon on any of our shores from the Giant's Causeway to Bantry Bay." Now, during nearly two months spent this summer at Cairn-lough Bay, in which scarcely a day passed that I did not examine some part of the shore, I did not find a fragment of it. I have from time to time gathered marine plants at Larne from my boyhood, and I never saw a trace there of this species, nor do I recollect ever finding a specimen of it but one, which I gathered a few years ago at Bangor, on the county Down, side of Belfast Lough.

Dichloria viridis.—Common at Cairn-lough, often lying in masses on the shore as large as, and not unlike a horse's tail. It is to be preserved in the ordinary way, but, as is properly stated by Dr Greville, "in drying it does not adhere very firmly to paper;" and the smaller the specimen, this is the more likely to happen; but I have some specimens of large size, whose branches coming in numerous points of contact with the paper, give to each other such a mutual support that the whole adheres with considerable firmness. It will remain a long time unchanged in fresh water, and is little liable to decay itself though it so readily decomposes other species.

From a preconceived idea that its solvent powers might have some strong affinity with those of the gastric juice, I was pretty confident that it would possess the quality of reuniting milk, but on making the experiment this summer, I ascertained that it had no such property. When it lies for some time in contact with *Plocamium coccineum* *Ptilota plumosa*, and some other red-coloured species, it changes them to a bright violet, but this is fugitive, and disappears on drying; the natural red colour continuing as before.

Chordaria flagelliformis.—Common at Cairn-lough and most parts of our coast. Fine specimens grow on the rocks below Holywood near Belfast. I do not know any species which gives out so great a quantity of mucus after being immersed in fresh water as this.

Its glutinosity also causes much difficulty in preserving good specimens in the usual way, from its strong adhesion to the drying paper placed over it. The best management is to spread it and allow it to dry at leisure exposed to the air; in doing so it gives out a quantity of mucus of a brown colour, which tinges the paper along the sides of each branch, but this gives rather a richness and beauty to the specimen than acts as a deformity. This mucus often has a glistening appearance like the dried slime of a snail.

Chorda Filum.—Very common, growing most luxuriantly in situations somewhat sheltered from the violence of the open sea. It need not be spread in water, but if placed on white paper, and submitted to pressure under drying papers, by frequently changing these it will remain firmly attached to the former. By letting it steep in fresh water for several days to deprive it of its elasticity, it may be rolled into a spiral coil and then dried as above. It thus assumes an interesting though perhaps unnatural and fantastic appearance.

Dictyota dichotoma.—Not uncommon, the variety β (*intricata*) is very frequent on the Larne shore, though the normal form is rare, grows extremely flaccid soon after immersion in fresh water, and the easiest way to preserve it is to clean it in a plate with sea water, and to spread it immediately on the paper ready to receive it in the fresh water.

Delesseria sanguinea.—This species has its colour very much beautified by letting it steep in fresh water for five or six hours or longer: this changes it from a garnet to a rich rose red, though it does not always retain when dried the same beauty of tint which it exhibits when moist. I found specimens at Cairnlough in June, with the footstalks crowded with fructification, though it is commonly found in this state in winter and spring. It sometimes acquires a monstrous bulk; a single frond of one specimen in my collection gathered at Cairnlough Bay in July, measuring in length $10\frac{1}{2}$ inches (independent of the footstalk,) and at its middle $7\frac{1}{4}$ inches in breadth.* The finest specimens of the usual form of the plant I have ever seen, were gathered at Groomsport on Belfast Lough.

Delesseria sinuosa.—The colour of this is also rendered more beautiful by steeping several days in fresh water. It is very common on the Antrim coast, and grows to a great size. A frond of one of the

* It is excessively plaited at the edges, as are some of the other fronds from the same specimen, which are also cordate at the base in short, the variety β (*latifolia*) of Captain Carmichael, Eng. Flor. Vol. v. Part i. p. 285, but considerably larger than these described.

specimens I preserved in June at Cairnlough is $5\frac{3}{4}$ inches long from the commencement of its lamina from the footstalk to the point, and is 7 inches broad; another is $5\frac{1}{4}$ inches long, and $7\frac{1}{2}$ broad; and a third, $6\frac{1}{4}$ inches long, and somewhat more than 7 in breadth. The ciliary fructification is the most common, but the capsular is also frequent in the summer. Nothing can be more easy than to preserve this in the common way.

Delesseria alata.—This is also very easily put up, and, like most of the garnet red ones, its colour is brightened by long maceration in fresh water. It grows very luxuriantly on the Antrim coast.

Delesseria hypoglossum.—Tolerably frequent. The effect of fresh water on this species is almost instantaneous. When recent it has considerable rigidity, and a large variety, of which I found several specimens at Cairnlough Bay, and which at first sight I could scarcely recognize as being this species, was firm and cartilaginous, but after being in the fresh water for a few minutes was perfectly flaccid, and its colour changing rapidly from garnet to orange-red. It may be preserved in the common way without any trouble, and adheres closely to paper. The same may be remarked of *D. ruscifolia*, which is much more rare.

Notophyllum punctatum.—I found little of it this season. It also, when perfectly recent, is of a garnet red, and is as rigid as silk paper to the touch. When dipped in fresh water it emits a crackling noise, turns rapidly to a rosy orange tint, grows extremely flaccid, and gives out a large quantity of pink colouring-matter. It is so very thin that it dries rapidly, and requires no particular precautions.

Notophyllum laceratum.—Common, rigid when recent, becomes flaccid in fresh water, but is not otherwise changed, dries easily.

Rhodomenia laciniata.—Abundant, and often very large; is not altered by fresh water, except that it becomes less rigid, and more easily spread after some hours maceration. It is best to change the papers frequently during its desiccation, as it sometimes adheres when this is neglected. I preserved a single specimen at Larne in July, which was so large that I was obliged to separate it into portions, and spread it on four folio leaves, the dimensions of which are as follow:—Specimen on first leaf $7\frac{1}{2}$ inches from base to top; 14 inches in breadth; specimen on second leaf $7\frac{1}{4}$ inches high, and $12\frac{1}{4}$ broad; specimen on third leaf 7 inches high, and $9\frac{1}{2}$ broad; specimen on fourth leaf, five portions of the frond occupying the greater part of it.

Rhodomenia ciliata.—This species is very rare on the Antrim

coast, at least in any place I have had an opportunity of visiting. I mention it merely to notice, that it gives a transparency to the paper on which it is spread, as if the latter had been oiled at the points of contact.

Rhodomeniapalmata.—Dulse. Dillisch.—Easily spread, but troublesome, especially when large, to retain in a flat expanded state on account of its contracting very much as it dries. Dr Greville observes, that “while rather young, the substance is very thin, slightly lubricous, and adheres to paper in drying, but not when in fructification.”—*Alg. Br.* p. 93. Nothing can be more common than this species, but I have never seen it so extremely abundant as near the Garron Point, about three miles north of Cairnlough. It there seems to occupy the place which *Fucus vesiculosus* and *F. nodosus* do on other parts of the coast, and these species which do occur there are quite overgrown with it, as are also the stones and rocks. Large quantities are gathered at this place, and being dried, it is sold at a penny per pound to persons, who afterwards hawk it through the country towns for miles around: I was told that when taken to Ballymena, about fifteen miles from this locality, it is sold at 3d. or 4d. per pound. Dulse is brought in abundance to Belfast from various quarters, and is sold by huxters. Its usual price, as retailed by persons who come direct from the shore, and sell it from door to door, is about 4d. per pound, but in the dried state it is very light and bulky. There are few persons who are not pleased with its taste and flavour. In general it is not swallowed, but is chewed, sucked, and then discarded.

Dr Greville states, that “both the Scots and Irish wash the plants in fresh water, dry it in the sun, and rolling it up chew it like tobacco. But it is usually eaten fresh from the sea.”—*Alg. Br.* p. 94. In this part of the world I have never seen it brought for sale when fresh, nor is it here ever washed in fresh water previously to drying, which, indeed, I should apprehend, would deprive it of those qualities for which it is prized, namely, its flavour and saltness.

At Ballycastle, a small variety is found of a very rich claret-colour, growing on rocks, which is more highly valued than the common kind. It is called Craigan Dulse, the latter name, however, being generally given to such as grow on rocks, and which is esteemed more highly than that growing on tangle and other sea-weeds. One favourite way of using dulse is, to cut it very small, and then eat it strewn thick on a slice of bread and butter.

Rhodomenia reniformis.—At Cairnlough Bay I found in June a few but very beautiful specimens of this rare species, which adheres

extremely closely to paper, and is very easily preserved. One specimen, about three inches long and two broad, of an obovate form, has its margin fringed with nearly fifty lobes, each on a narrow footstalk, and having so formal an appearance as rather to resemble a work of art than of nature. These lobes are generally circular, though some are ovate, and others obovate, and in width from the diameter of a pea or less, to that of a sixpence, the smaller ones occupying the torn edges of the frond.

Odonthalia dentata.—Common, is very easily spread, but when nearly dry the main stem contracts and separates from the paper, especially in old plants. The extremities of the fronds, however, sometimes adhere very well.

Laurencia pinnatifida.—When recent is rigid and cartilaginous, but soon gets flaccid in fresh water, and gives out much mucus and colouring matter. If allowed to remain too long in maceration it becomes almost gelatinous, and will then require to be nearly dry by exposure to air, before it is submitted to pressure, when it must be very often changed to prevent adhesion. The var. β . (*Fucus osmunda*, Gmel.) is not very frequent on our coast, though very fine specimens are occasionally thrown ashore. The other varieties are as common as on most coasts. In spreading variety β . it will be often necessary to cut away such superfluous branches, as if retained would encumber the specimen, and give it an indistinct and confused appearance. One very important part, indeed, of the art of preserving marine plants is to sufficiently prune luxuriant specimens. *Ptilota plumosa*, for instance, is often so luxuriant on our coast, that unless much thinned it would form on paper a confused and unsightly mass.* The same remark will apply to several other species.

Laurencia obtusa.—I have now found this species on the Antrim coast, north of Belfast Lough, and there, I believe, it only grows on the county Down side, though detached specimens are not unfrequently thrown on the opposite. About Bangor it is not uncommon, growing in pools of sea water. It is best preserved by letting it be nearly dry before it is pressed.

¹ *Chylocladia clavellosa*.—Common in Belfast Lough, and on the Antrim coast, and of very large size; should be nearly quite dry before it is submitted to pressure.

Chylocladia ovalis.—I never found this species till June last, when

* This practice may be useful when preserving specimens for examination; in other cases the character of the species will be entirely lost.—Eds.

I detected it sparingly in a rocky pool about half-way between Glenarm and Cairnlough Bay. There were many other pools at the same locality, but it only occurred in the one. It was when growing almost entirely of a yellowish olive-green, but reddened a little when exposed to the air, and still more when steeped in fresh water. It was in fruit, having granules imbedded in the ramuli.

Chylocladia articulata.—Common. This and the other *Chylocladia* just mentioned, (the stem of *C. ovalis* excepted) are so succulent, that a person who had seen them only in the dried state could have little idea of the appearance they present in the recent. *C. clavellosa* when just spread on paper looks so thick, coarse, and complicated, that one might almost despair of its becoming fit for preserving, yet when simply left to itself it dries away to the greatest degree of tenuity, becomes so attached to the paper as to seem incorporated with it, and forms one of the most beautiful plants of the herbarium. *C. articulata* is best dried under pressure from the first, and the two or three first times it is changed, it will be advisable to remove the moisture it has discharged by blotting-paper.

Sphaerococcus coronopifolius.—Not unfrequent. This species dries easily in the usual way, but its branches shrink up very much in diameter, I think, to more than one-half their original thickness. It adheres pretty well to paper, and, as remarked in the Flora Hibernica, becomes darker in drying. It “becomes horny in the thicker parts.”—Grev. Alg. Br. p. 138.

Ptilota plumosa.—Common, growing especially on the stems of *Laminaria digitata*. This beautiful species is much improved for spreading by maceration for six or eight days in fresh water. When taken from the sea, (especially large specimens,) it is so rigid that the smaller ramuli escape from pressure and shrink up, thereby deteriorating the beauty of the specimen. This is considerably obviated by long steeping, from which the plant becomes more flaccid and obedient to pressure, and the colour is in general also more beautiful. Old specimens dry sometimes almost black, and this occurs sometimes even after long maceration, for this species retains its colouring matter with great pertinacity.

Iridæa edulis.—Common; but, as every botanist knows, is very seldom thrown ashore in a perfect state, being torn and perforated in every possible way. As it grows in pools of water, it may occasionally be found in a good state several inches long. It adheres strongly to paper, and is easily preserved. I am inclined to suspect, from the appearance of some of my specimens, that the perforations so common

in this species are not accidental, but that portions spontaneously separate from the frond and drop out.

Dumontia filiformis.—Very common. Should be nearly dry before pressure is used.

Porphyra laciniata.—Exceedingly common. This I believe is the only species used in Ireland under the name of Sloke (*Laver* in England.) It is gathered during the winter months only, the fronds being too tough in the summer. After being properly cleaned, it is stewed with a little butter to prevent its getting a burnt flavour, and is brought to Belfast, where it is sold by measure, usually at the rate of fivepence per quart. Before being brought to table, it is again heated, with an additional quantity of butter, and is usually eaten with vinegar and pepper. I have never heard of any ill effects attributed to its use.

Porphyra vulgaris.—Frequent on the coast, but so excessively abundant at Cairnrough Bay, that it often proved a serious obstruction to my collecting other species, by covering and hiding them from sight. Dr Greville mentions a specimen $3\frac{1}{2}$ feet in length, but I saw many specimens of considerably larger dimensions. It is the most difficult plant I know to preserve in perfection, not that there is any difficulty in spreading and going through the other steps of the process, but because, when it has nearly arrived at the last stage of drying, a moment's exposure to the air will cause it to contract so instantaneously, that the edges of the paper are immediately drawn towards each other, and, if attempted to be restored without the whole being first damped, the specimen tears through the middle, and becomes of little value. The edges of the plant adhere strongly to the paper when dry, or nearly so, but the centre does not adhere at all, and being as fine as gold-beaters' leaf, though having considerable strength, it at once loses the little moisture it possesses, on coming in contact with the air, and contracts with a force remarkable, when we consider its extreme thinness. If the paper be thin, its four corners will in a moment be brought almost in contact with each other. I believe the best chance of succeeding is, when we suppose that it is almost dry, to have a flat book (such as a music book) held open, and the pressure being taken off, to remove the specimen along with the drying paper covering it, as quickly as possible, between the leaves of the book, which is to be immediately closed, and not opened till next day, or till we are satisfied that the desiccation is absolutely complete.

The colour in this species varies very much,—in some specimens

being pale, and in others a rich reddish-purple; sometimes a bright orange, which latter, I believe, is the effect of incipient decay. I often observed it at Cairnlough, when floating in still water, to have an appearance as if it were bordered with white, and on closer inspection I found that this proceeded from the margin having attached to it in its whole extent minute air bubbles, which in certain lights looked exactly like a regular row of seed-pearl. On disturbing the plant, these bubbles were not very easily dislodged. They appeared equally in shade as in sunshine.

Polysiphonia violacea.—Abundant at Cairnlough Bay, in May, and in fruit in June. When put in fresh water, it almost immediately gives out a cloud of colouring matter, of the tint of Roman ochre, and becomes much darker in colour than before. When it has lain for a night in a wet state on the edge of a dish, I have found it on the following day to be almost black. When rolled in a large bunch on the shore by the action of the waves, its long fasciculated branches become so ravelled, that it is almost impossible to get them disengaged from each other, and from this cause I lost some fine specimens, as I found* the task of unravelling them too trying for any ordinary degree of human patience. It adheres firmly to paper.

Dasya coccinea.—Common. When quite fresh, it is of a garnet-red colour, and, like most others of that tint, it becomes of a beautiful rose pink, when macerated in fresh water.

Ceramium rubrum.—I found a number of specimens of this very common plant, with distinct capsules imbedded in the substance of the filaments. The central parts of these were so opaque, that I could not with the microscope distinguish separate seeds, but each globular mass was surrounded by a hyaline ring, and in some specimens, where, from decay, the filament had become white, the globules retained the same intensity of colour as in other parts; shewing that their vital properties had protected them from the decaying process to which the part containing them had yielded.

I have an interesting specimen of *Delesseria sinuosa*, which is bleached almost as white as the paper on which it lies; but the ciliary processes upon its margin, containing the seeds, are of the usual colour and form, a beautiful contrast with the rest. It seems to me indeed not improbable that cases might occur where attention to circumstances of this kind might throw some light on the reproductive parts of some of these tribes.

Griffithsia setacea.—Common on the Antrim coast. It was chiefly in reference to this species that I threw out a caution with regard

to cleaning specimens in fresh water, for a very short exposure of it to the latter deprives it of most of its colour, and materially alters its appearance. By adopting the following method, I find that specimens of this species can be preserved in a much more beautiful state than by any other. I first clean the specimen in a dish containing *sea* water, and disentangle any branches that may be interwoven, and when ready, I transfer it to a paper lying in *fresh* water and spread it out. This is done without any trouble, for the plant is still rigid and perfectly tractable, whereas, had it been previously soaked in fresh water, it would be quite flaccid, and not at all so manageable. When spread, the paper is to be held up till it is well drained, and then to be laid flat, the moisture that remains continuing to act on the plant, causes the latter to give out its colouring matter, and this forms a cloud of bright pink surrounding the specimen, giving a richness and beauty to it which cannot in any other way be obtained. *Chylocladia clavillosa*, and some others, treated in a similar way, are also much enriched in appearance by their colouring matter given out. When almost dry pressure is to be applied.

Calithamnion plumula.—Not unfrequent at Cairnlough Bay. I have found it also in Belfast Lough; but at Larne, which is nearly intermediate between these two places, I have never seen a trace of it. Its colour is brightened by steeping for some hours, or even a night, in fresh water. It may be dried either with or without pressure.

VI.—Observations on the *Caprimulgus Europæus* (Night-Jar.)

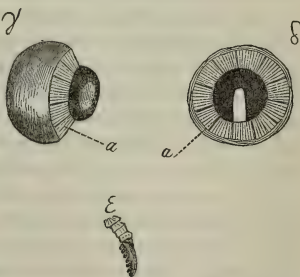
By Dr W. B. CLARKE, Ipswich.

BIRDS of the genus *Caprimulgus* are nearly allied to the *Hirundines*, and appear to bear the same relation to them that the owls do to the hawks, or the *Bombycidæ* to the *Papilionidæ*, amongst the lepidopterous Insects.

The species more particularly under consideration is the European night-jar, *Caprimulgus Europæus*. Its length is about ten inches and a-half. The plumage is of a brown colour, beautifully varied with spots and streaks of light yellowish-brown, white, cinereous, and black. The chin and sides of the mouth marked with white; and in the male, the tips of the two external tail-feathers, and a spot on the three distal primary feathers of the wings on each side are white. The markings on the different parts of the body are so complex and varied as almost to exceed a perfect description.

The night-jar is provided with an extremely wide mouth, which is beautifully constructed for taking its prey, which consists principally of the larger Bombycidæ. I have taken sometimes seven or eight moths, of the size of the yellow underwing, almost entire from the stomach. So beautifully is the mouth adapted for the reception of this kind of prey, that it opens like a trap, and presents a funnel-like aperture to receive the insect that the bird makes a dash at. The vibrissæ in this bird are very strong, and can be depressed against the side of the mouth, or erected at pleasure. Not only is the mouth remarkably large, but the vibrissæ are so directed when the mouth is open, as to reflect any insect into it which might otherwise have been missed by the bird in its attack. These vibrissæ stand out on either side of the mouth more than equal to half the width of the mouth itself, by which means the bird is rendered more sure of the seizure of its prey.

The eye of the night-jar has a structure very similar to that of eagles, hawks, and owls, and is, like the eyes of these, furnished with a strong bony ring, which surrounds the cornea, and strengthens the sclerotic coat in that part, and renders it so unyielding, that a slight pressure upon the sclerotic coat behind the ring causes the humours of the eye to be forced into a degree of convexity which could not be attained without this provision. By this beautiful yet simple contrivance the eye can be adapted to distant or close vision, according to the increase or decrease of convexity. The cornea has considerable dimensions, which enables the eye to receive a great deal of light, by which means objects become distinctly seen, which would be otherwise invisible in a paucity of light. The sketches γ and δ represent two views of the eye of the Night-jarr: γ is the lateral view, and δ is the front of the same eye: $a a$ represent the situation of the osseous ring.



The middle toe of this bird is provided with a singularly pectinated claw, with the tooth-like processes pointing, with a gentle curve, inwards and backwards, as the bird sits grasping its perch. It is a difficult thing to decide upon what use this can be to the animal in its economy, for other birds, (the heron for in-

stance,) whose habits are extremely different to those of the night-jar, are provided with a pectinated or serrated claw very similar to this. The figure ϵ amongst the sketches represents the claw and part of the middle toe of one of the feet, shewing the serrated form of the claw.

The *Caprimulgus Europæus* is the only British species of this genus. It is a migratory bird, and generally makes its appearance in England about the latter end of May or the beginning of June, and remains with us generally until the end of September or beginning of October. As it proceeds from the eastward, it visits the Island of Malta in the Mediterranean, and the south of France, about a month sooner than it arrives in England. On the other hand, in its passage from our island, it leaves us about the latter end of September, and south of France about the latter end of October. Some French authors assert, that in rare instances this species has been shot in some of the woods and mountainous parts of Vosges in the middle of winter. This species has also been found in the open parts, as well as the woods and rocky parts, of Siberia and Kamtschatka.

The night-jar feeds upon insects which it takes in its flight, and this is principally done during the night, and by morning and evening twilight, these being the times at which it generally flies, although it may be occasionally seen at intervals during the day; but this appears principally to be when it has been driven from its diurnal retreat by some intruder. The plumage is peculiarly soft, which enables it, at its pleasure, to pass rapidly through the air without the vibrations of its wings being heard, and nature has so beautifully provided for its safety during its diurnal rest, that it can only, with the greatest difficulty, be discovered amongst the decayed branches and trunks of trees, the dead ferns, and leaves amongst which it hides; the colours of the plumage much resembling the tints of the bodies amidst which it secretes itself. The bird lays two eggs upon the bare ground where it is a little hollowed out beneath a whin bush, patch of ferns, or some other similar body, which serves as a kind of security or shelter to the parent bird whilst incubating. The egg is large for the size of the bird; has both ends nearly alike in size, is prettily mottled with brown, relieved by marblings of paler tints of the same colour. To give an idea of the habits of this bird, I shall here insert a few notes that I have made at different times respecting it. When in the middle of a heath in the neighbourhood of this town, and at the distance of a quarter of a mile from any wood, my atten-

tion was suddenly arrested by the appearance of a male night-jar, (*Caprimulgus Europæus*;) which rose from a small spot of bare ground by the side of a whin bush, and after flying about eight or ten yards, alighted upon the ground with its wings and tail expanded, and its head turned round towards me : here it remained a few seconds, and afterwards, slowly fluttered along the ground over the space of four or five yards, describing a curved course, and apparently with difficulty, appearing, by its actions, to imitate a wounded bird labouring to fly. This was doubtlessly done to decoy me away from the spot it had risen from ; but which I walked up to, and there found two eggs lying in a slightly hollowed spot of ground beneath the shelter of a whin bush. One would suppose that the little animal was led by reason to act this admirable part, for the incapability of a wounded bird to rise into the air was so exquisitely represented by this little creature, that an individual unacquainted with the habits of birds might have been led from the site of its eggs, by the idea of his being able to secure it. After fluttering a short distance it rose from the ground, and flew slowly in a curved direction away from me, and was lost amongst the bushes that were thickly dispersed around. Upon a cursory view the eggs struck me as much resembling the white stones speckled with lichens which are commonly to be seen upon heaths, from which characters they would very generally elude the eye of any one walking past them, although he might even be in search of them.

Supposing that the bird would soon make its appearance again to visit its eggs, I was induced to secrete myself as well as I could behind a whin bush, about fifteen yards from the spot where the eggs were lying, and from this place I had an opportunity of observing the actions of this interesting little creature. After waiting about a quarter of an hour it came round to the whin bush under which its eggs were lying ; over this it lightly skimmed and hovered, as if to ascertain whether its eggs were safe, and then suddenly turning, came flitting directly towards me, and approached within a few feet of my face, and then flew off. This it did two or three times at intervals of ten minutes or thereabouts. It was now about a quarter to nine o'clock on the 21st of June A. D. 1832, the sun had set about a quarter of an hour : the evening was mild and fine, and all was still, when the peculiar note of the night-jar was faintly heard, but the bird at this time was not visible : soon after this a faint squeak was heard, and a pair of night-jars were seen in the air, occasionally fluttering within a few yards of me, and at intervals remaining motionless in the air with their wings expanded ; then fluttering and ho-

vering; then descending nearly to the ground with their wings expanded and elevated over their backs, at the same time striking them together, the back of one against that of the other, so as to produce a smart snapping sound. This was often accompanied by a sharp quick sound or squeak. At another time they would skim round me at a few feet distant from the earth,—again they would hover at a short distance from me, occasionally reiterating the sharp squeak before described,—then they would fly to a neighbouring whin bush, and, perching upon the top of it, commence the peculiar sound from which their name (night-jar) is derived, and which precisely resembles the sound produced by a wheel in quick rotation. Then they would rise into the air, again gliding through it without producing the least sound, again hovering, flitting, and squeaking. This they continued until, from the darkness of the night, I could see them no more, although I could at the same time distinctly hear them, and knew they were close by me. I observed when these birds were sitting that their wings were a little expanded, the body nearly horizontal, with the head rather elevated. These birds will sit sometimes in a wood perched upon a dead branch of an oak tree, with their bodies in a direction parallel with that of the branch, and in this situation, just as the sun goes down, will commence their jarring or vibrating note, and at intervals flit suddenly from this situation through an opening amongst the trees, skimming and hovering for a short time around and amidst the tops of the neighbouring oak trees, and then settle upon the branch from which they rose, and again commence their jarring note, then again dash into the upper part of the trees at some unwary moth, and again light upon the same bough, repeating this at intervals, and each time upon alighting commence their vibrating note, which they continue as long as they maintain their sitting posture. We have not at present been able to detect a bird in the act of making its *vibrating* note whilst upon the wing. Upon visiting a spot where these birds are likely to be, as soon as the sun goes down, if the evening be fine, their vibrating note may be heard if the birds are sitting, or their little sudden squeak several times repeated will announce their flight, and presently the little creatures will be seen like airy sprites floating at no great distance from the ground, or over the tops of trees, so prettily and lightly do they seem to float and fan themselves along. Often upon a heath, when the night is fine, yet dark from the lateness of the hour, and the vibrating sound of the night-jar is heard at no great distance, if one walks towards the sound it will soon cease, and after a few seconds of perfect stillness, the sound will be again heard at a distance. If we continue our course

we shall find the sound increasing upon us. Upon walking on in the same direction it will soon cease, and after an interval of silence will be heard again at a distance; for the eye of the night-jar is so beautifully adapted for nocturnal or crepuscular vision, that it observes the approach of an object, although a person is incapable of distinguishing his companion, or a body the size of himself at the distance of a few feet only. They will wander over a considerable tract of ground in the course of an evening in search of prey, beginning by flitting over the spot near which they have taken up their diurnal abode, and afterwards continuing to fly over some heath or moor at a considerable distance from the place where they were first seen. This bird is by no means common in the neighbourhood of Ipswich, but there are places not very distant from the town where a pair or two of them may be generally found every year.

VII.—*On the advancement of Local Botany in the environs of London, with remarks relative to the Dispersion of Plants in that vicinity, and the formation of plans exhibiting the Distribution of Species over localities.* By DANIEL COOPER, Curator to the Botanical Society of London, &c.

THE formation of the *Botanical Society of London*, and the publication of the *Flora Metropolitana*, or *Botanical Rambles within thirty miles of London*, have been the means of bringing forward numerous papers and plans, exhibiting the distribution of the localities of species in the directions frequented by the metropolitan botanist, and of advancing the objects of local Floras generally. No local Flora of the environs of so extensive a city, and, as will be presently shewn, producing species of so rare occurrence, having been published in a cheap and portable form,* induced me to attempt to arouse the minds of practical men towards the furtherance of this object. In directing their attention to this subject, I had two objects in view: the first, to solicit their aid for the purpose of endeavouring to arrive at a more accurate and actual Flora of the environs of so great a city—the latter, to obtain correspondents who might be willing to join in the establishment of a society for mutual intercourse and benefit. In

* About sixty years since “Curtis’s *Flora Londinensis*” was published. This work contains plates of all the species that had been found round London. 3 large folio volumes. Mr Warner published a Local Flora on the plants of Woodford, Essex; and Mr Blackstone of Harefield, Middlesex. The localities in these works cannot be relied on, having both been brought forward upwards of sixty years since.

both my objects have been realized to a greater extent than had been expected. Contributors without number have kindly lent their assistance towards the accomplishment of the first object, and the second has already manifested itself by the formation of the "Botanical Society of London." That local botany is attracting more notice daily throughout the kingdom, is evident from the number of local floras of late years published, and valuable, indeed, they are to the naturalist, —if we consider the immensity of labour, trouble, and time, spared to the lover of nature for other pursuits.

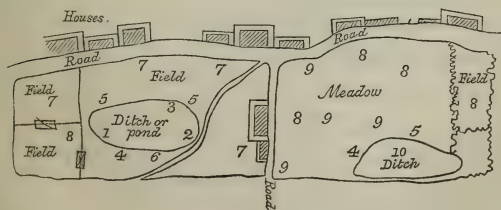
The rapid formation of the Botanical Society of London affords a still greater proof of the progress of that department of science, since we find that out of seventy members elected since its formation, (29th Nov. 1836,) two-thirds at least devote the major part of their time to practical botany. That a society embracing the objects it does, has been long a desideratum in the metropolis, cannot be denied, and is evident from the number of its members, and also from the various important memoirs that have been brought forward relating to subjects deserving the attention not only of the practical, but the physiological and geographical botanist.

I shall now offer some views respecting the formation of plans, exhibiting the actual flora of the vicinity of, or in, any particular locality, in order that the botanist, at a glance of a map or plan of such a locality, would be enabled with greater facility to arrive at or near the spot where any species have been observed to grow. The first idea of this nature was brought before the Botanical Society of London on the 5th January 1837, illustrating a paper which I read on the distribution of plants in one of our principal localities in the immediate vicinity of London,—a locality for years celebrated for the profuse supply of specimens it has yielded to the naturalist. I allude to Battersea Fields, the spot where most of our ancestors and ourselves have often rambled with so much profit and delight. In the subsequent part of this paper, I shall give in a table the number of genera and species found in various localities.

In producing plans of this kind, there is but one objection, viz. that many botanists of the present day are not content with collecting one, or even half-a-dozen specimens, more particularly if the plant is of uncommon occurrence, and I have known instances, where whole species have been rooted out by the eagerness and avarice of the collector. Such measures ought not to be adopted to the destruction of the habitats of species. If the plants are *annuals* it is doing injustice to the rising generation of botanists; if they are *bien-*

nials or perennials, surely collecting the portion above the earth in most instances is sufficient, without rooting out the species entirely. There are certain plants of which the root is necessary for distinguishing and defining specific characters; in such cases some attention should be paid to the number of species observed in the locality; bearing in mind the necessity of leaving a sufficient number for the continuance of the propagation of the species. It has been observed, by some eminent botanists of the present day, that the formation of the different societies for the exchange of specimens, &c. will in a great measure have the effect of destroying some of our richest localities. Let it not be understood, that the formation of maps and plans of the nature before alluded to, are for the purpose of facilitating these ravages. That in the hands of the most avaricious they will do so, I have not the slightest hesitation in acknowledging, but it is to be hoped that not many of those individuals now exist, who would thus damp the ardour and zeal of the rising generation of botanists, and also be the means of retarding science, while the execution of such ideas may prove beneficial to the scientific inquirer.

The plan of Battersea Fields before alluded to, exhibited the various houses, ditches, fields, and other minor but interesting stations, on the scale of two feet to the mile. This plan was executed and the locality surveyed by myself, in order that accuracy might be the result. I afterwards learned that this labour and trouble might have been spared, by inspecting the plan of the parish or parishes from which the rates are made, and therefore, on a scale sufficient for the present purpose; it is, I understand, generally to be found hanging up in the vestry room, or in the care of the vestry-clerk of the parish. Such plans might be conveniently applied to local Floras, and would be admirable *desiderata* to such works, numbering the species in the letter-press to correspond with the numbers on the plate; thus supposing the cut to represent a plan of a locality, and the figures somewhat the situation of the plants there found.



- | | |
|----------------------------------|-----------------------------------|
| 1. <i>Alisma Damasonium</i> | 6. <i>Campanula hederacea</i> |
| 2. <i>Menyanthes trifoliata</i> | 7. <i>Galium verum</i> |
| 3. <i>Villarsia nymphaeoides</i> | 8. <i>Rhinanthus crista galli</i> |
| 4. <i>Drosera rotundifolia</i> | 9. <i>Saxifraga granulata</i> |
| 5. <i>Narthecium ossifragum</i> | 10. <i>Butomus umbellatus</i> |

By using figures in the place of writing or printing the names in full, much unnecessary space can be dispensed with; and thus a plan of a locality on the scale of three or four inches to the mile, might be conveniently introduced into a duodecimo or octavo volume. Any additional localities the botanist might discover could with facility be marked on the spot in their proper situations, by making additional figures on the plan, which figures of course to agree with the names of the plants upon a separate page. In this way it appears to me that much time might be spared the naturalist for his other pursuits, and also be the means of producing more complete and accurate local Floras than any plan hitherto adopted.

In conclusion, I have a few remarks to make upon the dispersion of species in the environs of London. The former hints respecting the eradication of plants will be sufficient to those collectors who are in the habit of *herbalizing* into various counties. Such individuals must bear in mind, that the lover of natural history is the more or less proud of his country, according to the specimens of interest and value that have been collected in it. Take for instance the county of Surrey—what would it be to the botanist without its orchideous and chalk plants, for which it has been long celebrated. At Boxhill, and the hills adjoining, with other places in the neighbourhood, (and in this, as well as all places hereafter cited, within a distance of thirty miles of London,) the following lists of orchideous and other uncommon plants have been found.

<i>Orchideous Plants.</i>		
† <i>Ophrys apifera</i> , 30.	* <i>Platanthera viridis</i> , (<i>Banstead Down.</i>)	† <i>Orchis hircina</i> , 34.
† ——— <i>muscifera</i> , 30.		† ——— <i>militaris</i> , 34.
† ——— <i>aranifera</i> , 31.	† <i>Aceras anthropophora</i> , 20.	* <i>Malaxis paludosa</i> (<i>Reigate.</i>)
† ——— <i>arachnites</i> , 30.		<i>Herminium monorchis</i> , 32.
† <i>Anacamptis pyramidalis</i> , 34.	† <i>Orchis maculata</i> , 5, 16.	† <i>Neottia nidus avis</i> .
† <i>Gymnadenia conopsea</i> , 34.	† ——— <i>mascula</i> , 16.	† <i>Listera ovata</i> , 15-34.
† <i>Platanthera bifolia</i> , 16, 34.	† ——— <i>fusca</i> , 34.	† <i>Spiranthes autumnalis</i> , 29-30.
	——— <i>latifolia</i> , 15.	
	† ——— <i>morio</i> , 34.	
	——— <i>ustulata</i> , 34.	

* Those marked thus * have been recently discovered in this county.

————— † have been also discovered in Kent.

The numbers affixed correspond to the pages where the localities may be seen in the "*Flora Metropolitana*," 1836.

† <i>Epipactis grandiflora</i> , 30.	† <i>Epipactis ensifolia</i> , 32. ————— <i>palustris</i> , 117	† <i>Epipactis latifolia</i> , 4.
<i>Xanthium strumarium</i> , 8, 98.	<i>Narcissus biflorus</i> , 15	<i>Impatiens noli-me-tan- gere</i> , 30.
<i>Tulipa sylvestris</i> , 3.	<i>Fritillaria meleagris</i> , 25.	————— <i>fulva</i> , 43.
<i>Myosurus minimus</i> , 1, 23.	<i>Dentaria bulbifera</i> , 21.	<i>Scilla autumnalis</i> , 30.
<i>Chelidonium laciniatum</i> , 1.	<i>Leonurus cardiaca</i> , 21.	<i>Lilium martagon</i> , 31.
<i>Polygonum dumetorum</i> , 4.	<i>Botrychium lunaria</i> , 22.	<i>Chrysosplenium oppositi- folium</i> , 39.
<i>Symphytum tuberosum</i> , 3.	<i>Scrophularia vernalis</i> , 22.	<i>Vaccinium oxycoccus</i> , 40.
<i>Anemone apennina</i> , 1, 39.	<i>Coronopus didyma</i> , 25.	<i>Adoxa moschatellina</i> , 40.
<i>Melilotus leucantha</i> , 30.	* <i>Utricularia vulgaris</i> ,	<i>Lonicera xylosteum</i> , 40.
* <i>Crocus aureus</i> ,	<i>Astragalus hypoglottis</i> , 26.	<i>Myrica gale</i> , 41.
————— <i>vernus</i> , 15.	* <i>Corydalis lutea</i> ,	<i>Osmunda regalis</i> , 42.
	<i>Hesperis matronalis</i> , 30.	

From inspecting the above lists it may be easily imagined that the botanist resident in Surrey is not a little proud of his country. The metropolitan botanist also can certainly boast of a Flora perhaps not to be equalled throughout the whole of England. In this district he is particularly rich in orchideous plants. Of the 36 species described as British, 26 are found dispersed within thirty miles from London.

In Kent, it may be observed that the species are not quite so abundant, in the ratio of 21 to 36, including two species that have not as yet to my knowledge been found in Surrey, at least within the range before specified, viz. **Orphrys fucifera* and *Orchis tetrapho-
santhos*, 61. These plants are not confined to the counties of Surrey and Kent, in the London district, as might perhaps be supposed; they also occur in Essex and Middlesex, but not so frequently. Towards Harefield and St Albans they make their appearance again in great quantities. We have then in the combined counties of Surrey and Kent, as far as observation has gone, 28 species out of 36 British orchideous plants, the remaining eight being mostly confined to the northern districts.

Nor is Kent behind her sister county in other rare plants,—*Althæa hirsuta*, *Bupleurum tenuissimum*, *Hutchinsia petræa*, *Valerianella calcitrapa*, *Hyoscyamus niger*, *Paris quadrifolia*, *Gentiana amarella*, and *G. pneumonanthe* may be considered but a few of them.

With regard to the distribution of the whole of the species within thirty miles of London, I have from careful examination and research arrived at the following result :

Lindley's 1st edition of Synopsis of British Flora.

Dicotyledons.	{ 1. Dichlamydeæ, Nat. Ord. 67	Genera 370	Species 904
	{ 2. Monochlamydeæ, 14	25	91
	{ 3. Achlamydeæ, 5	14	86
	—————	—————	—————
	86	409	1081

Monocotyledons,	{	1. Petaloideæ,	Nat. Ord. 16	Genera 58	Species 147
		2. Glumaceæ,	2	69	224
			18	127	371

Found within thirty miles of London. (Flora Metropolitana.)

Dicotyledons.	{	1. Dichlamydeæ,	Nat. Ord. 64	Genera 317	Species 683
		2. Monochlamydeæ,	13	20	72
		3. Achlamydeæ,	5	14	49
			82	351	804
Monocotyledons,	{	1. Petaloideæ,	Nat. Ord. 16	Genera 46	Species 106
		Glumaceæ,	2	57	137
			18	103	243

Total in Lindley's Synopsis.

Dicotyledons,	Nat. Ord. 86	Genera 409	Species 1081
Monocotyledons,	18	127	371
	104	536	1452

Total in "Flora Metropolitana."

Dicotyledons,	Nat. Ord. 82	Genera 351	Species 804
Monocotyledons,	18	103	243
	100	454	1047

Several papers having been read before the Botanical Society of London on the distribution of the number of species in certain localities within a few miles of London, the results might perhaps be interesting to some of your readers. Mr Irvine* found 670 species within two miles of Hampstead, Middlesex, and 900 within the same distance of Croydon, Surrey. Dr Macintyre† found 10 genera, including 23 species of ferns—65 genera, including 136 species of Monocotyledons,—and 265 genera, including 542 species of Dicotyledonous plants around Warley Common, Essex. I‡ have found 61 Natural Orders, 214 genera, including 406 species in Battersea Fields, Surrey—some of them of rare occurrence.

The following tables have been drawn up from various works, in order to exhibit the number of *genera* and *species* contained in some of our local Floras; the *genera* and *species* have not been reduced to a common standard, but have been calculated as they appear in those works.

* Mr Irvine's paper was read, November 17, 1836.

† Dr Macintyre's paper was read, December 15, 1836.

‡ Paper read, January 5, 1837.

The numbers placed over the tables correspond to the notes, [p. 170.] to show from what works the data have been taken.

Class I.	British Flora.		Lindley's Synopsis, 1st edition.		English Flora.		Scotch Flora.		Irish Flora.		Great Britain.		
	Gen.	Spec.	Nat. Ord.	Gen.	Spec.	Nat. Ord.	Gen.	Spec.	Nat. Ord.	Gen.	Spec.	Gen.	Spec.
VASCULARES													
Dicotyledons,	} 517	1575	86	409	1081	36	381	1067	82	333	902	313	782
Monocotyledons.				18	127	371	21	104	331	20	33	280	74	135
Total,.....	517	1575	104	536	1452	107	485	1398	102	416	1182	387	917

Class I.	Fl. Edinensis.		Flora Metropolitana.		Flora Cantabrigiensis.		Flora of Berwick.		Flora Woodfordensis		Flora Oxoniensis.		
	Gen.	Spec.	Nat. Ord.	Gen.	Spec.	Gen.	Spec.	Nat. Ord.	Gen.	Spec.	Gen.	Spec.	
VASCULARES.													
Dicotyledons,	} 385	894	82	351	804	} 414	} 850	63	526	} 263	} 824	} 324	
Monocotyledons,				18	103			243					155	370	775	324	729
Total,.....	385	894	100	454	1047	414	850	76	681	263	824	370	775

Class I.	Flora Devoniensis.		Flora Glottiana		Flora Bedfordiensis.		Flora Berwick.		Flora of Anglesey.		Fl. Northumb. & Durham.		Flora Snowdonian Mountains, (rare plants.)		
	Nat. Ord.	Gen.	Spec.	Gen.	Spec.	Gen.	Spec.	Gen.	Spec.	Gen.	Spec.	Gen.	Spec.	Genera.	Species.
VASCULARES.															
Dicotyledons,	66	284	587	} 292	} 662	} 295	} 719	} 234	} 466	} 318	} 763	} 343	} 875		120
Monocotyledons.	15	59	187												
Total,.....	81	343	774	292	662	295	719	234	466	318	763	343	375		120

Notes to Table, p. 169.

- 1, 2, 3. Magazine of Zoology and Botany. Vol. i. p. 267.
- 4, 5. Calculation from the Prospectus of the Botanical Society of Edinburgh. 1836.
6. Flora Metropolitana, or Botanical Rambles within 30 miles of London. By Daniel Cooper. 1836.
7. Flora Cantabrigiensis. By Richard Relham. A. M. 3d edit. Cantab. 1820.
8. Flora of Berwick upon Tweed. By G. Johnston, M. D. Edinburgh, 1829.
9. Flora Woodfordiensis.—A Catalogue of Plants growing at Woodford, Essex. By Richard Warner, London, 1771.
10. Flora of Oxfordshire and contiguous counties. By Richard Walker. Oxford, 1833.
11. Flora Oxoniensis. By John Sibthorp, M. D. Oxonii, 1794.
12. Flora Devoniensis. By Rev. J. P. Jones, and J. F. Kingston. London, 1829.
13. Flora Glottiana.—A Catalogue of the Indigenous Plants on the banks of the river Clyde, and in the neighbourhood of the city of Glasgow. By Thomas Hopkirk. Glasgow, 1813.
14. Flora Bedfordiensis, comprehending such plants as grow wild in the county of Bedford. By Charles Abbott, M. A. Bedford, 1798.
15. A Catalogue of the Plants of Berwick upon Tweed. By John V. Thompson, Surgeon. London, 1807.
16. Flora of Anglesey, in Welsh Botany. By Hugh Davies. London, 1813.
17. Flora of Northumberland and Durham, in the Botanist's Guide through those counties. Newcastle-upon-Tyne, 1805.
18. Flora of the Snowdonian Mountains (rare plants only.) By the Rev. W. Bingley in 1798–1801. (Appendix to Jones's Illustrations of the Natural Scenery of the Snowdonian Mountains.) London, 1829.

VIII.—*Contributions to the Natural History of Ireland.* By WILLIAM THOMPSON, Esq. Vice-President of the Belfast Natural History Society. (Continued from p. 57.)

No. 3.—*On the Birds of the Order Raptores.*

GOSHAWK—*Astur palumbarius*, Bechst.—“ I have seen a young one got at the rocks of Magilligan (Londonderry.)”—MS. late Mr Templeton, where it is also stated under the head of Gentil Falcon. “ On 25th July 1809, I saw at Carrickfergus a stuffed specimen that had been shot at the Gobbins, (Antrim.)”

I have never seen an Irish specimen of this bird. The term goshawk or *goose**-hawk is commonly applied in the country to any of

* In reference to its comparatively superior size.

the Falconidæ of a larger size than those ordinarily met with, such as the common buzzard (*Buteo vulgaris*,) &c.

SPARROW-HAWK—*Accipiter fringillarius*, Will.—Is common in the enclosed and wooded parts of Ireland. It is certainly the boldest of the British Falconidæ. I have known this species to be shot in a yard attached to an occupied dwelling-house in the country, where it was discovered by the uproar produced among the inhabitants of the dove-cot. Dr J. D. Marshall was, in October 1833, sent an old female sparrow-hawk, that in pursuit of a thrush (*Turdus musicus*) followed it into a cottage in the neighbourhood of Belfast, where both were secured. On some stuffed birds being placed near this hawk, she dashed fiercely at them. When bent on spoliation, the sparrow-hawk scruples not to enter even the church itself, as a male bird was about two years since caught by the sexton in Newtownbreda Church (Down,) whither it had pursued some small bird, I believe a robin (*Sylvia rubecula*.) A sparrow-hawk was once observed by Mr R. Langtry to strike one of his sea eagles which was perching on his shed; and when his golden eagle was at liberty, he has not only seen it struck by one of these birds in passing, but was once witness to the latter turning back and repeating the impertinence. Another ornithological friend, on climbing a tree to one of their nests, and when within a very few yards of it, was attacked by the female bird, and his cap at one stroke sent to the ground. He speedily followed it, lest the next should be on his bare head, but, replacing the cap more firmly on, he gallantly remounted to the nest, which he had been in the habit almost daily of visiting, and was gratified with a sight of the young birds that day hatched, which accounts for the boldness of the parent. He describes the young as being beautiful in their first garb of snow-white down.

I have known this species to build only in trees, in Ireland. The stomachs of several specimens examined by me contained the remains of birds alone.

KITE—*Milvus iclinus*, Sav.—Under the name of "Kite," a bird appears in many of the statistical surveys of Irish counties, as well as in other catalogues of native birds, but the true *Falco milvus* or *Milvus iclinus* has never been seen in Ireland, either by myself or any ornithologist with whom I have communicated, nor am I aware of the existence of a native specimen in any collection. When Ireland presented an aspect different from the present, and was a well-wooded country, the Kite may have been one of our

birds, but the larger species of the Falconidæ, and chiefly the common buzzard, being in some places called kite and glead, as well goshawk or goosehawk, leaves us in uncertainty whether the real *Falco milvus* was ever indigenous to the country. And for the same reason the doubt is no way removed even by the "authority" of the Irish Statutes, in which rewards are offered for the destruction of the "kite" as one of the birds of prey. Vide 11th Anne, ch. 7 and 17, Geo. II. ch. 10.*

Mr R. Langtry, when at Loch Awe, in Argyleshire, early in the summer of 1833, procured from the nest two young kites, which proved a highly interesting addition to his aviary. They at once became very tame and familiar, and were so gentle in disposition as to be most engaging. Every morning they had their liberty, never flew far, but soared to a great height in the air, and, "in still repeated circles," displayed their peculiar and graceful flight. To either lure or "fist" they always returned when called. Mice were preferred by them to birds or any other food. When these kites were on wing rats let off from the cage-trap were expertly caught by them.

COMMON BUZZARD—*Buteo vulgaris*, Will.—This species is of common occurrence in Ireland. From the most extensive and best wooded demesnes in Down and Antrim, I have at every season of the year seen specimens. In such localities they build in trees, whence I have heard the young call in Shane's-Castle Park. The buzzard is also found in the retired, rocky, and mountainous parts of the country, where trees are quite unknown, and there forms its nest in the cliffs.

When at Rosheen mountain (before-mentioned as the eyrie of the Golden (?) Eagle) near Dunfanaghy, in June 1832, we saw a pair of buzzards, and heard their young call from the nest on a ledge of rock, midway down a precipice. This we were told had, until the present season, been for many years occupied by a pair of ravens (*Corvus corax*), which it was stated did not yield their possession quietly, but fought hard, though in vain, against the buzzards' usurpation. My friend being desirous of obtaining the young birds, a man undertook to descend the rock for them in the ordinary way, being secured from falling by a rope fastened about his body, and held by persons above. However, from its impending at the summit, this was rather perilous, and for greater safety he preferred ascending

* For extracts from the Statutes, I am indebted to Francis Whitta, Esq. of Belfast.

from the base ; the preventive just mentioned against accidents being in this case likewise resorted to. When the least apprehension of danger was manifested, we endeavoured to dissuade him altogether from the attempt, but his father, an old gray-haired man, insisted, though gain was never thought of, that he should not turn craven, and was so froward in leaning over the cliff to direct his son's movements, that we verily feared his own life would become a sacrifice, but all expostulation was in vain. By this method three young birds were taken, a fourth escaping by flight. The climber said the nest was composed of the strong stems of heather and roots of grasses, and lined with the fur of hares and rabbits, and that it would have held several more than the four birds it contained. The legs of rabbits and hares were lying about it.

When at Macgilligan, in the county Londonderry, in July 1833, I saw a buzzard, which appeared to be the *Buteo vulgaris*, soaring about the basaltic precipices, and flying from one pinnacle of rock to another, its young being all the while very vociferous, and one of them loudly heard above the others, calling similarly to the male bird brought from Donegal last year, satisfied me respecting its species. The continual and loud cry of the latter bird, as we drove from Dunfanaghy to the city of Londonderry, proved ludicrously annoying to us, by giving evidence of the contents of our baskets to all persons we met, (it was a holiday,) and thus drawing their attention towards us. The other two buzzards and the eagles remained generally quiet. These three buzzards, but especially the male, became very familiar. When let off in the morning, his favourite perch was upon some stacks of grain, where he remained patiently watching for mice, which he has been seen to catch, but was not always successful, sometimes dashing his talons into the straw, and bringing them out empty. He preferred mice to rats, though very expert at killing both. He was quite a pet bird. One of his favourite tricks was to fly on his master's feet and untie his shoe-strings. But he was likewise very bold ; and, taking a dislike to a certain individual, flew at him whenever he appeared, and endeavoured to strike him about the head. Against these attacks a walking-stick generally served as a defence ; but the buzzard once came upon him unawares, and inflicted a severe blow on the back of his head. This bird occasionally astonished strangers, by smartly striking them on the hat, so as to send it over their ears.

At the range of inland rocks called Salagh Braes, and at another similar locality in Antrim, the buzzard nestles, as it is likewise presumed to do at the promontory of Fairhead, in the same county, a pair of these birds having been seen there in June last by my friend

Richard K. Sinclair, Esq. who on the same day observed, in addition to them, pairs of sea-eagles, peregrine falcons, and kestrels, all of which are well known to have eyries there.

A native specimen of the buzzard, which I lately examined, had a few feathers half an inch in length about the middle of one of the tarsi, which was bare for nine lines above them.

ROUGH-LEGGED BUZZARD—*Buteo lagopus*, Vig.—About the middle of October 1831, a bird of this species was killed near Dundonald, in the county of Down.* On dissection, the remains of birds and of a full-grown rat were found in its stomach. It was purchased by Dr J. D. Marshall, and is now in his possession. This bird accords with Temminck's description of the adult male. It has not any indication of bands on either side of the tail. In Mr Selby's figure of the female, a band appears near the tip on the under side.

About this time two others were seen at Killinchy, in the same county, and one of them shot, but it was, through ignorance, lost as a specimen. Last autumn, the gamekeeper at Tollymore Park described to me a bird, which, from size, being feathered to the toes, &c. evidently had been of this species. It was shot a few years ago (probably at the same period as the others) in Castlewellan demesne (Down) when carrying off a young rabbit.

HONEY-BUZZARD—*Pernis apivorus*, Cuv.—The following notice of this species appeared in the Magazine of Natural History for 1833, Vol. vi. p. 447.

“ At a meeting on July 23, 1833, of the Council of the Belfast Natural History Society, Mr W. Thompson, V. P. stated, that, on the 11th of June last, a fine male specimen of the honey-buzzard, which is unrecorded as having ever before occurred in Ireland, was, when in company with a similar bird, most probably the female, shot by Robert G. Bomford, Esq. in his demesne of Annandale, in the vicinity of Belfast; and who, on being informed of the rarity of the bird, had most handsomely presented it to the Belfast Museum. Mr Thompson, who saw the specimen when recent, related, that the bill and forehead were covered with cow-dung, in such a manner as to lead him to suppose the bird had in that substance been searching for insects. On examination of the stomach, which was quite full, it was found to contain a few of the larvæ, and some fragments of coleop-

* This is the individual mentioned in “ Mag. Nat. Hist.” Vol. v. p. 578.

terous insects, several whitish-coloured hairy caterpillars, the pupæ of a butterfly, and also of the six-spot burnet-moth (*Zygæna filipendulæ*,) together with some pieces of grass, which it is presumed were taken in with this last-named insect, it being on the stalks of grass that the pupæ of this species of *Zygæna* are chiefly found. Mr Thompson remarked, that this insectivorous food must to the honey buzzard have been a matter of choice, the bird being in the full vigour of its powers, and the district in which it was killed abounding with such birds, as, were they its wished-for prey, it might have easily captured and destroyed."

The individual thus dwelt upon was a mature male. The bands on the tail exhibit a greater inequality than is represented in any figure I have seen, the first and second being less than an inch apart, the third more than two and a-half inches distant from the second band.

MARSH HARRIER—*Circus rufus*, Briss.—I have had opportunities of examining four recent marsh harriers, which were killed in Down and Antrim, but all in different localities—one only was an adult male. A person conversant with birds has mentioned to me, that he once saw an old male bird of this species on the banks of Belfast bay at ebb-tide.

A brood of these birds taken a few years ago from the nest on the mountains of the county Monaghan was reared by Captain Bonham of the 10th Hussars, who intended trying them in falconry, but for this purpose they proved most intractable. Some years since, three or four young marsh harriers were brought to Belfast from the mountains of Ballynascreen (Londonderry) and I am credibly informed that the species breeds at Claggan (Antrim). It is considered very rare in Donegal.* Mr R. Ball states in a letter to me, that its young have been brought to him at Youghal (Cork). In suitable localities in the counties of Tipperary and Dublin I am informed that it occurs.

On dissection, the stomach of one of the first mentioned was found full of frogs.

HEN-HARRIER—*Circus cyaneus*, Flem.—This handsome species is generally distributed in Ireland. In Antrim I have been assured that it breeds at Claggan, and occurs at all seasons in the mountains around Ballymena. From an adult male being seen by an ornithological friend on the 15th of May near Glenarm, it is probably

* Mag. Nat. Hist. Vol. v. p. 581.

indigenous to that neighbourhood. Two mature male specimens were shot, I have been told, near Dublin, in July 1836. The hen-harrier does not appear in Mr Stewart's published catalogue of the Birds of Donegal; but in a letter, with which he lately favoured me, that gentleman mentions it as a subsequent addition, but at the same time as a rare and only occasional visitant. It is stated by Mr R. Ball to be sometimes shot about Youghal, and is enumerated among the birds seen in August 1835, in Connemara, by Mr Lingwood.*

When looking for snipes in a boggy spot in the Belfast mountains, I once shot a female bird of this species, hovering in the manner of a kestrel over it. She was not alarmed by the presence of myself and friend, nor by that of our dogs engaged in "beating" the ground immediately beneath.

A gentleman of my acquaintance has long known "white hawks" to have their nests every summer in his mountains at Ballynascreen (Londonderry,) where he had two of them last year. They are always placed on the ground among the heath. When at "the Horn" in 1832, the gamekeeper told me of his having the winter before seen a "white hawk" strike a curlew (*Numenius arquata*) in passing, and break its wing, which so disabled the bird, that it became an easy capture to my informant. In a communication lately received from the Rev. Thomas Knox of Toomavara, it is remarked under the head "Hen-Harrier"—"From the description given by different persons, I have no doubt that this bird frequents the bogs adjoining the Shannon, where it is called the 'white kite.' I have not been able to get one of them shot, but have seen it at a distance frequently." A "large bluish-white hawk" has been mentioned to me by a correspondent, as frequent about Clonmel. The localities have been thus particularised, as the ash-coloured harrier may possibly be the species alluded to under some of the latter appellations.

EAGLE OWL—*Bubo maximus*, Sibbald.—The only record of the eagle owl's occurrence in Ireland appears in Mr Stewart's Catalogue of the Birds of Donegal, in the following words:—"Four of these birds paid us a visit for two days, after a great storm from the north, when the ground was covered with snow. They have not since been seen here. As I am informed that a pair of them breed in Tory Island, about nine miles to the north of this coast, it is probable that they came from that island. I have heard of them nowhere else."†

* Mag. Nat. Hist. Vol. ix. p. 128.

† Ibid. Vol. v. p. 581.

LONG-EARED OWL—*Otus vulgaris*, Flem.—Occurs throughout Ireland, and is resident. Where a sufficient extent of wood exists in Down and Antrim, it is a common species, and is remarked by a correspondent to be “not uncommon” in Tipperary. It is considered rare in Donegal.*

I have known this species to be shot in the dusk of the evening, a mile from high-water-mark, in Belfast Bay, by a person waiting in a barrel (sunk in the ooze) for the flying of widgeon. The white owl has in several instances been obtained by these shooters.

An individual, well acquainted with the long-eared owl, informs me, that in a close plantation of spruce firs (*Abies communis*) at Scout-bush, near Carrickfergus, he for several years had its nests, which, in consequence of the trees being young, were placed not higher than six feet from the ground.

The Rev. Thomas Knox, in a letter to me, mentions the contents of the stomach of a long-eared owl, shot at Killaloe, to be “part of a rat, the skull of a mouse, and the heads of two sparrows.” A sparrow almost entire was found in the stomach of one examined by myself.

SHORT-EARED OWL—*Otus brachyotos*, Flem.—This species is one of our regular winter visitants in the north of Ireland. October the 13th is the earliest date of its occurrence to me. It has been added to the birds of Donegal by Mr Stewart, since the publication of his catalogue, and its migration in winter to the mountains of Wexford and Tipperary has been communicated to me.

I have several times met with, and shot this owl in the neighbourhood of Belfast, and invariably in wet and boggy places, where snipes might be expected. One of these owls being only wounded, afforded me the opportunity of observing the exceeding brilliancy and depth of its golden eyes. In the stomach of a specimen examined on the 16th December last, I was surprised to find the legs of a purre (*Tringa variabilis*,) as the localities frequented by the two species at this season are generally very different.

WHITE-OWL—*Strix flammea*, Linn.—This beautiful species is the most common owl in Ireland. I have had the following evidence of its regular flight to some distance from its domicile, just as twilight commences. Near Belfast there is a considerable extent of low-lying meadows, which are flooded by heavy rains, and at such times are re-

* Mag. Nat. Hist. Vol. v. p. 581.

sorted to by various species of wild-fowl (*Anatidæ*.) The flood never attaining such a height as to cover the banks surrounding these meadows, they are frequented by persons for the purpose of shooting the wild-fowl on their evening flight, and to whom the owl, on as "murderous deeds intent," occasionally falls a victim. On becoming acquainted with this fact, it occurred to me that the owl's visit might be in consequence of the flood driving its prey from the meadows to their banks, where, as the only place of refuge, it would be more abundant; but I have ascertained that the owl equally haunts them when the flood is gone. From the distance of half a mile I have seen it flying towards them.

The white owl is a well known visitor to the dove-cot, and in such a place, or rather a loft appropriated to pigeons in the town of Belfast, I am informed by an observant friend that a pair once had their nest. This contained four young, which were brought up at the same time with many pigeons. The nests containing the latter were on every side, but the owls never attempted to molest either the parents or their young. As may be conjectured, this owl's nest was frequently inspected during the progress of the young birds. On the shelf beside them, never less than six, and so many as fifteen mice and young rats (no birds were ever seen) have been observed, and this was the number they had left after the night's repast. The parent owls when undisturbed remained all day in the pigeon-loft.

Of the stomachs of four white owls I have examined, one contained the remains of rats; another of mice; a third was filled to distension with portions of eight mice; and the fourth exhibited only a part of a coleopterous insect of the family *Harpalidæ*, that could not when perfect have exceeded nine lines in length. A friend, too, informs me, that, on examining the pellets cast by these owls, which he has very frequently done, he has often perceived, in addition to the fur and bones of rats and mice, the wing-cases of beetles shining through them.* The remains of birds he never detected in them. It is only, I believe, in dearth of other prey that this owl attacks any of the feathered tribe.

A white owl, kept for upwards of a year in a friend's house, was from the first kindly disposed to the servant who fed it, but pugnacious towards its master, instantly striking with its talons at his finger when placed against the cage, but this he in some degree taught it. When spoken to by any one, it returned the recognition by most

* I do not recollect these mentioned as the food of the white owl in any work on British Ornithology; "scarabees" are, however, enumerated as such by Temminck, *Man d'Orn de l'Eur.* Tom. i. p. 92.

grotesquely moving from one leg to the other on its perch, accompanied at the same time by a bow or inclination of the head sideways. It screamed greatly during the night.

TAWNY OWL—*Ustula stridula*, Selby.—This species is mentioned as Irish in several of the statistical surveys of our counties and other catalogues. It never occurred to the late Mr Templeton, nor have I seen an Irish specimen.

SNOWY OWL—*Surnia nyctea*, Dumeril.—On June 9, 1835, I had the satisfaction of communicating an account of the snowy owl's appearance in Ireland to the Zoological Society of London, in whose "proceedings," 1835, p. 78, it subsequently appeared. The following is a rather more full account, as the limited scope of that most valuable work renders a condensation of matter for its pages quite necessary.

About the 26th of March 1835, a specimen of this bird was sent in a recent state to Dr Adams of Portglenone, (co. Antrim) by a person who had shot it a few days before in that neighbourhood, and who stated that a similar individual had been seen about the place where it was obtained. The specimen was presented by Dr Adams to the Natural History Society of Belfast. It is immature, agreeing with the figure in Mr Selby's "Illustrations of British Ornithology."

On the 21st of the same month, as two of my friends were out snipe-shooting at Bruslee, about twenty miles to the south-east of Portglenone, a large white owl, represented by them as twice the size of the common species of that colour (*Strix flammea*,) rose from the heath within a few yards of one of them, just as he had discharged both barrels at a snipe. His companion fired at it from such a distance, that, with the loss of only a few feathers, it escaped, and afterwards alighted at a short distance. On showing the specimen killed at Portglenone to one of these gentlemen, he recognized it as similar in size and colour to the bird he had seen.

In Dublin I subsequently saw a snowy owl, which had been shot in the county Mayo, also in the month of March, and am credibly informed, that a few others were obtained about the same time in different parts of Ireland. One may be mentioned as having been received from the county Longford on the 5th of April by a bird-preserver in Dublin.*

* I have lately heard of the occurrence in Ireland, of three of the rarer species of British Raptores, but have not yet had the facts sufficiently authenticated for introduction here.

IX.—*Account of a Botanical Excursion in the Alps of the Canton of Valais, Switzerland, in August 1835; and Catalogue of the Plants collected, with occasional Remarks.* By R. J. SHUTTLEWORTH, Esq. (Continued from p. 24.)

121. *Aretia tomentosa*, Schleich. Rchb.—Androsace, Gaud.
H. Ad Fissuras rupium in alpibus supra Täsch.

Obs. Variat habitu laxiori vel congesto, et floribus brevissime vel longiuscule pedunculatis. Cl. Gaudin, hac *Aretia* Hall. Hist. No. 618 γ . citavit, et certe descriptio, sua cum forma laxiuscule bene quadrat: sed Hallerus capsulam quadrivalvem descripsit, quam semper quinquevalvem ut in *Aretiis* *Androsacisque* omnibus observavi.

122. *A. alpina*, L. Rchb. Germ. exc. No. 2697. excl. cit. et icone Hall. et Lam. Androsace—Gaud. non Lam. Androsace pubescens, DC. *Aretia*, Hall. Hist. No. 618 α .

H. In fissuris rupium M. Gemini supra Schwarrenbach.

Obs. Optime descripsit nostram plantam cl. Hallerus, l. c.

123. *A. pennina*, Thomas. *A. glacialis*, Schleich. Rchb. Germ. exc. No. 2696. Androsace—Gaud. *A. alpina*, Lam. DC. *Aretia*, Hall. Hist. No. 618 β . Tab. 11, (“*A. villosa*, scapis unifloris.”) bona!

H. In glareosis ad moles glaciales summi jugi alpium supra Täsch.

Obs. Et hanc speciem bene descripsit cl. Hallerus, l. c. sub var. β . et corollam roseam observavit, quæ (nisi fallor) nunquam in *A. alpina* occurrit. Iconem citatam, nostræ plantæ recte a cl. Gaudino relata, huc pertinere expressius significavit ipse Hallerus; non obstantibus “auctorum Hallucinationibus non excusandis.” (Rchb. l. c. No. 2697!) et Reichenbachii ipsius—Species pulcherrima sed in eodem loco mire varians, floribus albis, carneis, roseis, et violaceo-purpureis, cum annulo flavo: caulibus laxis vel congestis, pedunculisque brevissimis vix lineam unam longis, et sæpe uncialibus. (huc. Ic. Hall. cit).

124. *Androsace maxima*, L.

H. In arvis incultis inter Varen et Siders, copiose sed exsiccata.

125. *A. carnea*, L.

H. Ad moles glaciales summi jugi alpium supra Täsch.

126. *A. obtusifolia*, All. Fl. Ped. i. p. 90. No. 326. Tab. 46, f. 1. ejusdem Ped. Spicel. p. 22. Tab. 4, f. 2. Gaud. Rchb. α . scapis multifloris. β . scapo unifloro. *A. obtusifolio* β . *aretioides*, Gaud?

H. In graminosis M. Gemmi supra Schwarrenbach, et *Zermatt- β . In M. Fünelen.

Obs. Var. β . differt tantum scapo folia excedenti α . var Gaudini, cl. Koch in Deutsl. Fl. ii. Aretias Androsacesque pessime exposuit: ex gr. iconem All. Fl. Ped: ad. A. obtusifoliam, iconem All. Spici, autem ad A. lacteam ducit. Sed Allionius in Flora Ped: l. c. rem ita exponit: "Hujus Aretiae iconem Tab. 4. f. 2 et descriptionem dedi. Pedem. Speci. p. 22."

127. *A. Chamæjasme*, Wulf. (In Jacq. Misc. i. p. 194, in descript. A. villosæ L. ubi notas differentiales bene exponit.) A. villosa β . Koch. ii. p. 100.

H. In graminosis M. Gemmi supra Schwarrenbach.

Obs. Species ab A. villosa, L. et Wulf. l. c. Tab. 7. f. 3 (in Helvetia rarissime in Jurrassi cacuminibus occurrit) omnino distincta, nec cum A. obtusifolia All. confundenda.

128. *Primula viscosa*, Vill. P. viscosa α . minor, Gaud. P. ciliata Schrank. Koch. P. hirsuta, Rchb. Germ. exc. No. 2726. Pl. crit. vii. ic. 854. an Vill.?

H. Ad moles glaciales M. Fünelen, et in alpebus supra Tæsch.

129. *P. farinosa*, L.

H. In graminosis M. Fünelen et supra Tæsch.

Obs. Planta alpina sæpius variat scapo humili, floribus paulo majoribus saturatiusque coloratis.

130. *Soldanella alpina*, L. Willd. Koch. Rchb. Germ. exc. No. 2736. S. Clusii Schmidt. non? Gaud. cf. Rchb. l. c.

H. Ad nives deliquescentes M. Gemmi.

131. *Thymus pannonicus*, All. α . lanuginosus; caule foliisque undique pilis longis griseis instructis; floribus capitato-spicatis, staminibus inclusis. Th. pannonicus, Gaud. T. pannonicus β Rchb. Germ. exc. No. 2118 excl. syn.

β . major, Gaud. Helv. iv. p. 82; foliis majoribus punctatis glabrusculis; floribus spicato-verticillatis, verticillis remotiusculis, staminibus exsertis.

H. α . ad viam inter Siders et Leuk. β . inter Stalden et St Nicholas et alibi in Valesia superiori.

Obs. I^{ma} In var. β —variat etiam undique minute tomentosa. Ad hanc varietatem, me iudice, sine dubio referendi sunt: Thymus humifusus, M. Bieb! T. Austriacus, Berh! T. montanus, Walds. et Kit! T. serpyllum exserens, Bess! T. nummularius, M. Bieb. (E Georgia Caucasica specimen unicum a Hohenackero lectum U. T. 1834, possideo.)

T. hirsutus, M. Bieb! (quo T. pilosus Bernh! prope Vindebonas lectus, vix differt) recedit foliis anguste lineari-oblongis uninervis

(in *T. pannonico* valde 5-nervosis,) nervo exstanti dorso acute carinatis. *T. Marschallianus* MB! differt etiam foliis angustissime lineari-oblongis, fere linearibus et ex axillis valde foliosis, quasi fasciculatis. cf. Koch, Deuts. Fl. iv. p. 312, 313. et Rchb. Germ. exc. No. 2118, 2119. *T. lanuginosus*, Schrank! etiam differt foliis orbiculatis acuminatis.

Obs. 2^{da}. Similitudo cum *T. angustifolio* non patet, ac certe notis melioribus differt quam "ramis floriferis longioribus erectioribus villosis et foliis duplo longioribus." Benth. Lab. Gen. et Sp. p. 345. Certe in spec. meis omnibus et multa ex Helvetia, Germania, Podolia, Hungaria, &c. possideo, nunquam folia linearia inveni, sed semper oblonga et oblongo-lanceolata. cf. Benth. l. c.

132. *Ajuga pyramidalis*, L. β . alpestris, minor e cæruleo purpurascens, foliis floralibus rubris, Gaud.

H. In graminosis M. Gemmi supra Schwarrenbach.

Obs. Formam α . in Helvetia hucusque non inveni.

133. *A. chamæpitys*, Schreb. var. *canescens*, foliis latioribus incano-lanatis (est forsitan forma monstruosa insectis producta.)

H. In arvis et incultis prope Varen.

134.* *Teucrium montanum*, L.

H. Zermatt.

135. *Nepeta Cataria*, L.

H. Ad viam inter Siders et Leuk.

136. *Leonurus Cardiaca*, L.

H. Ad viam inter Brieg et Münster.

137. *Acinos alpinus*, Moench.

H. Inter St Nicholas et Zermatt.

138. *Calamintha officinalis*, Moench.

H. In fruticetis saxosis apricisque inter Inden et Varen.

139. *Euphrasia officinalis*, L. δ . alpestris, Koch. Deuts. Fl. iv. p. 349. δ β minima. E. minima, Schleich. Koch. Gaud. E. pratensis, α minima Rchb.

H. In graminosis M. Gemmi supra Schwarrenbach.

Obs. Corolla parva lilacina palato flavo, vel sæpe tota flava venis purpurascens. Forma capsulæ, emarginatura, longitudoque styli valde variabiles sunt, et in eodem individuo inconstantes: ab hac varietate vix differt E. officinalis var. alpina Rchb. exsic!

140. *E. salisburgensis*, Funk. E. alpina, Dec. Gaud.

H. In glareosis arenosisque prope Kandersteg (forma pyramidata, imbricata); in graminosis M. Gemmi supra Schwarrenbach (for-

ma parva, debilis); et inter St Nicholas et Zermatt ad viam (forma subimbricata, ramosa).

Obs. Etiam variabilis sed species rite constituta; variat foliis omnibus angustis imbricatis, dentibus setaceo-productis, vel latioribus distantibus, dentibus minus acuminatis, caule ramosissimo vel subsimplici, rigido vel debili.

141. *E. (Odontites) lutea*, L.

H. In arvis incultis prope Varen.

142. *E. (O.) viscosa*, L.

H. In apricis ad viam inter Inden et Varen.

143. *Bartsia alpina*, L.

H. In M. Gemmi ad lacum infra Schwarrenbach.

144. *Pedicularis verticillata*, L.

H. In M. Gemmi supra Kandersteg et in graminosis supra Schwarrenbach. In alpibus supra Zermatt.

Obs. Spica florens capitata, fructifera, valde elongata.

145. *P. rostrata*, L. Koch. Deutsch. Fl. iv. p. 367, Gaud. non Rchb.

H. Ad moles glaciales M. Fünelen et summi jugi alpium supra Tæsch.

Obs. *P. rostrata*, Rchb. Germ. exc. No. 2459 et exsic! est species aliena, *P. Jacquini*, Koch. l. c. p. 363. Errore Reichenbachii indutus, hucusque *Pedicularis nostram rostratam a Linnæana diversam et eandem cum P. aspleniifolia Floerke existimavi*, sed, præunte Kochio, has species tres inter se distinctæ habeo.

P. Jacquini, Koch, caule adscendente, foliis bipinnatifidis, spica pluriflora congesta, floribus erectis, calyce glabriusculo, filamentisque pilosis. *P. rostrata* Rchb. non L.

P. rostrata, L. Koch Gaud. caulo prostrato-adscendenti, foliis pinnatifidis, spica pauciflora laxa, interdum uniflora, calyce pubescenti, filamentisque barbatis.

P. aspleniifolia, Floerke, Rchb. Koch., caule erecto, foliis pinnatifidis, spica pluriflora laxa floribus patulis, calyce lanato, filamentisque vage pilosis vel glabriusculis.

146. *P. Barrelieri*, Rchb. Germ. exc. No. 2465 et exsic! *P. adscendens* Gaud. non Schleich.

H. In graminosis M. Gemmi supra Schwarrenbach.

Obs. *Glabriuscula*, folia pinnatifida lobis profunde incisis, racemus elongatus, calycis segmenta glabra ciliata subintegra, nec foliacea; capsula calyce duplo longior.

147. *P. tuberosa*, L. Rchb. Germ. exc. No. 2466 et exsic! *P. adscendens*, Schleich. non Gaud.

H. In graminosis alpium supra Tæsch.

Obs. Pilosa, folia bipinnatifida, lobis acute dentatis, racemus brevis subcapitatus, calycis segmenta pubescentia, foliaceo-incisa; capsula calyce vix longior.

148. *Veronica verna*, L.

H. ad muros inter St Nicholas et Zermatt, copiose.

Obs. Specimina mea deflorata sunt, sed capsulis obcordatis compressis, lobis divergentibus ciliatis styloque brevissimo ab affinibus facile distinguenda.

149. *V. aphylla*, L. α . flore cæruleo. β . flore carneo.

H. In $\frac{1}{2}$ raminosis ad nives deliquescentes M. Gemmi.

150. *V. Teucrium*, l. *latifolia* Gaud. var. minor, tomentosa, racemo florifero abbreviato. *V. latifolia* δ . *Pseudochamædryis* Rchb. germ. exc. No. 2510 δ .

H. In locis aridis ad viam inter Thermas Leucenses et Inden.

151. *V. fruticulosa*, L.

H. Ad moles glaciales M. Fünelen.

152. *V. alpina*, L.

H. In M. Gemmi supra Schwarrenbach in M. Funelen.

153. *V. bellidioides*, L.

H. In M. Gemmi supra Schwarrenbach.

154. *Linaria alpina*, DC. α . maculata, palato aurantiaco conspicuo.

β . subimmaculata, palato obsolete diluteque ochroleuco.

H. In glareosis, M. Schwarzseeberg.

Obs. Semina patelliformia, uno latere concavo, altero convexo: immatura ala tenui albida circumdata, matura concoloria nigra.

155. *L. italica*, Trev. Koch. Deuts. Fl. iv. p. 397, exc. Syn. Dec.

L. angustifolia, Rchb. germ. exc. No. 2550, pl. crit. v. ic. 608. opt! *L. genistifolia* Ser. exs! *Antirrhinum Bauhini*, Gaud.

H. Ad viam inter Visp et Stalden.

Obs. Species distinctissima, nullomodo cum *L. genistifolia*, Mill. confundenda. Semina *L. genistifoliae* angulato-pyramidata, punctata, calycis segmentis capsulam æquantibus vel superantibus: in *L. italica* Trev. semina orbiculata alata patelliformia muriculata, calycis segmentis capsula duplo triplove brevioribus. *Antirrhinum angustissimum* Lois. (ex. Aix in Sabandia, Balbis) differt foliis omnibus angustissimis, racemis laxis; semina matura in exemplaribus meis desunt, sed immatura videntur angulata. *L. genistifolia*, DC. Fl. fr. No. 2653 "Les divisions du calyce couvrent presque la capsule" et Dub. Bot. Gall. i. p. 346 "calycis laciniis linearibus acutis capsulam subæquantibus" potius ad *L. genistifoliam* Mill. pertinet. sed notæ e calyce sumptæ forsán variables.

156. *Antirrhinum Orontium*, L.

H. In fossis exsiccatis prope Leuk.

157. *Physalis Alkekengi*, L.

H. In vineis prope Varen.

158. *Myosotis alpestris*, Schmidt.

H. In graminosis supra Zermatt et M. Fünelen.

Obs. Planta variabilis: caulis inferne pilis patentibus hirsutus, superne longe aphyllus racemisque appresse-strigosus; Folia strigoso-hirsuta, pilis longioribus ciliata; pili calycini vix curvato-hamati. Huc pertinet *M. alpestris*, Schmidt, Boh! *M. alpestris* bot. Scot. differt tantum calycibus fructiferis paulo majoribus, caule foliosiori, pilisque magis patentibus. *M. Suaveolens*, Walds. et Kit! vix differt caule elatiori, foliis calycibusque strigoso-hispidis, pilis appressis, illis, nisi basi, non ciliatis; quod odorem attinet, plantam amænissime odoratam in alpibus Bernensibus Stockhorn et viciniis copiose legi. *M. lithospermifolia*, Horn, (ex exempl. unico a Balbisio misso) magis cum planta Scotica congruit, recedit tantum caule elatiori, racemisque axillaribus plurimis; sed vix species diversa. *M. alpestris*, Schmidt, magis habita, quam notis bonis a *M. sylvatico* differre videtur.

159. *M. nana*, Vill. *Eritrichium nanum*, Schrad.

H. ad moles glaciales summi jugi alpium supra Tæsch.

160. *Echinospermum Lappula*, Lehm.

H. In vineis inter Varen et Siders, et ad viam inter Siders et Leuk.

Obs. Variat ramis suberectis vel squarroso-patulis reflexisve. *E. squarrosum*, Rchb. vix diversum.

161. *Cuscuta Epithimum*, Sm.

H. Ad astragalum Leontinum in pratis alpinis supra Zermatt.

Obs. Styli vix exserti.

162. *Chlora serotina*, Koch, Deuts. Fl. iii. p. 32. Rchb. Germ. exc. No. 2809. Pl. crit. iii. ic. 351 et 350 (var. β Koch.) *C. perfoliata* β pusilla, serotina, foliis sessilibus imperfoliatis connatis, Gaud. Helv. iii. p. 18.

H. Copiose in paludosis Valesiæ ad Rhodanum prope Pfynd inter Siders et Leuk. cons. *Chrysocomæ Linosyris*, L.

Obs. Optime descripsit cl. Koch. l. c. plantam nostram, differt a *C. perfoliata*, L. Rchb. pl. crit. iii. ic. 349, floribus minoribus, calycis segmentis basi altius connatis, duplo latoribus trinervis nervis-

que minoribus reticulatis corollam subæquantibus; foliis in exempl. pinguioribus perfoliatis ovato-acutis, in exempl. pusillis amplexicauli-connatis sed imperfoliatis: huc spectat cit. Gaudini.

163. *Erythraea pulchella*, Fries. γ . palustris, Gaud. caule simplici superne dichotomo-paniculato.

H. In paludosis Valesiæ prope Pfyn.

164. *Gentiana ciliata*, L.

H. In pascuis prope Randaa.

165. *G. glacialis*, Vill.— β . flore albo $\dagger\gamma$. forma monstruosa, pusilla, caule folioso, foliis elongatis, corolla difformi calyce vix longiori, viridescenti.

H. Rarissime in M. Gemmi in graminosis cac. rupium M. Schalmette et ad nives perennes supra Schwarrenbach. Copiose in M. Schwarzseeberg et cum β et γ . satis frequens in graminosis ad moles glaciales summi jugi alpium supra Tæsch.

166. *G. campestris* L. β ? alpina mihi—*G. chloræfolia* N. ab E. e Rehb. Germ exc. No. 2825? Caulibus pedunculisque alatis, calycis segmentis eximie serrulatis, corollæ segmentis subrotundo-apiculatis vel orbiculari-obtusiusculis; foliis caulinis ovato-triangularibus obtusiusculis, radicalibus spathulatis petiolatis.

H. In ascensu M. Gemmi prope "die Wintereck."

Obs. Corollæ superiores sæpe 5-fidæ, majores quam in *G. campestri* e Scotia, &c. et folia latiora, breviora. Corollæ pallide cæruleæ vel purpurascens.

167. *G. obtusifolia*, Willd. Koch. Gaud.

H. Ad moles glaciales, M. Schwarzseeberg et summi jugi alpium supra Tæsch.

Obs. Corollæ superiores quinquifidæ, inferiores interdum quadridæ: me iudice forma alpina *G. Germanicæ*, Willd., et hæc forsitan a *G. amarella*, L. non diversa.

168.* *G. Verna*, L. var flore albo.

H. Zermatt.

169. *G. nivalis*, L. Froehl. Mon. p. 83, α . ramosissima, ramis dense foliosis, foliis subimbricatis, β . elongata, ramosa, foliis remotis. *G. nivales* β . Froehl. γ . pusilla, simplex, uniflora, interdum subacaulis. *G. nivalis* γ . Froehl. exc. syn. Villarsii.

H. α . et β . In ascensu M. Gemmi supra Kandersteg: in Alpibus supra Zermatt et Tæsch. β . ad moles glaciales M. Schwarzseeberg.

Obs. Varietates omnes, sed præsertim β . e Scotia accipi.

170. *G. asclepiadea*, L.

H. copiose in pratis uliginosis prope Kandersteg.

171.* *G. purpurea*, L.

H. Zermatt.

172. *Cynanchum vincetoxicum*, R. Br.

H. In glareosis inter Stalden et St Nicholas.

Obs. Forma monstruosa prostrata ramosa; umbellulæ ad florem unicum depauperatæ.

173.* *Pyrola chlorantha*, Sw.

H. Zermatt.

174. *Erica carnea*, Scop.—forma autumnalis, alabastris viridibus.

E. herbacea, L.

H. In umbrosis M. Gemmi cons. *Astrantiæ minoris* supra Kandersteg.

175. *Rhododendron ferrugineum*, L.

H. In M. Fünelen.

176. *Phyteuma pauciflorum*, L.

H. In graminosis M. Schwarzseeberg et copiose ad moles glaciales M. Füeblen.—Supra Tæsch.

Obs. Variat bracteis late ovatis, et subrotundis, foliis lineari-lanceolatis obovato-spathulatis, lineari-spathulatisque, apice dentatis vel integris, plus minusve ciliatis; caule humili vix 6''' usque ad 4" alto: persuasus sum, præunte Am. Guthnicko in "Flora oder Regensburger Bot. Zeitung," *P. globulariæfolium* Hoppe et Sterub. mere formam proceriorem, *P. pauciflora*, L. (cf. Rehb. pl. crit. iv. ic. 545, 547—549,) et vix ut varietas enumerandum.

177. *P. hemisphæricum*, L.

H. In graminosis M. Gemmi supra Schwarrenbach. In M. Schwarzseeberg, Fünelen, et supra Tæsch, et in M. Grimsula supra Obergestelen, ubique copiose.

178. **P. humile*, Schleich. Gaud.

H. Occurrit rarissima planta in graminosis ad moles glaciales vallis D. Nicolai supra Zermatt, &c.

Obs. Bracteæ interiores demum induratæ, acuminatissimæ fructus superantes, adeo ut capitulis maturis *Scabiosarum* similes sunt. Folia bracteæque nervo valido exstante percursæ sunt.

179. *P. orbiculare*, L. α . *cordatum*, Gaud.

H. In M. Gemmi supra Schwarrenbach.

180. *P. spicatum*, L. Var. *glaberrimum*, capitulo bracteato, foliorum bractearumque dentibus patentibus.

H. In sylvis laricinis inter Zermatt et valleculam Tæsch.

Obs. Glabritia solummodo, a varietate bracteata, Alp. DC. Mon. p. 198, differre videtur.

181. *P. betonicæfolium*, Vill. Gaud.

H. In M. Gemmi supra Schwarrenbach, in M. Fünelen, et in alpibus supra Tæsch.

182. *Campanula pusilla*, Hænke. β . flore albo, magisque pubescens.

H. In glareosis M. Gemmi ad nives perennes supra Schwarrenbach, et lacum Dauben. β . rarius, 30–31 Aug. 1836.

Obs. Forma alpina differt a subalpina et campestri floribus majoribus, habituque laxiori.

183. *C. glacialis*, n. sp.

C. humilis cæspitosa pauciflora glabra, foliis radicalibus ovatis nitidis dentatis in petiolum ciliatum attenuatis, caulinis lineari-lanceolatis: alabastris nutantibus, floribus suberectis; calycis laciniis subulatis erectis, corolla campanulata lobis erectis inflata, quadruplo brevioribus.

H. In glareosis ad moles glaciales M. Funelen supra Zermatt.

Cons. *C. pedunculati*, Gaud. et *Sedi repentis*, Schleich. cæspites magnos laxosque efficiens.

Obs. Proxima affinitas cum *C. pusilla*, Hænke, et *C. linifolia*, Lam. Alp. DC. A *C. pusilla* differt corollæ forma aliena et statura fere duplo majori, styloque breviori; a *C. linifolia* habitu nano cæspitoso, et corolla inflata suberecta calycis segmentis quadruplo longiori. Forma corollæ videtur omnino distincta, est nempe exactè campanulata, inferne multo latiori, superne multo angustiori, pro rata, quam in *C. pusilla* et *linifolia*. Stylus etiam in *C. pusilla* fere longitudinis corollæ, in nostra planta tertia parte breviori.

Species pulcherrima denuo indaganda an jure a *C. pusilla* diversa.

184. *C. linifolia*, Lam. *C. Valdenses*, β . Gaud.

H. In graminosis M. Gemmi supra Schwarrenbach.

185. *C. cenisia*, All. Ped. Tab. 6. f. 2.

H. Ad moles glaciales summi jugi alpium supra Tæsch, in glareosis.

186. *C. rhomboidalis*, L.

H. In pratis Valesiæ superioris inter Brieg et Münster.

187. *C. Trachælium*, L. β . *urticæfolia*. *C. urticæfolia*, Schmidt. Pedunculis unifloris solitariis, calycis segmentis glabriusculis; corolla pallida.

H. Ad sepes Valesiæ sup. inter Brieg et Munster.

188. **C. spicata*, L.

H. Zermatt.

189. *C. barbata*, L.

H. In pascuis M. Gemmi.

190. *Adenostyles candidissima*, Cass. Less. *A. leucophylla*, Rchb.

H. In petrosis alpinis valleculæ Tæsch, paulo infra moles glaciales.

Obs. Caulis semipedalis, bipedalis et ultra. Capris et pecori videtur grata.

191. *Petasites niveus*, Baumg. fl. Trans. lass.

H. In glareosis prope Thermas Leucenses.

Obs. Folia tantum inveni.

192.* *Senecio viscosus*, L.

H. Zermatt.

193. *S. uniflorus*, All. Ped. i. No. 728. α Allionii, mihi. *S. uniflorus* All. l. c. Tab. 17, f. 3. opt. *Senecio* caule unifloro, foliis oblongis crenato-incisis, incano-tomentosis. β . corymbosus mihi, caule 3-8 floro, capitulis minoribus, foliis altius incisis interdum subpinnatifidis, incano-tomentosis. Pluk. Tab. 39. f. 6? γ . leucanthemifolius mihi, caule corymboso, capitulis parvis numerosis congestis, foliis spathulato-ovatis, vel lineari-lanceolatis, crenatis vel inciso-pinnatifidis, facie glabriusculis, dorso incanis. *S. carniolicus*, Willd. Rchb. *S. incanus*, Scop. Hoppe exsic! *S. leucanthemifolia* Lezay! (in Herb. nostr. "ex altissima alpe Scaletta, quæ Rhætiam ab Eugadino separat.") *Chrysanthemum alpinum judenbergense* Jacobææ affine. J. Bauh. Hist. ii. p. 1058 cum icon. et in Herb. Scheuchzeriano!

H. α . ad moles glaciales M. Fünelen copiose, et in alpinis supra Tæsch. β . cum α in M. Fünelen.

Obs. In var. α , formas duas legi, nempe α α macrocephala, capitulis uncialibus et α β microcephala, capitulis vix semi-uncialibus: variat etiam foliis plus minusve altius crenato-incisis, indumentoque minus copioso. In var. γ , quoad foliorum incisionem, et tomentum valde variabilis.

194. *S. incanus*, L. α . Genuinus mihi, caule simplici corymboso, capitulis coarctatis, foliis spathulato-lanceolatis, ovatisve pinnatifidis, incano-tomentosis. *S. incanus*, L. Rchb. germ. exc. *Jacobæa pumila alpina*, Bocc. Mus. Tab. 8. opt. β . elatior mihi, caule superne ramoso corymboso, capitulis laxioribus, foliis spathulato-lanceolatis, ovatisve pinnatifidis, radicalibus sæpe mere crenato-incisis, incano-tomentosis.

H. Ad moles glaciales M. Fünelen sed parcius.

Obs. 1^{ma}. In var. α caulis vix ultra 4-uncialis, capitula minima; in var. β , caulis semipedalis et ultra.

Obs. 2^{da}. Inter *S. uniflorum*, All. et *incanum*, L. nulla discrimina specifica adesse, ex observationibus iterum iterumque repetitis (et exempl. per multa e Germania (Styria,) Helvetia et Sabaudia possideo) persuasus sum; et, nisi auctoritate Willdenowii, Reichenbachii, Gaudini, &c. obstante, in unam speciem ambos conjunxissem. Var. β . *S. uniflori* omnino inter α et γ media; ac var. β . *S. incani* fere transitus in var. γ *leucanthemifolium S. uniflori*. Cl. Gaudin, semina *S. uniflori*, setulis brevissimis parum extantibus adpersa, pappumque brevem scabrum descripsit; et semina *S. incani* glabra et pappum squalide albidum scabriusculumque: sed in exempl. meis *S. uniflori*, Carniolicum et *incani* nullum discrimen, nisi pappum in *S. incano* α magis coloratum quam in β . inveni. Semina juniora semper setulis conspicuis adpersa, matura sæpe glabriuscula; pappus in planta florenti albidus, in fructifera plus minusve coloratus, semper scaber.

Si res sic se habeat, nomen Linnæanum aptissimum ita retinendum. *Senecio incanus*, L. α . Linnæi—*S. incanus*, L. et auct. β . *elatior*. γ . *leucanthemifolius*. *S. Carniolicus*, Willd. et auct. δ . *corymbosus*, (cf. All. l. c.) ϵ . *uniflorus*, *S. uniflorus* All. et auct.

195. *S. Doronicum*, L.

H. In M. Gemmi supra Schwarrenbach. et* Zermatt.

Obs. 1^{ma}. Variat caule uni et multifloro, foliisque plus minusve incanis.

Obs. 2^{da}. *Senecio Scheuchzeri*, Gaud! Helv. v. p. 294, vix nisi forma alpestris *S. tenuifolii*; specimen a cl. Gaudino descriptum, et in Herb. Scheuchzeriano asservatum, “*Jacobea alpina laciniatæ, flore Buphthalmi ex Monte Fracto*” possideo: involucrum fere ut in *S. Jacobæa*, sed capitula minima; videtur forma ϵ localitati nata.

196. *Arnica scorpioides*, L. *Aronicum*—Rehb.

H. In glareosis M. Gemmi supra Schwarrenbach—in Alpibus supra Zermatt.

197. **A. Doronicum*, Jacq. α . foliis caulinis dentatis. *Aronicum Doronicum* Rehb. *Arnica Clusii*, All. Ped. Tab. 17. f. i. (sed maxima) β . foliis omnibus angustioribus, subintegerrimis. *Aronicum glaciale* Rehb. an Jacq? *Arnica Clusii*, var. All. l. c. f. 2, (sed etiam major.)

H. Supra Zermatt.

Obs. Limites nullos inter varietates invenio.

198. *Chrysocoma Linosyris*, L.— β . minor, Hall. Vill. Gaud. Tabernæmontanus, p. 1209, f. 2. opt.

H. α . ad viam inter Stalden et Visp. β . In paludosis prope Pfyn, inter Siders et Leuk.

Obs. Corymbus var. β . valde irregularis, pauciflorus.

199. *Aster alpinus*, L.— β , flore discoideo.

H. In M. Gemmi, * supra Zermatt. β . in M. Fünelen.

200. *Erigeron uniflorus*, L.

H. In M. Gemmi supra Schwarrenbach ; in M. Fünelen.

Obs. Pulcherrima planta ; flores rosei vel albi. Var. calyce plus minusve hirsuto, et huc *E. hirsutus*, Hoppe.

201. *E. alpinus*, L. α . minor, uniflorus. Gaud. Helv. v. p. 266.

β . ramosus, pedalis et ultra, pedunculis unifloris foliolosis, Gaud. l. c. γ . hirsutus, foliis præcipueque caule pilis longis patulis hirsutis, calyce subtomentoso, pappo dilute carneo, semine longiori. Gaud. l. c.

H. α . In M. Gemmi supra Kandersteg et Schwarrenbach. β . in M. Gemmi prope Hospitium. γ . In alpebus supra Tæsch, et prope Randaa.

Obs. In exempl. meis var. γ . caulis uniflorus semipedalis antheræque atrofusæ. Ad hujus species var. α pertinere videtur *E. glabratus*, Hoppe.

202. *Solidago virgaurea*, L. * β . angustifolia, Gaud. Helv. v. 316.

γ . pumila, Gaud. l. c.

H. β . Zermatt. γ . In M. Gemmi supra Schwarrenbach.

Obs. γ . variat, caule foliisque glabriusculis vel pubescentibus, pedunculis unifloris vel racemosis, foliis inferioribus lanceolatis in petiolum attenuatis, vel ovalibus, subrotundisve longe petiolatis. Differt a planta campestri floribus facile duplo majoribus, racemo brevissimo conjesto, rhizomateque crasso longissime repenti. Ab hoc var. vix differt *S. cambrica*, Britann. nisi floribus minoribus.

203. *Inula Britannica*, L.

H. In paludosis prope Pfyen.

204. *Gnaphalium montanum*, L. Rchb. germ. exc. No. 1390. *G. arvense*, W. et Rchb. l. c. Gaud.

H. In incultis arenosis inter Stalden et St Nicholas, et in arvis incultis prope Siders.

Obs. Mihi etiam non obviæ sunt differentiæ inter *Gn. arvense*, L. (*G. montanum*, Willd.) et *G. minimum*, Sm., sed forsitan et ego *G. montanum* et *arvense*, L. non bene intelligo.

205. *G. Leontopodium*, L. α . minus, caule 2–4 unciali vix ultra.

β . elatius, caule pedali et ultra, flexuoso, capitulis majoribus, numerosioribus, bracteisque armato-patentibus.

H. α . In M. Gemmi supra Schwarrenbach, et ad lacum Dauben.

β . In graminosis ad moles glaciales supra Zermatt.

Obs. Cum varietate β . bene convenit icon Rchb. *G. Leontopo-*

doidis, Willd., Pl. crit. x. ic. 1292, nisi caule superne ramoso, capitulisque laxioribus, sed planta e cultura forsā mutuata. Rchb. l. c. et de planta culta commentatur. "Planta imprimis bracteis arcuatis minus tomentosis nec candidis a pulchro nostro *G. Leontopodio* diversa," sed hæ notæ non extant apud Willd. Spec. iii. p. 1894. Notis exceptis, icon Rchb. nostram plantam omnino refert.

206. *G. supinum*, L. Syst. Veg. (Ed. 13. c. Murray.) *G. supinum* Lavandulæfolium, Bocc. Mus. 107. tab. 85. *G. supinum*, Gaud. Helv. v. p. 241. desc. bona. Willd. Sp. iii. p. 1888. *G. fuscum*, var. Rchb. Germ. exc. No. 1397.

H. In M. Gemmi supra Schwarrenbach, et in saxosis ad lacum Dauben. * Zermatt.

Obs. *G. supinum*, Sm. Eng. Fl. Ed. 2^{da}. iii. p. 416, non hac sed ad sequentem *G. pusillum* Hænke pertinet, ut videtur ex observationibus suis de icone Bocconii citata, nam *Gn. supinum* lavandulæfolium Bocc. a Linnææ ad suum *G. supinum* allatum est, et bene refert plantam juniorem *G. supini*, Bot. Helv. et Germ. (Rchb. in germ. exc. No. 1397 in ann. et add. figuram Bocconii ad *G. uliginosum* refert.) Utramque specierum e Scotia accepi et in Herbario meo, e fere omnibus localitatibus copiose sed intermixtæ extant, et dubitor an vere inter se distinctæ. Interdum ægre distinguendæ sunt, quamquam formæ extremæ valde distinctæ. *G. supinum* gaudet foliis latioribus minus tomentosis, capitulis sæpius capitato-spicatis numerosis (4-12,) magis coloratis, brevissime pedicellatis; caulibus vix cæspitosis, biuncialibus et ultra, spicisque sæpissime arcuato-cernuis, occurrit etiam capitulis sparsis, interdum subremotis, pallidioribusque, sed semper numerosioribus quam in sequenti. Hujus speciei varietas videtur *G. fuscum*, Scop. non Lam.

207. *G. pusillum*, Hænke. Willd. sp. iii. p. 1889, Gaud. l. c. desc. bona. *G. alpinum* Lightf. Scot. i. p. 470 cum icon. opt. *G. supinum*, Sm. e descr. et annot.

H. In M. Schwarzseeberg et Fünelen.

Obs. Descriptio Willdenowiana optima, nisi "fiores sessiles, et calycis squamæ glabriusculæ ex toto fuscæ." Phylla nempe pubescentia, sed multo minus quam in præcedenti; color variabilis. Differt a præcedenti caulibus sarmentosis procumbentibus, florentibus magis erectis paucifloris, sæpius unifloris, sed interdum quinquefloris; capitulis omnibus remotis, plus minusæ pedicellatis; foliisque linearibus utrinque argenteo tomentosis. Ab hac specie, videtur, cl. Smith varietatis uni et paucifloris præcedentis non separavit, et forsā recte sed formam spicatam ad *Gn. sylvaticum* retulit.

208. *G. carpathicum* Wahl. Carp. p. 258 cum icone. *Gn. alpinum*,

Gaud. Rchb. pl. crit. viii. ic. 996. (*Antennaria hyerborea*, Don. Lindl. syn. (?) e Rchb. germ. exc. No. 1398 in add.)

H. In M. Gemmi supra Schwarrenbach. In M. Funelen.

Obs. In exempl. meis capitula omnia distincte pedunculata. *G. carpathicum*, Wahl. ! differt tantam capitulis congestis, foliisque latioribus, sed in icone suæ capitula etiam, quoque minus distincte, pedunculata sunt.

209. * *G. dioicum*, L.

H. Zermatt.

210. *G. luteo-album*, L.

H. Ad viam inter St Nicholas et Zermatt et inter Visp et Brieg.

211. *Chrysanthemum atratum*, L.

H. In pascuis M. Gemmi prope Hospitium Schwarrenbach, 29, 30 Aug. 1836.

Obs. Cum *C. Leucanthemum*, L. ut var. alpinum conjunxit cl. Rchb.

212. *C. Alpinum*, L.— β pubescens, Dub. Bot. Gall. i. 272, caule foliisque pubescentibus, squamis ciliatis. *C. minimum*, Vill. *C. alpinum β *minimum*, Thom. Gaud.*

H. Ad moles glaciales M. Funelen: in glareosis M. Gemmi supra lacum Dauben, 31 Aug. 1836. β . ad moles glaciales supra Zermatt.

Obs. *C. tomentosum*, Lois. Dub. hanc varietatem a Rchb. adjectum videtur, imprimis squamis ovatis hirsutis distinctum.

213. *C. Halleri*, Sut.

H. In glareosis M. Gemmi ad moles glaciales Lammerngletscher, 31 Aug. 1836.

214. *Achillaea moschata*, Jacq. Rchb. germ exc. No. 1443. A. Livia Scop. Del Ins. Tab. 3. opt. β . *intermedia* Rchb. l. c. A. *intermedia* Schleich. A. *moschata* β . *hybrida*, Gaud. v. p. 370, foliis villosito-tomentosis, corymbo composito, Hall. Hist. No. 112. β .

H. In glareosis ad moles M. Funelen cum var. β . et summi jugi alpium supra Tæsch.

Obs. “*A. moschatæ* et *nanæ* hybrida proles. Rchb. l. c.” sed hybridæ, persuasus sum, multo rariores sunt quam autumnat cl. auctor. Ad collum radice præsertim var. β . sæpius nidulas lignosas villosissimas, insectis productas inveni.

215. *A. Macrophylla*, L.

H. In M. Grimsula infra Hospitium copiose.

216. *A. atrata* L.

H. In M. Gemmi frequens; in glareosis supra Schwarrenbach forma humilior magisque pilosa.

Obs. Valde variat quoad foliorum decompositionem et indumentum ; caulis superne semper plus minusve piloso-tomentosus, sed sæpe, ita ut etiam folia, e toto valde pilosus ; ut opinor, *A. clusiana*, Tausch et Rehb. Pl. crit. ii. ic. 368, non diversa et vix varietas constans, sed tantum forma e localitate orta.

217. *A. nana*, L.

H. In M. Schwarzseeberg ; ad moles glaciales M. Fünelen et summi jugi alpium supra Tæsch.

Obs. Variat etiam corymbo laxiusculo, caule foliisque minus villosis.

218. *A. tomentosa*, L.

H. In arenosis ad viam inter Stalden et St Nicholas et copiose inter Brieg et Munster.

219. *A. setacea*, Gaud. W. et Kit? *A. odorata*, Murith!

H. Ad viam inter Siders et Leuk.

Obs. *A. setacea* Walds. et Kit! differt foliis latioribus forsann tenuiter dissectis cauleque villosioribus. An ab *A. odorata* vere distincta planta Kitaibeliana, an ab *A. millefolium*, nostra?

220. *A. millefolium*, L. var. foliis, caulibusque vix semipedalibus, tomentoso-villosis et floribus roseis.

H. Ad viam inter Siders et Leuk.

221. *Artemisia campestris*, L.

H. In apricis ad viam inter Inden, Varen et Siders.

222. *A. nana*, Gaud. Helv. V. 231. α . helvetica, gemina, racemo simplici, foliis incanis, capitulis majoribus. *A. helvetica* Schleich. Rehb. β . parviflora, Gaud. l. c., racemo composito, racemulis subsexfloris caulem arete appressis, foliis minus incanis, capitulis paululum minoribus. *A. campestris*, β . alpina Schleich. Gaud. exs!

H. In alpihus supra Tæsch.

Obs. Planta rarissima, *A. campestris* affinis sed notis bonis distincta: caules trientales vix semipedales, adscendentes ; folia plerumque longe petiolata in α incano-sericea, subbipinnatifida, pinnularum laciniis lanceolatis latiusculis. Racemus in α vix 20-florus, in β . racemuli 3-6 flori. Capitula duplo-triplove majora quam in *A. campestris*, disco eleganter purpureo, secunda, nutantia.

223. *A. valesiaca*, All.

H. Copiose in apricis inter Varen et Siders.

224. *A. glacialis*, L.

H. In alpihus supra Zermatt—M. Schwarzseeberg.

225. *A. spicata*, Jacq. Gaud. Helv. V. 229. α . floribus pertotum caulem laxius spicatis. Gaud. l. c. β . floribus superne laxius spicatis,

Gaud. l. c. γ . spica terminali densissima. Gaud. l. c. † δ . foliis caulinis linearibus indivisis. Gaud. l. c.

H. α . ad moles glaciales summi jugi alpium supra Tæsch. β . in M. Schwarzseeberg et Fünelen. β . γ , et δ . rarius. In rupibus M. Gemmi supra Schwarrenbach.

Obs. Var. † omnes enumeratæ variant foliis caulinis palmato-incisis, pinnatifidis, et linearibus integris.

226. *A. mutellina*, Vill. Gaud. A. rupestris, All. non L. A. glacialis Wulf. Hoppe exs! non L. Variat. α foliis caulinis apice trifidis, summis simplicibus, pedunculis axillaribus unifloris aphyllis, caule valde cæpitoso. β . foliis omnibus palmato-pinnatifidis argenteo-sericeis, pedunculis axillaribus unifloris aphyllis, caule humiliori. γ . foliis radicalibus elongatis, caulisque subpalmato-pinnatifidis, pedunculis axillaribus unifloris aphyllis, caule elato. δ . pedunculis axillaribus elongatis foliolosis, plerumque trifloris. A. mutellina, Vill. Dauph. iv. Tab. 35.

H. α , γ , δ . in glareosis ad moles glaciales supra Tæsch. β . et γ . In M. Fünelen.

227. *A. Absinthium*, L.

H. Fere ubique in Valesia vulgaris.

228. *Carduus*. An nov. sp.?

H. In pascuis alpinis M. Fünelen satis copiose.

Obs. 1^{ma}. Species mihi ignota, sed exemplare unico, quanquam perfecto, novam speciem generis spinosissimi instituere nolo, sed ad nullam specierum Floræ Germaniæ, Helvetiæ, Galliæve redigere possum.

Carduus foliis lanceolatis decurrentibus pinnatifidis, laciniis inciso-spinosis; caule superne nudiusculo unifloro, involucri hemisphærico, phyllis linearibus erectis subappressis, nervo valido percursis.

Caulis pedalis et ultra tomentosus, inferne dense foliosus, foliis decurrentibus ubique alatus spinosusque, superne nudiusculus vel folio unico semidecurrenti instructus;—Folia, præsertim subtus, piloso-tomentosa, utrinque ad nervos pilis crassis valde articulatis intricatis arachnoideo-floccosa, lanceolata fere pinnatifida, laciniis valde approximatis latiusculis spinuloso-dentatis, spina valida terminatis: terminali producta;—Capitulum terminale, sesquinciale erectum vel suberectum, læte purpurascens, pedunculo vix incrassato tomentoso; involucrum subtomentosum, phyllis erectis, spina brevissima terminatis.

Capitulum duplo major quam in *C. acanthoidis*, L.:—videtur affinis *C. alpestri* Walds et Krit! a quo differt capitulo majori, caule

simplici tomentoso, multo majus alato spinosoque et foliorum laciniis arcti approximatis subtus lanuginoso tomentosis.

C. leptophyllus, Gaud. differt, foliis glabris, capitulo multo minori ("duplo fere minori quam *C. deflorati*"—in planta nostra duplo fere majori) sed aliis notis bene congruit.

C. acuminatus, Gaud. etiam differt capitulis minoribus capitato-aggregatis phyllis omnino patulis.

Obs. 2^{da} *C. acanthioides*, Auct. Brit. videtur certissime, *C. crispus* et pinnatifidus, Rchb. Germ. exc. No. 1893.—Spec. mea ab am Campbell prope Edinburgum lecta, foliis subtus incano-tomentosis vel sublanatis, et capitulis numerosis dense aggregatis gaudent.

C. acanthoides Germanorum, Rchb. pl. crit. X. ic. 1319, 20, 21, et exsic! differt capitulis pedunculatis subsolitariis majoribusque, et foliis læti virentibus vix pubescentibus.

229.* *Saussurea alpina*, D. C.

H. Zermatt.

Obs. Variat foliis ovato-lanceolatis, lanceolatis lineari-lanceolatisve distincte petiolatis vel in petiolum attenuatis; involucri phyllis exterioribus ovato-triangularibus viridibus, nigro-marginatis, purpurascensibus, vel e toto atropurpureis, appresse pilosis vel glabriusculis, interioribus lanceolatis pilosissimis.

230. *Cirsium spinosissimum*, Scop.

H. Copiose in petrosis, M. Gemmi.

231. *Centaurea crupina*, L.

H. In arvis incultis inter Inden et Varen.

Obs. *Ochenia magna* juniora aureo-grisea appresse sericea, pappo concolori (contra Gaudin,) matura brunneo-nigrescentia.

232. *C. Phrygia*, L. Gaud. exc. *C. austriaca*, L. α caule simplicissimo unifloro, foliis dentatis scabriusculo-hirtis, opacis, dentibus mucronatis. *C. phrygia*, β . Helvetica, Gaud. Helv. v. p. 393. β . ambigua, minor uniflora, foliis caulinis subpellucidis sinuato-dentatis hirtis-pubescentibus basi attenuatis, subtrinervis. *C. Phrygia*. γ . ambigua, γ . β . minor, Gaud. l. c. *C. ambigua*, Thom.

H.* α . Zermatt. β . In M. Schwarzseeberg.

233. *C. cyanus*, L. var. *pusilla*, *incana*.

H. In arvis incultis inter Varen et Siders.

234. *C. paniculata*, L. var. β . *incana*, phyllis appendicibus pallidis.

H. In apricis ad viam inter Inden et Varen, Siders et Leuk, et inter Stalden et Visp.

(To be continued.)

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MAGAZINE

OF

ZOOLOGY AND BOTANY.

ORIGINAL COMMUNICATIONS.

I.—*On the British Species of the Genus Cerastium, being an attempt to elucidate their distinctive characters.* By CHARLES C. BABINGTON, M. A. F. L. S. &c. (Plate VI.)

CERASTIUM, Linn.

Calyx of 5 sepals. Petals 5, bifid. Stamens 10-5-4. Styles 5-4. Capsule 1-celled, many-seeded, cylindrical, the apex opening by 10 or 8 erect teeth.

A. CERASTII VULGATI, Fries. The petals equalling or shorter than the calyx.

a. PERSISTENTES, Fries. The capsule curved, the petals about equal to the calyx, but sometimes slightly longer.

1. *Cerastium vulgatum*, Linn. Sm.—Leaves oval, petals about as long as the calyx, sepals lanceolate, acute, and together with the bractæ, herbaceous and hairy throughout; capsule cylindrical, curved, about twice as long as the calyx, fruit-stalks about as long as the calyx.

C. *vulgatum*, Linn. *Sp. Pl.* 627. *Sm. Fl. Brit.* 496. *Eng. Bot.* 789.

D. *Cand. Prod.* i. 415. *Reichenb. Icon. Plant.* f. 385, 386, 387. *Host. Fl.* i. *Aust.* 555. *Reichenb. Fl. excurs.* 4970.

Hooker, Br. Fl. 215. *Lind. Syn.* 51. *Mack. Fl. Hibern.* 48.

C. *viscosum*, *Huds. Fl. Ang.* 200. *Curt. Fl. Lond.* ed. 1. *Wahl.*

Fl. Succ. (excl. var.) 517. *Gaud. Fl. Helv.* iii. 240. *Fries Nov. Succ.* ed. 2, 128.

C. *glomeratum*, *Koch, Syn. Fl. Germ.* 121.

Root fibrous. Stems mostly erect, hoary with long spreading hairs, usually glandular. Leaves ovate, often very broad and usually obtuse, the lower ones narrowed into a petiole. Flowers aggregated or in dichotomous panicles, upon short stalks, which never exceed the calyx. Sepals lanceolate, acute, entire, the outer ones very slightly membranous, the inner rather more so, hairy throughout. Petals white, scarcely longer than the calyx. Capsule cylindrical, slightly curved upward, about twice the length of the calyx. Seeds very small, tuberculated.

In fields, on dry banks, &c. common. April—September.

2. *C. viscosum*, Linn. Sm.—Leaves oblong, lanceolate, petals about as long as the calyx, sepals oblong-ovate, and, together with the bractæ, membranous at their margins and glabrous apices, capsule cylindrical, curved, about twice as long as the calyx, fruit-stalks longer than the calyx.

C. viscosum, Linn. *Sp. Pl.* 627. *Sm.* 497. *Eng Bot.* 790. *DC. prod.* i. 416. *Host.* 557. *Hook.* 215. *Lind.* 51. *Mack.* 48.

C. vulgatum, *Huds.* 200. (*Walcott Fl. Brit.* plate.) *Curt. ed.* 1. *Wahl.* 520. *Gaud.* iii. 238. *Fries*, 125.

C. triviale, *Link. en. hort. Berol.* i. 433. *Reich. Fl. excurs.* 4972, *Icon. pl.* f. 402, 403. *Koch, Syn.* 122.

β. holosteoides, *Fries.* “Glabrous, the stalks with their sides alternately pubescent.”

C. holosteoides, *Fries. nov. ed.* 1, 32. *Link en. h. Berol.* i. 433. *Reich. Icon. pl.* f. 317, 318.

C. vulgatum, *β holosteoides*, *Fries. ed.* 2, 126.

C. triviale, *β holosteoides*, *Reich. fl. excur.* 4972. *Koch, Syn.* 122.

Root fibrous and stronger than in *C. vulgatum*. Stems diffuse, and, unless supported by other plants, prostrate, with their extremities ascending, of a much darker green than the preceding, and covered with shorter pubescence, usually without any glands. Leaves oblong or lanceolate, frequently acute, the lower ones narrowed into a petiole. Flowers collected in small terminal panicles, not forming dense fasciculated heads, as in *C. vulgatum*, upon stalks which are longer than the calyx. Sepals oblong-ovate, rather obtuse, entire, the apex and margins, particularly the inner one, broadly membranous, but slightly hairy and usually quite glabrous at their tips. Petals white, scarcely longer than the calyx. Capsule as in the preceding species. The seed, according to Gaudin, beautifully muricated, and of about half the size of that of *C. vulgatum*.

The whole plant is sometimes glandular, more particularly upon the peduncles and calyx, when it forms the variety *glandulosum* of

authors. There is also an alpine form "*var. δ. uliginosum*, Schleich." Reich. and *δ. alpinum* of Koch, which has broader leaves and larger flowers.

In fields on banks, walls, &c. common. May—September.

I have not noticed either the variety *holosteooides* or *alpinum* in this country.

From the very confused state of the synonyms in this first section, I cannot help thinking that it would be far better to adopt different names from those given by Linnæus, that is, *C. glomeratum* after Thuillier and Mertens and Koch, in place of *C. vulgatum* of Smith, and *C. triviale* after Link, Reichenbach and Mertens and Koch, in place of *C. viscosum* of Smith.

b. FUGACES, *Fries*. The capsule straight, the petals shorter than the calyx.

3. *C. semidecandrum*, Linn.—Leaves ovate or ovate-oblong, petals shorter than the calyx, sepals lanceolate, broadly membranous at their margins and apex, bracteæ with their upper half membranous, capsule cylindrical, slightly inflated, straight and longer than the calyx, fruit-stalk longer than the calyx, at first reflexed but ultimately erect.

C. semidecandrum, Linn. *Sp. Pl.* 627. *Sm. Eng. Bot.* 1630. *Hooker, Lind. De Cand., &c.*

C. pellucidum, *Löisel. Fl. Gall.* i. 323.

α Friesianum, leaves ovate-oblong, stems filiform and erect. *C. semidecandrum*, *Fries*, 134.

β. glutinosum, very viscid, leaves ovate, stems thicker, more spreading and decumbent below. *C. glutinosum*, *Fries*. 132.

C. viscosum, *Reichenb. f.* 399, 400, 401. *C. pumilum*, *Curt.?*

γ. macilentum, *Fries*. glabrous throughout. *C. macilentum*, *Reich. f.* 379, 380.

Root small, fibrous. Stems nearly erect, except in var *β*. usually covered with short glandular pubescence. Leaves ovate or oblong, the lower ones narrowed into a petiole. Flowers in small terminal panicles, often umbellated, upon stalks which are longer than the calyx, and are reflexed after the flower is faded, but ultimately again erect. Sepals lanceolate, somewhat acute, the apex and margins, particularly the inner one, broadly membranous, hairy but nearly glabrous towards their points, (*fig. d.*) Petals white, much shorter than the calyx. Capsule cylindrical, not curved, nearly twice as long as the calyx. Seeds minute tuberculated.

C. semidecandrum, *Lois.* is said, by him, not to have the mem-

braneous margins to the bractææ. He has, probably with justice, considered it as a distinct species, but has incorrectly retained the Linnæan name for it, rather than for that form to which it has been given by most, if not all other authors. Seringe has retained them both as distinct species in *DC. Prod.* but in the *Botan. Gall.* *C. pellucidum* is considered as a variety of *C. semidecandrum*. By Reichenbach (*Fl. excurs.* 4969,) *C. semidecandrum*, *Lois.* is referred to *C. pumilum*, *Curt.*, and considered as distinct from *semidecandrum*. I have unfortunately not seen authentic specimens of Curtis's plant, nor that of Loiseleur.

In dry fields and upon walls. April—May. I have not noticed var γ . in England.

4. *C. pedunculatum*. (Plate VI.)—Leaves ovate or oblong, petals much shorter than the calyx, sepals lanceolate, acute, covered with short glandular hairs, their apex and margins membranous, the margins of the bractææ slightly membranous, capsule straight, subcylindrical, equal to or longer than the calyx, always erect, the fruit-bearing peduncles two or three times as long as the calyx, stems repeatedly dichotomous.

a. *5-partitum*. Calyx and corolla 5-parted, capsule opening by 10 teeth, and longer than the calyx.

β . *4-partitum*. Calyx and corolla 4-parted, capsule opening by 8 teeth, and about as long as the calyx. *Pl.*

The whole plant covered with short hairs, many of which are glandular. Root small, fibrous. Stems several, from 6 inches to 1 foot in height, erect, repeatedly dichotomous, bearing a flower in each fork, and having very long internodes. Leaves ovate or oblong, usually pointed, small, the lower ones narrowed into a broad petiole, the rest sessile. Flowers scattered, one in the axil of each fork of the stem. The peduncles of the fruit two, three, or even four times as long as the calyx, always erect and straight. Bractææ slightly membranous at their margins. Sepals lanceolate, acute, covered with short glandular pubescence, membranous at the margins and apex. Petals much shorter than the calyx. The number of stamens is variable, as is usually the case in this genus. Capsule straight, cylindrical, as long or rather longer than the calyx, always erect, and never forming an angle with its peduncle. Seeds small and tuberculated.

On sandy ground. St Hellens, Isle of Wight. *Mr Borrer*. Southend, Essex. Annual. May and June.

I was for some time inclined to consider this plant as a variety of *C. brachypetalum*, *Desp.* but having recently received authentic specimens of that plant from Germany, (No. 389, in Reichenbach's

Flora German. exsiccata.) I am led to consider it as a distinct species. It differs from that plant, at the first glance, by its much more branching habit, and its want of the long shaggy pubescence with which that species is covered in all parts. *C. brachypetalum* also has its bractæ totally destitute of a membranous margin, and the capsules nodding in a remarkable manner, the peduncle itself remaining straight and erect, but curved at a right angle, just below the calyx. This plant is well represented by Reichenbach in his *Plantæ Crit.* Fig. 388. Our plant may be distinguished from *C. semidecandrum* by its habit, its slightly membranous bractæ, that plant having them membranous for half their length, and by its capsule being always erect, not at first pendulous, and then (when the seed is perfected) erect.

5. *C. tetrandrum*, Curt.—Leaves elliptical, petals rather shorter than the calyx, sepals lanceolate acute, their apex glabrous and attenuated with a central almost excurrent herbaceous line: the two margins broadly membranous, capsules straight, a little longer than the calyx.

C. tetrandrum, Curt. Lond. *Sm. Fl. Brit.* 498. *Eng. Fl.* ii. 332. *Hooker*, 216. *Mack.* 48.

C. semidecandrum, *Bentham in Lindl. Syn.* 51.

Sagina cerastoides, *Sm. in Linn. Trans.* ii. 343. *Eng. Bot.* 166. *DC. Prod.* 1. 389. *Hooker*, 216.

Moenchia cerastoides, *G. Don. Syst. of Bot.* i. 420.

Esmarchia cerastoides, *Reich. fl. excurs.* 4954.

? *Cerastium pumilum*, *Koch, Sin.* 122‡ (not Curtis.)

Root slender. Stems procumbent, spreading, their extremities ascending, covered with short hair. Leaves elliptical, the lower ones elliptic-oblong, the lowest narrowing into a petiole. Flowers on stalks, which are rather longer than the calyx, but not invariably so, as large as those of *C. vulgatum*. Sepals 4, lanceolate, attenuated, acute, broad below, the apex glabrous with the mid-rib continuing to its extreme point in the form of an herbaceous line, bounded on both sides by a broad membranous margin. (Fig. c.) Petals 4, white, shorter than the calyx. “Capsule a little longer than the calyx, straight, with 8 long linear teeth. Seeds roughish on the outer edge.”

There appears to be some confusion in Sir W. Hooker's *Brit. Flora*, which, I think, has not improbably arisen from his having received my *C. brachypetalum* β as *C. tetrandrum*. I have also recently received from Yarmouth, through the kindness of my friend Mr Ball of Christ's College, a tetrandrous form of *C. semidecandrum*.

In this plant the petals are about half the length of the calyx, and the stems are very short and spreading, but it agrees exactly with the specific characters of *C. semidecandrum*. On the same root of this Yarmouth plant I have noticed flowers with 4 and 5 sepals, and Mr Ball informs me, that although flowers with 4 sepals and 4 stamens were far the most common, yet that he noticed many cases of the presence of 5 sepals and 5 stamens, I am quite convinced that no confidence whatever can be placed upon the number of those parts in this genus. I have therefore omitted them altogether in my specific characters. Under these circumstances I shall only mention the station from which my specimens of this plant were obtained by the kindness of Mr R. B. Bowman of Newcastle, namely, Tynemouth, Northumberland. "May—June."

B. GRANDIFLORI, *Fries*. The petals twice as long as the calyx.

6. *C. alpinum*, Linn.—Hairy, the stems ascending, leaves ovate, ovate-oblong or lanceolate, flowers few, sepals bluntish, with their margins membranous, bracteæ wholly herbaceous, or with a narrow membranous margin, capsule at length twice as long as the calyx.

C. alpinum, *Bentham in Lind. Syn.* 51.

α. Linnæanum, smooth, or clothed with long silky hairs, stem mostly simple, flowers 1, 2, or 3, together in a forked panicle, bracteæ slightly membranous at the margin.

C. alpinum, Linn. 628. *Sm. Eng. Bot.* t. 472. *Sm. Eng. Fl.* ii. 333. *Hooker*, 217, &c.

C. latifolium, *Lightf. Fl. Scot.* 242. t. 10.

β. piloso-pubescens, Benth. Rough with short bristly hairs, stem branched, flowers usually solitary, bracteæ often wanting, but when present wanting the membranous margin.

C. latifolium, *Sm. Eng. Bot.* t. 473. *Sm. Eng. Fl.* ii. 334. *Hooker*, 217.

Root strong, creeping, stems mostly erect in var. *α*, prostrate in var. *β*, usually clothed with spreading hairs. Leaves ovate, varying through all the intermediate forms to lanceolate, placed rather closely upon the stem in var. *β*, much more distantly in var. *α*. Flowers few in number, either solitary or in a dichotomous panicle, upon long stalks. Sepals ovate, with a membranous margin, bluntish, more so in var. *β* than *α*. Petals white, nearly three times as long as the calyx. Bracteæ lanceolate, acute, with a slight membranous margin, usually present in var. *α*, frequently wanting, and with the margin scarcely at all membranous in var. *β*. "Capsule oblong, cylindrical; when ripe about twice as long as the calyx." Benth.

I have been unable to detect any permanent character to distin-

guish *C. alpinum* and *latifolium* of Sir J. E. Smith, and have therefore followed Messrs Bentham and Lindley by considering them as constituting only one species. Their extreme forms certainly are very different, but intermediate states often occur, and it is then almost impossible to determine to which of the supposed species they ought to be referred. Mr Bentham is of opinion that the *C. latifolium* of our English authors is not the same as the Linnæan plant. I have therefore not quoted the Sp. Plant.

The peduncles of our plant are said by Koch to be deflexed after the flower has faded, and that is made a point of distinction between it and *C. arvense*, in which they are described as erect.

In the higher mountains of Scotland and Wales. June—August.

7. *C. arvense*, Linn.—Stems ascending, prostrate below, leaves linear-lanceolate bluntish, flowers in terminal panicles, sepals and bractæ lanceolate, slightly acute and broadly membranous at their margins and apex, capsule at length longer than the calyx.

C. arvense, Linn. 628. *Sm. Eng. Bot.* 93. *Eng. Fl.* ii. 333.

Hooker, 217. *Mack.* 49, &c.

C. arvense l. commune. *Gaud. Fl. Helv.* iii. 244.

Root strong, creeping. Stems decumbent below, the flowering part ascending, covered with fine deflexed hairs. Leaves narrowly lanceolate, often nearly linear, their edges fringed below, placed closely upon the lower parts of the stem, but much more distant upon the upper part. Flowers much more numerous than in *C. alpinum*, usually about 7 in each di or trichotomous panicle, sometimes amounting to 14 or 15, upon long stalks, which, together with the general stalk of the panicle, are covered with minute spreading glandular hairs, (according to Gaudin the hairs upon the peduncles are sometimes not glandular, and then they are deflexed like those of the stem.) Sepals and bractæ lanceolate, their margins and apex broadly membranous. Petals white, twice as long as the calyx. Capsule oblong, longer (shorter *Sm.*) than the calyx.

In gravelly and chalky places. April—August.

Note.—The *Cerastium aquaticum*, Smith, appears to be more naturally referred to the genus *Stellaria*, or, perhaps, in conformity with the views of Fries, to form a genus distinct from either of them. As, however, it is included in the genus *Cerastium* by Smith, Hooker, and Lindley, I have added its characters and synonyms, together with a few observations upon its nomenclature.

STELLARIA, Linn.

Calyx of 5 sepals. Petals 5, bifid. Stamens 10, rarely 5 or 8. Styles 3, rarely 5. Capsule 1-celled, many seeded, opening with 6, or rarely 5, valves.

A. STELLARIUM. Styles 3, the capsule bursting by 6 entire valves.

This section includes the whole genus *Stellaria* of most authors.

B. MALACHIUM. Styles 5, the capsule bursting with 5 valves, each of which is bifid at its extremity. *Larbrea*, Ser: in DC. Prod. (not of St Hil.) *Malachium*, Fries, Reichenb. Koch.

S. aquatica, Vill. Leaves cordate-ovate, mostly sessile and semi-amplexicaule, peduncles axillary and solitary, petals rather longer than the calyx, fruit-stalks reflexed.

Cerastium aquaticum, Linn. *Sp. Pl.* 629. *Eng. Bot.* 538. DC. *Prod.* iii. 366, (note,) &c.

Stellaria aquatica, "Vill. *Delph.* iii. 617." *Pers. Syn.* i. 500, (not of *Seringe* in DC. *Prod.* i. 398.)

Larbrea aquatica, Ser. in DC. *Prod.* i. 395, (not of St Hilaire.)

Malachium aquaticum, Fries, "Hall. 1817, p. 77." *Nov. Succ.* 121. *Reichen. Fl. excurs.* 4967. Koch, *Syn.* 120.

Stellaria pentagyna, Gaud. *Fl. Helv.* iii. 179.

For a detailed description of this plant I would refer to *Sm. Eng. Fl.* or *Gaud. Fl. Helv.*

The *Stellaria aquatica* of DC. *Prod.* i. 398, is *St. uliginosa* of Curtis and Smith, which is now distinguished as a genus under the name of *Larbrea* of St Hilaire. *Seringe* applied this latter name to our plant in De Candolle's *Prodromus*, as quoted above. This mistake was corrected in the third volume of that work, and the genus *Larbrea*, distinguished by its perigynous stamens, adopted for the *St. uliginosa* of Curtis. Our plant was, at the same time, referred back to *Cerastium*.

Should it be considered advisable to follow Fries, Reichenbach, and Koch, by separating this plant both from *Stellaria* and *Cerastium*, the name *Malachium* conferred upon it by Fries in the year 1817 cannot be retained. A genus of Coleopterous insects having been described under the name of *Malachius*, and therefore only differing in gender from *Malachium*, by Fabricius in his *Systema Eleutheratorum*, which was published in 1801.

According to Reichenbach and Koch, the *Cerastium manticum*, Linn. (*Stellaria mantica*, DC.) possesses the same structure as our plant. It is consequently referred by them to the genus *Malachium*, and will of course be included in our section of that name.

St John's College, Cambridge, April 8, 1837.

II.—*Characters and Descriptions of the Dipterous Insects indigenous to Britain.** By JAMES DUNCAN, M. W. S., &c. &c. (Continued from p. 459.)

FAMILY BOMBYLIDÆ, *Leach.*

ANTENNÆ consisting of three joints, the third not ringed and surmounted by an articulated style : proboscis long and porrected horizontally from the lower part of the face ; palpi consisting of a single joint ; head much narrower than the thorax ; the latter very convex above ; legs long and slender ; wings divaricating, and usually having four posterior cells.

The insects included in this family belong principally to the southern parts of Europe and to Africa. Comparatively few, therefore, fall to be described by the British faunist, and these all admit of being referred to three genera, viz. *Bombylius*, *Phthiria*, and *Ploas*. These may readily be distinguished from each other by the relative length of the proboscis, and radical joints of the antennæ :

Proboscis longer than the head and thorax,	{ 1st joint of antennæ much longer than 2d,	BOMBYLIUS.
	{ 1st & 2d joints of antennæ short and equal,	PHTHIRIA.
Proboscis shorter than the head and thorax,	- - -	PLGAS.

Genus BOMBYLIUS.

Antennæ inserted close together, the third joint turned outwards ;

the radical joint pretty long and cylindrical, clothed with very long hairs, second joint cup-shaped, likewise hairy, third long and subfusiform, nearly naked, attenuated, surmounted by a short oblique style, which consists of three joints, the



central one longest, (Fig. 1 :) labrum very long and spear-shaped, somewhat dilated a little before the point : tongue very long, and ta-

* As these descriptive notices are intended to embrace all the species recorded as British, it forms part of our plan to publish an appendix at intervals, supplying any accidental omission in the original papers, describing new species, and adding new localities, the latter of which have been furnished in great numbers through the attention of our correspondents. By following this method, we shall be enabled to present the subject in as ample, and, we hope, as complete a form, as its present progressive state admits of.

pering gradually from the base to the point, which is very acute ; maxillæ setiform and shorter than the labrum ; lip terminating in two curved lobes : head small and trigonate, hypostome densely hairy : eyes meeting in the male, but separated in the female ; ocelli three, very minute (Fig. 4 :) body short and bulky from being covered with fine down ; wings narrow with two discoidal cells, the first posterior cell closed, legs very long and slender ; basal joint of the tarsi as long as all the rest ; pulvilli bilobed and very slender.

These insects are known at first sight by their downy bodies, long exerted proboscis, and the length and delicacy of their legs. From the first mentioned peculiarity, they bear so much resemblance to humble bees, that they are known in some parts of England by the name of humble-bee flies. Some of them are vernal insects, but others do not appear earlier than May, and one species, *B. minor*, is even later in taking wing, at least in Scotland. They fly only during fine weather, and in the middle of the day when the heat of the sun is greatest. They hover over flowers like the humming-bird hawk-moth, employing their long proboscis for a similar purpose, producing at the same time a humming noise—another point of resemblance to the insect just named. It is the latter circumstance to which the generic name refers. The following notice applies to *B. medius*, but it well describes the habits and appearance of the Bombylii generally. “Of all the active, vigilant creatures that animate our paths, we have none superior to the little bee-like bombylius ; but this creature is to be seen only in the mornings of a few bright days in spring, seeming to delight in the hot windy gleams of that season, presenting an emblem of that portion of our year, fugitive and violent. It is, I believe, plentiful nowhere. Particularly solicitous of warmth, it seeks the dry, sunny reflection of some sheltered gravel-walk, or ditch bank in a warm lane ; and here it darts and whisks about in seeming continual suspicion of danger ; starting away with angry haste, yet returning immediately to the spot it had left, buffeting and contending with every winged fly that approaches, with a jealous pugnacious fury that keeps it in constant agitation. This action, its long projecting proboscis and its pretty spotted wings, placed at right angles with its body, distinguish our bombylius from every other creature. It appears singularly cautious of settling on the ground. After long hovering over and surveying some open spot, with due deliberation and the utmost gentleness it commits its long delicate feet to the earth ; but on the approach of any winged insect, or on the least alarm, is away again to combat or escape. Associates it has none, the approach even of its own race excites its ire, and, darting at

them with the celerity of thought, it drives them from its haunts. When a captive, it becomes tame and subdued, and loses all its characteristic bustling and activity, the inspiration of freedom.”*

Of the larvæ of *Bombylius* no account has yet been given. Fallen presumes that they live in the earth and feed on the roots of plants; a conjecture which appears probable, when we consider that those of the most nearly related groups afford instances of such an economy.

BOMBYLIUS MAJOR. (s.)

Linn. Donovan's Brit. Ins. ii. pl. 66—*Meigen*, ii. 190; *Curtis*, B. E. pl. 613; ♂.—*Bom. variegatus*, *De Geer*. vi. 268, pl. 15. fig. 10.—*Bom. sinuatus*, *Mihan*, Mono. Bomb. Bohemiæ, pl. 2, fig. 4.—*Bombylius*, *Harris' Expos.* pl. 47. f. 2.

Ground colour of the body black, but the surface entirely covered with soft ochreous-yellow hairs; head with whitish-yellow hairs; antennæ dark-brown; hairs of the beard whitish; on the underside the hairs are yellowish-white, those covering the breast and the apex of the abdomen black. Wings with the anterior portion brown, that colour extending from the base, where it is widest, nearly to the apex, the internal edge forming a sinuated line; the remaining portion of the wing transparent; halteres dark brown; legs pale ferruginous, the tarsi brown. Length of the body $5\frac{1}{2}$ –6 lines; proboscis 3 lines. (*Wood-cut*, fig. 3.)

This insect, which is the largest of our British species, first appears in April and the beginning of May, and occurs occasionally in the more southern parts of England. It probably does not inhabit Scotland. “In plenty at Glanville’s Wootton, New Forest, near Bristol, &c. in the months of April, May, June, and at times may be seen (as was the case in 1826 and 1827,) as early as March.” *J. C. Dale, Esq.* “Open places in woods, Coomb, Norfolk, &c.” *Curtis' Brit. Ent.* “Vicinity of London,” *Stephens' Catal.* “I have seen this species twice at Raehills, Dumfries-shire.” *Rev. W. Little.*

BOMBYLIUS MEDIUS.

Linn. Donov. Brit. Ins. v. pl. 146, f. 1; *Meigen*, ii. 196.—*Bomb. major*, *Samouelle's Useful Comp.* pl. 9. fig. 10.—*Wood's Illust.* ii. 106, pl. 71.—*Bomb. discolor*, *Mihan*, pl. 2. fig. 1.—*Bomb. punctatus*, *De Geer*. vi. pl. 15, fig. 12.—*Bombylius*, *Harris' Expos.* pl. 47, fig. 1.

Clothed with soft ochreous hairs, beneath which the surface is black. Head with brownish-yellow hairs, becoming nearly black towards the base of the antennæ; thorax with two lines of black hairs on each side, terminating anteriorly at the insertion of the wing; the female distinguished by a dorsal line of white down:

* Journal of a Naturalist.

abdomen having the anterior half clothed with fulvous hairs, the posterior half with black hairs, the female with a white anal spot; belly entirely covered with black hairs: base and outer border of the wings for nearly two-thirds of their length brown, the remainder transparent, with a brown spot at the base of each cell: halteres black: legs pale ferruginous, the tarsi dusky at the extremity. $5\frac{1}{2}$ - $6\frac{1}{2}$, proboscis $4\frac{1}{2}$.

“Middle of April, open places in woods, Norfolk, Essex, and around London.” *Curtis, Brit. Ent.* “In plenty at Enborne, Berks, several years ago, and in Tidworth woods, Hants, May 1829; rare at Glanville’s Wootton.” *J. C. Dale, Esq.* “Common on sunny banks in the spring; but the only species of this genus which I have as yet taken in Cambridgeshire.” *Rev. Leonard Jenyns.* “Cambridge and Bath,” *C. C. Babington, Esq.*

BOMBYLIUS PICTUS.

Meigen, ii. 198; *Mikan*, pl. 2, fig. 2.—*Panzer*, Faun. Germ.—*Bomb. planicornis*, *Fabr.*

Head with dark-brown hairs, the male with two white points over the base of the antennæ; the latter dark-brown, with the third joint flat and very much dilated, ending in a point, but without a distinct style. Thorax clothed with light-brown hairs, changing with the light into white, the back marked with five spots of black hairs, three anteriorly, and two behind; hairs investing the abdomen dark-brown, the sides with alternate fulvous and black tufts, and the hinder extremity with two white spots: belly black, halteres of the same colour; wings brown at the base and anterior margin to beyond the middle; the rest of the surface transparent and spotted nearly as in *B. medius*, but many of the spots usually larger; legs pale ferruginous. 5 lines.

This insect is admitted on the authority of Mr Stephens, who includes it in his catalogue among our indigenous species; but we have not ascertained in what part of the country examples occurred. It is no doubt a rare native: it seems doubtful whether it is found in France, and it is considered scarce in Germany, where it was first discovered.

BOMBYLIUS POSTICUS.

Fabr. Meigen, ii. 200.—*Bomb. micans*, *Meig.* Klassif.

Body black, invested with fulvous hairs: forehead black in the male, inclining to brown in the female, having a white spot on each side in the former sex, and a single spot in the latter: proboscis, palpi and antennæ black, the latter with the third joint a little enlarged in the female: the fulvous hairs covering the body have a whitish schim-

mer when seen in certain directions, and those on the hinder part of the abdomen are entirely white: halteres brown; wings transparent, brown at the base, and having a small pale yellow spot towards the apex; the base slightly tinged with yellow only in the female. Halteres brown: legs shining yellowish-grey, the inner side of the anterior thighs, and all the tarsi black. $4\frac{1}{2}$ lines; proboscis 3 lines.

We have to adduce the same authority for regarding this as an indigenous species that was referred to in the preceding instance. Like *B. pictus* it is a scarce insect even on the continent, and seems to prefer a more southern climate to ours.

BOMBYLIUS MINOR. (s.)

Linn. Donovan's Brit. Ins. xv. pl. 536; Meigen, ii. 201—Bomb. venosus, Mikan; Meigen's Klassif.

Considerably less than any of the preceding; the body black, covered throughout with soft yellowish hairs: whiskers (mystax) ferruginous, black at the sides: forehead of the females clothed with reddish yellow hairs; antennæ and proboscis black. Halteres dark-brown: wings somewhat greyish, the base and outer border tinged with light yellowish brown: legs pale ferruginous, the tarsi obscure. 4 lines: proboscis nearly $2\frac{1}{2}$.

This is one of the most common species of the genus, and appears to be the only one that extends far to the north. It occurs in some plenty, in the month of June, in many places near Edinburgh, such as the base of Arthur Seat, fields about Duddingston, and has been taken in Perthshire and other more northern counties.

In England it appears to be rather local, but abounds in certain situations. Captain Blomer was accustomed to take it plentifully in Bradley and Cleve Woods, near Teignmouth and Bideford, Devon; and also in Wales. It has likewise been observed at High Bickington by Mr Cocks—at Shanklin Chine by Mr Rudd, &c. According to Captain Blomer's Journal, it seems to be in June and beginning of July that it appears in greatest force. "Avondale, county Wicklow, Ireland, taken once." *A. H. Haliday, Esq.*

BOMBYLIUS CTENOPTERUS (s.)

Mikan, Meigen, ii. 204; Macquart's Diptères, 382.

Brown, the male clothed with fulvous hairs, the female with whitish yellow hairs: hypostome, whiskers and forehead grey: halteres white: wings nearly transparent, tinged with yellow at the base, and a considerable way along the exterior border, the marginal nervure strongly ciliated at the base: the basilar cells of equal length, whereas in all the species previously described they are un-

equal. Legs yellow, the tarsi dark-brown. $4\frac{1}{2}$ lines; proboscis about half that length.

“Devon, Mr J. Cocks, and near Perth,” *Curtis' Brit. Ent.* “Dover, July 1826.” *Mr Ingpen.*

BOMBYLIUS CINERASCENS.

Mikan, Monog. pl. iii. Fig. 10; Meigen, ii. 212.

This small species, which, according to Mr Stephens, has occurred in Britain, is thus described by Mikan, to whom we are indebted for a monograph of this tribe of Diptera: whiskers black above, grey beneath: body black, covered throughout with ash-grey hairs: wings transparent, the base black: halteres black: thighs with grey pubescence; tibiæ brown; tarsi black. $2\frac{1}{2}$ lines; proboscis $1\frac{2}{3}$.

GENUS—PHTHIRIA.

Antennæ somewhat shorter than the head, approximating at the base, and directed sideways; first joint short and cylindrical, with a few hairs on the outer side; second cup-shaped and slightly pubescent; third fusiform and compressed, nearly double the length of the two others taken together, and having a very short bifid style at the apex; proboscis at least as long as the head and thorax; labrum grooved beneath; palpi thick and club-shaped, concealed within the cavity of the mouth: head spherical, the forehead prominent; ocelli three; abdomen obtusely conical: wings of moderate size, the submarginal cells nearly straight; first posterior one open; anal cell closed at the extremity and slightly petiolated: legs long and slender.

This genus includes a few small insects which were formerly referred to *Usia* of Latreille and *Volucella* of Fabricius. “The principal relations which they have with the *Bombylii*,” says Macquart, “consist in the length of the proboscis, the approximation of the antennæ at the base, and in the form of the third joint of these organs; but more considerable differences give them a peculiar habit, and render their affinity liable to be misunderstood. The spherical form of the head, and conical shape of the abdomen, the shortness of the first joint of the antennæ, and finally the reticulated appearance of the wings, remove them more or less from the *bombylii*: in the latter character, indeed, they deviate from the greater part of the family. The nervures are not sinuous as in *Anthrax* and *Mulio*; the first cell of the hinder border is not closed as in the *Bombylii*; and the anal cell, contrary to what takes place in the genus just named, is closed at its extremity, as in *Usia* and *Geron*.”

Finally, the wings assume an appearance very similar to those of the Empides.”*

As is the case with the Bombylii, we are still unacquainted with the previous states and metamorphoses of these insects.

PHTHIRIA PULICARIA.

Meigen, ii. 219; *Macquart*; *Curtis*, Brit. Ent. pl. 521.—*Bomb. pulicarius*, *Mikan*, Monog. pl. iv. fig. 14.—*Volucella campestris*, *Fallen*.—*Phthiria nigra*, *Meig.* Klass. pl. x. fig. 11.—*Phthiria pygmaea*, *Latr.* Gen. Crust. iv. 3.4.

Male: deep black; the hypostome clothed with white hairs; forehead black: the abdomen more or less invested with whitish hairs; halteres dark-brown: wings nearly hyaline, the stigma brown; legs black.

Female: not so deep black as the other sex; the hypostome white, and the forehead, which is wide and of a dark-brown-colour, has two white spots anteriorly; thorax with a white stripe on each side, the sides of the breast greyish, with two white spots; scutellum black, marked with a pale yellow point at the hinder extremity; halteres white; wings purely hyaline. $1\frac{1}{2}$ line.

This appears to be everywhere a rare insect, and was not known to inhabit this country till lately, when it was found by Mr Curtis at Covehithe, in Suffolk.

GENUS PLOAS.

Antennæ about the length of the head, placed close together at the base, diverging above; first joint thick, conical, and hairy; second cup-shaped, hairy; third rather long, slender, naked and fusiform, slightly compressed, and terminating in a short two-jointed style: proboscis not much longer than the head: palpi cylindrical, terminating in a small sharp point: labrum nearly as long as the proboscis, obtuse; tongue as long as the proboscis, and pointed: eyes contiguous in the male, remote in the female; the crown with three ocelli; thorax oval, the surface elevated: wings with three submarginal cells, the first posterior one open; legs slender.

The most distinctive character in this genus, which was established by Latreille, is the thickness of the radical joint of the antennæ. The proboscis also is much shorter than in the other members of the same family, so that the insects are obliged to settle on the corolla of flowers to obtain food, instead of sipping it while on

* Diptères du Nord de la France.

the wing like the bombylii. Very few species are known ; and although that described below has been admitted into our indigenous lists, the fact of its being a native requires confirmation.

PLOAS VIRESCENS.

Meigen, ii. 231. pl. 19, fig. 6.—*Ploas hirticornis*, *Latr.* Gen. Crust. iv. 312, pl. 15, fig. 7.—*Bomb. Maurus*, *Mikan*, pl. 4, fig. 13.—*Conophorus Maurus*, *Meigen*, *Klassif.* pl. 10, fig. 17.

Surface of the body obscure green, nearly black, invested with greyish hairs ; forehead whitish in the male, with fulvous hairs in the female ; first and second joints of the antennæ greyish-brown, with very long black hairs ; third joint black. Hairs on the thorax ferruginous ; sides of the breast whitish ; scutellum small, shining black and naked : abdomen rather broad, blackish green, clothed with ferruginous hairs ; that of the male with alternate tufts of white and black hairs on the sides : wings brownish at the base, the transverse nervures likewise bordered with brown : tibiæ yellowish, the thighs and tarsi somewhat obscure. 3—4 lines.

The principal station of this insect seems to be in the South of Europe ; but it has been found as far north as Paris ; and specimens in the British Museum are said to have occurred in this country.

FAMILY—CONOPIDÆ.

Antennæ three-jointed, angular at the base, the third joint with a terminal style ; proboscis long and slender, geniculated at the base ; ocelli wanting ; thorax without a cross suture ; abdomen curved inwards at the extremity, and consisting of six segments in the female, and seven in the male.

As constituted by Dr Leach, and adopted by several other authors, the family Conopidæ was made to include the genera arranged below as a distinct group under the name of Myopidæ. This separation was first made by Macquart, and is rendered necessary by the important difference of character which they present, as will be seen by comparing the respective descriptions. As it now stands, the present family is restricted to the old genus *Conops* of Linnæus.

GENUS CONOPS, *Linn.*

Antennæ rather longer than the head, inserted on a frontal protuberance, placed close together at the base and diverging at the apex, the radical joint short, slender, and cylindrical, forming an angle with the second, which is horizontal and elongated, increasing in thickness from the base, and forming with the third a compressed club, ending

in a point ; style three-jointed, first joint short and indistinct, second dilated, and having a pointed appendage at the apex turned downwards, third longer and tapering to a point (Fig. 2) ; proboscis hori-



zontal and directed forwards ; labrum slender and rigid : the tongue rather longer and likewise very slender ; labrum slenderest in the middle, and terminating in two lobes (Fig. 4:) palpi very small, truncated and pilose : head very large, the crown transparent and without ocelli : forehead wide in both sexes : abdomen usually much narrowed at the base, and curved downwards at the hinder extremity ; the fourth segment in the male provided with a curved horny appendage on the underside : legs rather long and robust ; the thighs slightly compressed before the apex : wings scarcely reaching to the apex of the abdomen, laid horizontally along the body when at rest, the first posterior cell closed and pediculated ; the anal one elongated. (Fig. 6)

The insects of this genus have a very peculiar aspect, arising from the great size of the head, narrow base of the abdomen, and the incurvation of its extremity, which renders them little likely to be confounded with other tribes even by the most inexperienced observer. Their prevailing colour, which is black with marks and bands of yellow, gives them at first sight something of the appearance of wasps or small ichneumons. They are autumnal insects, seldom appearing in force before August, and the more common kinds continue to frequent the common ragwort and other late flowering plants till the end of October. Notwithstanding the formidable appearance of the long exerted proboscis, their habits are quite innocuous, the whole of their sustenance being derived from the juices of flowers. Baumhauer was the first to discover that the larvæ are parasitical, and that they live in the bodies of humble bees. Latreille has witnessed the species named *rufipes* issue in its adult state from the body of a bee by the incisures of the abdomen, and similar observations have been made by other naturalists. Upwards of twenty different kinds are known, only eight of which appear to inhabit Britain.

CONOPS VESICULARIS.

Linn. Fabr. Meigen, iv. 209.—*Conops cylindrica* ♂. *Meig. Klass.*

Hypostome ferruginous, the eyes bordered with a bright yellow line: forehead ferruginous anteriorly with a black longitudinal line widened at the lower extremity; the vertex brown and transparent; antennæ ferruginous; thorax dark-brown, the shoulders and scutellum testaceous: abdomen in the male nearly cylindrical, the two first segments black, narrowly edged with fulvous, the third with a fulvous band becoming yellow on the sides, fourth fulvous, black at the base; the two last entirely fulvous; abdomen of the female contracted at the base, ferruginous, the first segment brown with a fulvous line, second brown with a yellow band behind, the third black at its anterior edge: legs ferruginous: wings reddish brown at the exterior edge, and pale towards the extremity. 6–7 lines.

A scarce species; it has occurred near London and in a few other places. "I have taken the male in the New Forest, and on Knighton Heath, Dorset,—dates May 22, 1835, and June 10, 1829." *J. C. Dale, Esq.*

CONOPS FLAVIPES. (s.)

Linn. Fab. Panzer. Faun. Germ. lxx. fig. 21, 22.—*Meigen*, iv. 122.—*Conops macrocephala*, *Samouelle's Comp.* pl. ix. fig. 9.—*Conops vesicularis*, *Harris*, *Expos.* pl. xx. fig. 1.—*Conops trifasciata*, *De Geer.* ♀.

Head fulvous, with a brownish transparent vertex, from which a broad black band extends to the base of the antennæ, the latter black; thorax black with a yellow callosity on each shoulder, and another on each side of the metathorax; scutellum bordered with yellow: abdomen a little contracted at the base, black, the second and third segments in the male, and the second, third, and fourth in the female, with a yellow posterior band; the first in both sexes, with a yellow spot on each side, and the two anal segments ash-grey inclining slightly to yellow: halteres yellow, legs also of that colour, the posterior half of the thighs black, and the tarsi brown at the apex: wings tinged with brown, deepest at the outer margin. 5 lines. (*Wood-cut, fig. 5.*)

This is the most plentiful species of this tribe in Britain. It seems to occur in all parts of England, is rather plentiful in the south of Scotland, and has been traced as far north as Aberdeenshire. In Scotland it seldom appears before August, and is then usually observed on the common ragwort (*Senecio Jacobæa*,) but in the more southern parts of the island it may be found much earlier. It varies a little particularly in the breadth of the abdominal

fasciæ. " I find this insect to be common at Glanville's Wootton, and other places, such as Eslington wood, Caundle Holts, &c." *J. C. Dale, Esq.* " Cambridgeshire. In one of my specimens the abdomen is entirely bright yellow above, with the exception of the incisures of the segments, which present each a narrow line of black. Is this a mere variety, or a distinct species?" *Rev. Leonard Jenyns.* " Needwood Forest, Staffordshire. August 1828." *C. C. Babington, Esq.* " Near Twizel." *P. J. Selby, Esq.*

CONOPS QUADRIFASCIATA.

De Geer, vi. pl. 15. fig. 1.—*Meigen*, iv. 123.—*Conops aculeata*, *Fabr.*

Similar to the preceding species; hypostome fulvous, with a play of bright yellow on the sides; forehead reddish-brown above, black over the antennæ, the latter likewise black: thorax black with two yellow callosities on the shoulders, the sides of the breast and metathorax with changeable spots of bright yellow; scutellum entirely black: abdomen yellow with four black bands; the first segment being black, with a yellow callosity on each side, and the hinder margin yellow; second black edged with yellow; third similar, but the yellow band wider; fourth yellow with a narrow black band; fifth almost entirely yellow; sixth yellow: halteres yellow; legs reddish-yellow; the tarsi dusky at the extremity; wings nearly hyaline in both sexes. 5 lines.

Of pretty frequent occurrence in the south of England, but scarce in most other parts of the country. " Common at Glanville's Wootton, and other places in this neighbourhood." *J. C. Dale, Esq.* " Near London." *Stephens' Catal.* " Birchwood, Southgate, &c." *Curtis, Brit. Ent.* " Woods at Tollymore, ascent o. Mourne Mountains, county Down." *A. H. Haliday, Esq.*

CONOPS ACULEATA.

Linn. Meigen, iv. 124.—*Conops macrocephala*, *Harris*, *Expos.* pl. xx. fig. 2, 3.
—*Conops scutellata*, *Meigen*, *Klass.*

This insect so closely resembles the preceding, that, with a very few exceptions, the same description will apply to both. Head ferruginous; forehead with a black band, the spot on the crown reddish-brown; antennæ and thorax black, the latter with a yellow spot on the shoulder, and another behind the insertion of the wings; the sides of the breast with two marks of changeable yellow, having a fine silky lustre; scutellum yellow: abdomen black with five yellow bands; legs reddish-yellow, the apex of the tarsi tinged with

brown : wings having a brown stripe along the outer border but not reaching to the apex. $4\frac{1}{3}$ lines.

Has been found near London, but we have not heard of any other British localities.

CONOPS MACROCEPHALA.

Linn. Fabr. Meigen, iv. 125, pl. 36, fig. 27 ; *De Geer*, vi. 263 ; *Curtis' Brit. Ent.* pl. 377.

Larger than any of the preceding ; black ; head and antennæ ferruginous ; face yellow, with a brown streak extending from the crown to the antennæ, and a triangular mark of the same colour below them : thorax with a whitish changeable spot on each shoulder : abdomen having all the incisures yellow or whitish-yellow, the first segment swollen ; the second long, and tapering to the hinder extremity, the remainder forming a thick incurved club : halteres and legs ferruginous ; the coxæ and base of the thighs dark-brown : wings with a broad testaceous stripe along the outer margin. 7 lines.

Rare : " The specimen figured by Mr Curtis was taken by me on 18th August 1824, in my own field at Hurne, Hants, in company with others of the genus. Mr Davis writes me that he took another example in Darenth wood, Kent, but I have not yet been able to compare his specimen with mine, to determine their specific identity." *J. C. Dale, Esq.* No other British locality has hitherto been discovered, as far as we know.

CONOPS NIGRA. (s.)

De Geer, vi. p. 105, pl. 15, fig. 9 ; *Meigen*, iv. 126 ; *Herbs, Gemein Naturg.* viii. 117, 5, pl. 70, fig. 5.

About the size of the preceding : head reddish-yellow ; the forehead with a black stripe, and the hypostome with four narrow black lines : region of the mouth likewise black : antennæ ferruginous : thorax entirely black, with a small indistinct spot with a yellow play of colour within each shoulder : abdomen likewise black ; the hinder margin of the first and second segments with a very indistinct narrow ring of a somewhat paler hue than the rest, the narrowest part at the base of the third segment : legs ferruginous ; the coxæ and base of the thighs black. Halteres yellow, blackish at the base : wings with a broad testaceous stripe covering the anterior half.

This species is certainly pretty closely allied to *C. macrocephala*, but it appears sufficiently distinct. Little notice seems to have

been taken of it since the time of De Geer, by whom it is figured and described. Like many others of its tribe, it is partial to northern climates, and it is probably not very scarce in Sweden. In this country the only example that has occurred was taken by Sir William Jardine, on the northern coast of Sutherland, in the summer of 1834.

CONOPS RUFIPES. (s.)

Fabr. Meigen, iv. 127.—*Conops petiolata*, *Donovan's Brit. Insects*, xiii. pl. 451.

This species differs from all the rest in having the abdomen very narrow at the base, so as to appear placed on a long peduncle. Head fulvous: forehead with a broad black line, and the hypostome with three abbreviated lines of that colour: antennæ reddish-brown: thorax black, with two whitish points below the shoulders: abdomen with the narrow portion at the base ferruginous; the third and fourth segments each with a broad black band: legs ferruginous; the extremity of the tarsi dusky; the hinder coxæ marked with a silvery white spot: halteres bright-yellow: wings with a broad reddish-brown stripe covering the anterior half. 5 lines.

The markings of the abdomen are somewhat variable: the third and fourth segments are frequently bright-yellow behind, and the anal segments more or less tinged with that colour. The insect is one of the more common kinds, especially in the southern parts of the country; it seems rare in Scotland. "Dalmeny." *Rev. William Little*. "I take *C. rufipes* in Plumley wood, Caundle Holts, &c. in the beginning and middle of August." *J. C. Dale, Esq.* "Gamlingay wood, Cambridge-shire, August." *Rev. Leonard Jenyns*. "Devil's ditch, Newmarket Heath, July 1833; likewise near Bath." *C. C. Babington, Esq.* "In plenty on umbelliferous flowers by the side of a field, close to a plantation at Hetheselt, Norfolk." *Henry Brown, Esq.* (in *Curtis' B. E.*) "London district." *Stephens' Catal.*

CONOPS CERIEFORMIS.

Megerle, Meigen, iv. 132, pl. 36, fig. 26.

General colour black: hypostome reddish-yellow, with a pale-yellow play of colour round the eyes; forehead black, the crown brownish; antennæ nearly black: thorax of that colour, with a yellow callosity on each shoulder, and a yellow spot on the metathorax: abdomen nearly cylindrical, black: the hinder margin of the four first segments ornamented with a yellow band: halteres yellow: legs ferruginous; the thighs black in the middle: the tarsi dusky at the apex: wings transparent, with a pale brown streak in the middle of the anterior margin. 5 lines.

Rather a scarce species, but occurring at times in the vicinity of London, and in some other parts of England. "I took it in Darenth wood in 1826, in the beginning of August." *J. C. Dale, Esq.*

FAMILY MYOPIDÆ.

Antennæ with the second joint longer than the third; the style dorsal, and consisting of two joints: proboscis long and slender, generally geniculated at the base, and near the middle: ocelli three; face usually very much dilated; the eyes rather small: winglets minute; wings lying along the body; the first posterior cell usually somewhat open, the anal one generally elongated.

As above defined, this family comprehends only two British genera, viz. *Myopa* and *Zodion*, which are readily distinguished from each other by the former having the proboscis geniculated at the base and middle, and the latter by having it bent at the base only. The presence of ocelli, and other prominent characters separate them decidedly from the *Conopidæ*, to which, however, they bear some resemblance in the shape of the body.

GENUS MYOPA.

Antennæ with the first joint short and cylindrical; second rather long, somewhat thickened at the tip, and compressed at the base; third rounded-ovate, with a short two-jointed style on the back: proboscis geniculated at the base and middle; labrum, tongue, and palpi variable, the latter generally somewhat elongate and fringed with hairs: inferior part of the face inflated; the forehead wide in both sexes; eyes rather small: ocelli three: thorax robust; abdomen consisting of six segments, somewhat narrowed at the base, the extremity obtuse and curved inwards; the fourth segment dilated beneath: legs rather strong, thighs somewhat thickened, the claws and pulvilli much developed: wings lying along the back when at rest; the anal cell straight.

About twenty species belong to this genus, but scarcely more than a third of these have hitherto been found in Britain. The remarkable dilatation of the lower part of the face, in connection with the incurved abdomen, and rather short strong legs, give them a very peculiar aspect. The prevailing colours are rust-red and brown. Although much similarity pervades the species in respect to colour and marking, the structure of the oral organs undergoes considerable modifications, as is occasionally pointed out in the subsequent descriptions of the different species. We are still unacquainted with the larvæ, but from the analogy which exists between

the perfect insects and the Conopidæ, it is not unreasonable to infer that they are parasitic, like those of the tribe just named. The flies derive their nourishment from the juices of flowers. We may expect that the following list of native species will ere long be considerably augmented by the discovery of kinds which have hitherto been overlooked in this country.

MYOPA PICTA. (s.)

Panz. Faun. Germ. liv. 22; Meig. iv. 140.

Hypostome white spotted with black, the hinder part of the head with four greyish spots, forming a curved line: forehead ferruginous, the crown dusky-brown; antennæ likewise ferruginous; the third joint black: thorax dark grey, with longitudinal stripes of deep brown: abdomen testaceous-brown, varying with light-grey reflections, and marked along the back with a row of dark points: legs pubescent, testaceous; anterior thighs black, with the tip ferruginous: tibiæ ciliated, and marked with four dusky rings. Halteres white; wings brown, spotted with white. $3\frac{3}{4}$ –4 lines.

A scarce insect, but occurring at times on flowers. It is observed occasionally near London; and we once found a specimen in the Edinburgh Botanic Garden.

MYOPA BUCCATA.

Fabr. Meig.—Conops buccata, Linn.

Usually somewhat less than the preceding: hypostome white, without spots; forehead dark-brown spotted with grey; antennæ entirely testaceous: thorax dark-brown, with ash-coloured bands, the shoulders and sides testaceous; scutellum dark-brown: abdomen nearly testaceous or reddish-brown, with light grey reflections, especially on the sides; the anal segments reddish-brown in the males. Legs ferruginous, the thighs with a single dark ring, and the tibiæ with two, one near the middle, and the other at the apex: tarsi tinged with yellow: wing-scales white; halteres pale yellow: wings brown, with pale spots. 3 – $3\frac{3}{4}$ lines.

Likewise one of the rarer species, of which we have been able to ascertain very few localities. It has been taken in the London district, but not frequently.

MYOPA TESTACEA. (s.)

Fabr. Meig.—Conops testaceus, Linn.—Conops buccata, Gmelin, v. 2895.

Very closely related to *M. buccata*, but distinguished by a few obvious characters. The inflated portion of the face is white and unspotted, but there is a distinct brown mark on each side, near the

margin of the eyes below the antennæ; the latter wholly testaceous, the terminal joint appearing of a lighter hue, owing to the absence of the black hairs, with which the others are covered. Thorax black, with ash-grey lines; the sides, shoulders, and usually the scutellum reddish, or pitchy brown: abdomen and legs nearly as in *M. buccata*; the dark rings on the latter more or less distinct, the femoral one frequently almost effaced. Wings brownish, each of them with a distinct blackish-point on the cross nerve near the centre. $3\frac{3}{4}$ -4.

This insect seems to appear not unfrequently, but at somewhat uncertain intervals, and on some occasions we have observed it in great profusion. This was particularly the case in the neighbourhood of Edinburgh, in the summer of 1835, when scarcely a flowering plant, especially of the umbelliferous kind, could be examined without finding specimens. On ordinary occasions, it occurs pretty frequently, apparently in most parts of England and Scotland, and also in Ireland. It is best distinguished from its associates by the brown mark beneath the eye, and the dark discoidal spot on the disk of the wings. "Bottisham, Cambridgeshire, on the flowers of the barberry; also near Cambridge." *Rev. L. Jenyns*. "Near London." *Stephen's Catal.* "Holywood on Belfast Lough, county Down; not common." *A. H. Haliday, Esq.* "Jardine Hall, 1837." *Sir W. Jardine, Bart.*

MYOPA DORSALIS. (S.)

Fabr. Meigen.—*Conops testacea*, *Gmelin*—*Myopa ferruginea*, *Panzer*, Faun. Germ. xxii. 24.—*Conops cessans*, *Harris*, Expos. pl. xx. fig. 4.

Prevailing colour testaceous; face reddish-yellow, with lighter reflections; forehead brown: antennæ reddish-brown: (upper lip very short, the palpi elongated and cylindrical;) thorax brown or blackish on the surface, the shoulders and sides of the breast inclining to testaceous: abdomen wholly of the latter colour, rather broad and depressed in the male, the first segment somewhat dusky, the others with pale grey reflections at the incisures; halteres pale yellow; wing-scales white; wings light-brown, inclining to yellow at the bases; legs wholly testaceous, the tarsi paler. $5\frac{1}{2}$ -6 lines.

Not a scarce species, occurring on flowers in the months of July and August.

MYOPA FERRUGINEA. (S.)

Fabr. Meig.—*Conops ferruginea*, *Linn.*—*Conops buccæ*, *Harris*, Expos. pl. xx. fig. 5-9.

Similar to the preceding, but usually rather less. Head fulvous,

with light reflections on the sides of the hypostome ; forehead having a black point ; antennæ reddish-brown : thorax dark-brown above, the colour disposed in three broad stripes : abdomen narrow and cylindrical, the basal segment, as well as all the rest, ferruginous with grey incisures ; the second segment is a good deal elongated, and the terminal ones are very much incurved in the male. 5 lines.

Likewise of frequent occurrence, at least in many parts of the country. In Scotland we notice it every summer in the neighbourhood of Edinburgh and in Roxburghshire, and have seen specimens from other southern counties. "London district." *Stephen's Catal.* "Bath." *C. C. Babington, Esq.* "Near Twizel." *P. J. Selby, Esq.* "Dundrum, a sandy beach below the Mourne Mountains, Ireland, taken once," *A. H. Haliday, Esq.*

MYOPA FASCIATA.

Meig.—*Myopa ephippium*, *Fabr.*—*Conops fusca*, *Harris' Expos.* pl. xx. fig. 6, 7?

A handsome species, and easily distinguished from its associates by its dark-coloured abdomen, ringed with white : face yellow ; forehead with two brown stripes and a shining yellow triangular mark on the crown ; antennæ reddish-brown ; the third joint appearing paler : thorax blackish, the shoulders and sides brown : abdomen black ; the second and third segments edged with white behind, and on the sides ; the fourth segment with two black spots anteriorly, all the rest white : halteres pale yellow ; legs fulvous-brown, the tibiæ having a dusky ring near the middle : wings of a uniform brownish colour. 3–4 lines.

Apparently somewhat scarce in Britain, but frequent on many parts of the continent. "Near London." *Stephens' Catal.* "Kenmare, Ireland." *A. H. Haliday, Esq.*

MYOPA ATRA. (s.)

Fabr. Meig.—*Myopa annulata*, *Fabr.* *Antl. Syst.*—*M. cinerascens*, *Meig.* *Klass.* i. 287.—*M. maculata*, do. 288.—*M. micans*, do. 289.

Very dissimilar to any hitherto described, both on account of its small size, obscure colours, and somewhat peculiar facies ; it appears also to differ in some measure in its habits from the other species. Black ; face yellow, with a silvery-white play of colour ; vertex brown ; antennæ (which are rather long in proportion to the size of the body) black, the second joint, and base of the third fulvous on the inner side : upper lip elongated, tongue very long. Tho-

rax cinereous, with three black lines, the central one double in the female: abdomen shining black in the male, ash-grey in the female; the second, third, and fourth segments edged with grey in the former sex, and a black dorsal streak along the first four segments in the latter: legs black; the hinder thighs, and occasionally the others also, more or less fulvous: tibiæ sometimes yellowish at the base. Halteres white; wings slightly tinged with brown, the base yellowish, strongly iridescent. $1\frac{1}{2}$ – $2\frac{1}{2}$ lines.

Varies considerably, which has caused a variety of names to be applied to this species. It is a common insect in most places, and, besides occurring in flowers, is often seen running about warm banks exposed to the sun. Near London, plentifully in some situations. Neighbourhood of Edinburgh, &c. “Everywhere in Ireland, on sunny banks.” *A. H. Haliday, Esq.*

MYOPA PUSILLA.

Megerle, Wiedemann, Meigen.

Antennæ blackish, reddish internally towards the apex: hypostome yellow, with a white play of colour; forehead testaceous: thorax shining blackish-grey, with two black lines dilated behind into a triangular spot: abdomen black, with large light-grey spots on the sides: wings brownish towards the costa: legs shining black: hinder thighs at the base and the knee reddish. $1\frac{1}{2}$ lines.

We have noticed this insect as it is said to have been taken in the vicinity of London, but there can be little doubt that it is a mere variety of *M. atra*.

III.—On the existence of a second membrane in the Asci of Fungi.—

By the Rev. M. J. BERKELEY, M. A. F. L. S. Plate VII.

M. MORREN, in a memoir of the highest physiological interest, (*Ann. de Sc. Nat. N. S. Vol. v. p. 257.*) has lately made known in the short filaments of *Closteria*, a genus formerly referred to the *Infusoria*, but most certainly, according to his most interesting observations, belonging to the order *Algæ*, the presence of three distinct membranes. The external hyaline tube is closely lined with a delicate flexible membrane; besides which there is a third sac proper to the green mass of granules and vesicles. It should seem from the analogy of this genus with *Zygnema*, that the individual *Algæ* are rather to be considered as extremely reduced threads, than as frustules; in other words, the genus is rather confervoid than diatomaceous; and therefore their relation to the asci of Fungi is per-

haps less complete than if the converse were the case. For *Mone-*
ma, a diatomaceous genus, greatly resembles certain asci with their
included sporidia; and I have pointed out in the English Flora the
curious analogy between the asci of *Sphæria entomorphiza* and *S.*
ophioglossoides, and the filaments of *Schizonema*.

Be the analogy, however, what it may, between individual *Clo-*
steriæ and the asci of *Fungi*, the point to which I now wish to draw
attention is the presence of two distinct membranes in the latter
organs, besides the proper integument of each sporidium, viz. the
external hyaline tube, and a second, answering to the secondary
membrane of *Closteriæ*, which at first lines the former closely, but
is at length more or less detached.

The species in which I have seen this most distinctly, are a form
of *Sphæria populina*, Pers. growing in winter and spring on small
fallen branches of ash, and *Sphæria pedunculata*, Dicks. and Sow.
referred in the English Flora, on the inspection of dry specimens,
as a variety to *Sphæria hypoxylon*, but now proved by the detec-
tion of recent individuals on the dung of rabbits more or less buried
in ant-hills to be a very distinct species, remarkable for several pe-
culiarities of structure, which will be adverted to in what follows.
The fact, however, being once satisfactorily established in these
species, it was clear, from certain anomalous appearances in the con-
tents of the asci of various *Fungi*, that it existed very generally.
More especially I have recognized its existence in *Sphæria phæo-*
comes, Reb. (which I have lately found with perfect asci and sep-
tate sporidia); an undescribed species detected by Mr D. Stock,
on *Arenaria peplodes*; and *Patellaria atrata*, Fr. In many other
cases I have ascertained the presence of a secondary membrane more
or less distinctly; and I have no doubt that it exists in all asci
which are surrounded by a distinct transparent border.

On submitting to the microscope some of the gelatinous contents
of the perithecia of *Sph. populina*, var. which had been previously
moistened, and gently crushed with the point of a lancet, I perceiv-
ed that some were snapped asunder, and that from the centre of the
fractured part a little hyaline tube projected very much in the same
way as is frequently the case in *Dentalium entalis*. (See *Deshayes*,
Monog. t. 2, f. 2.) This attracted my attention more particularly,
and after examining numerous asci I found that it arose from the
projection of a fractured portion of a secondary membrane imme-
diately enveloping the sporidia, which did not give way so soon as
the external tube, which appears to be exceedingly brittle. It is
highly transparent, capable of considerable dilatation, but at the

same time very contractile, so that when yet *in situ*, it frequently becomes nodulose from the pressure of the sporidia, especially if they get out of their natural position, which is mostly, though not universally, with their major axis parallel to the asci. The portion which projects after the asci are fractured, if empty, is generally contracted to a mere thread. In several instances, when the outer tube has been snapped asunder, I have seen a large portion of the inner tube projecting, and in one case it still retained three sporidia. Similar appearances presented themselves in *Sph. pedunculata*, but, from the circumstance of the sporidia being enveloped in a pellucid mucus, the structure is not always easily made out. The secondary membrane in general adheres very closely to the sporidia, adapting itself to their form, so that the row of sporidia when not as yet disarranged presents a moniliform articulated thread; the dark apparent articulations arising probably from the mutual pressure of the sporidia with their mucous coats against each other. Indeed, from the manner in which the sporidia adhere together when the asci are ruptured, I am inclined to think that the secondary membrane is in the present species so extensible, as to form a close covering to the sporidia, however much they may be disarranged. This is not, however, always the case, as the secondary membrane is sometimes perfectly distinct, both before and after the rupture of the asci. This I have seen especially in a remarkable variety, or rather form of the species, in which the receptacle is reduced almost to nothing, and the perithecium solitary. Besides the curious circumstance of the sporidia being coated with mucilage, a circumstance, as far as I know, without parallel in the genus, it is remarkable that they have another equally distinguishing feature, which is the existence of a regular longitudinal depression on one side, so as to resemble very strongly such pollen grains as have a single band. This is best seen when they are divested of their mucilaginous coat, which appears to be uniformly the case before they are discharged. It is by no means common amongst the uterine Fungi to have any inequalities in the coat of the sporidia, except such as are septate. At present I recollect but a single instance in the genus *Ascobolus*, in which I have seen them very strongly wrinkled. They vary remarkably in form, as will be seen from the accompanying figures, and in some specimens which, in addition to the usual coating of earth, had penetrated through a layer of cow-dung, it is most curious, in consequence, I suppose, of excessive nourishment, the sporidia were uniformly more than twice the ordinary size.

The primary membrane, though sometimes rather rigid, is by no

means universally so. Sometimes it is extremely tender and almost gelatinous, so that if a portion of the inner tube with its sporidia be bent at any part by any peculiar position which the sporidia acquire, the outer tube is also forced outwards, and in consequence the asci are sometimes curiously distorted. In some cases they appear torulose, from the pressure of the inclosed sporidia, and occasionally when the sporidia assume by accident a transverse position in the tube, I have seen the whole vessel regularly dilated. The apparent thickness of the walls of asci arises in general from the existence at a certain period of growth of a space between the two membranes, and the great difference of thickness at different parts is now easily explained from the greater contraction of those points of the secondary membrane. This is, I believe, attached to the primary at the apex. In *S. pedunculata* it certainly is, in which species there is almost always an articulation a little below the point of attachment.

M. Morren's paper is, if I mistake not, calculated to throw light upon the development of the sporidia themselves. In an early stage of growth the asci contain a mere grumous mass, out of which, probably at the expence of the greater part of the granules of which it is composed as its organization becomes more evident, the sporidia arise. The coat of the sporidia is frequently absorbed before they are discharged, and the asci then contain a number of distinct spores; and sometimes the asci themselves are absorbed, and the whole inner mass of the perithecia consists of sporidia or spores. These are points to which at present sufficient attention has not been paid, but they would doubtless highly repay the labour of investigation.

Explanation of Figures.

a. Fractured asci of *Sphæria populina*, var. with the secondary membrane projecting.

b. One more highly magnified. *c.* A single sporidium still more highly magnified.

d. Fractured asci of *Sphæria pedunculata*, with their sporidia involved in mucilage, and partly covered by the secondary membrane.

e. Portion of one of the asci showing the moniliform arrangement. *f.* Sporidia divested of mucilage.

g. Asci with one of the paraphyses of a variety of *S. pedunculata*. In one the sporidia are transverse, and the vessel is in consequence regularly dilated.

h. A distorted ascus of *Patellaria atrata*, with its divided paraphyses. *k.* One of the sporidia.

IV.—*Observations on the Gemmæ of Bryum androgynum.* By
 GEORGE DICKIE, Esq. Surgeon, Aberdeen. Plate VII.

BRYUM androgynum is of rare occurrence in this neighbourhood. It is found growing in the moist earth which fills the crevices of gneiss rocks, generally along with *Bryum cæspitium*. Sir W. J. Hooker, in the second volume of his *British Flora*, p. 57, remarks that this species is very rarely found bearing capsules, and I have never found it in this state: the reason of this seems very obscure. The gemmæ, however, being very plentiful, are quite sufficient to keep up the existence of the species: they are extremely abundant in the months of February, March, and April. These bodies occur in clusters on the summit of a stem bearing much resemblance to the setæ in other mosses; it is, however, of a looser texture, excepting toward its summit, where it presents a swelling and a denser tissue. The swollen part at the summit is easily separable from the rest of the stem, as is represented in Fig. 1, where a part has been removed, the other half remaining with the *cords* which arise from it. The *cords* just mentioned, when viewed under a high magnifier, appear to be transparent tubes composed of a simple membrane; each *cord* supporting a gemma. The gemmæ at the circumference of the clusters are the first to arrive at maturity, those in the centre are developed last of all; and on the same head we find them in several different stages of their growth. At first they are simple transparent vesicles (Fig. 2,) of an oval form, and, by a high magnifier, no matter can be detected in their interior. As they advance in growth a small stalk becomes evident (by this they are attached to the *cords* formerly mentioned,) and a grumous matter is seen within, (Fig. 3.) When fully matured they present the appearance shown in Figs. 4 and 5, and the substance in their interior assumes a granular appearance; it now resembles the matter called green fecula by some authors. The gemmæ drop off as they arrive at maturity, those at the circumference of the head first, and so on toward the centre until at last the *cords* alone remain. It appeared to me to be an interesting matter to determine the process of germination in the gemmæ, but considerable difficulty arising from their very small size, for a single gemma is scarcely if at all visible to the naked eye, (the accompanying figures are consequently very highly magnified,) the following method was employed. A watch-glass was placed in a saucer with its concavity downwards; over it a piece of fine gauze was spread, the size of which exceeded that of the glass, consequently its edges were in

contact with the saucer, into which water was poured, but only in quantity sufficient to preserve the gauze in a moist state; several entire gemmiferous heads of *Bryum* were then placed upon the gauze over the centre of the watch-glass, and the whole apparatus was kept in a moderately warm place not exposed to very bright light, and covered with a bell-glass. After some days some of the gemmæ were detached and examined with a magnifier; it was found that the contents of many had undergone a remarkable change. The green granular matter had nearly disappeared, and the cavity of each seemed now to be divided by several dark green partitions, (Fig. 6,) and many of them presented a swelling near that part by which they were attached to the *cords*, (Figs. 7 and 8.) At the end of from fourteen to twenty days, it was observed that in many a small transparent nearly cylindrical tube had been protruded from the part which some days previously had presented a swelling; Figs. 9, 10, 11, represent this appearance. It was not confined entirely to those whose granular matter had disappeared, for many in which this was still visible had begun to germinate, and the tube in some cases contained a portion of it. This tube or filament was invariably protruded from the same part in every gemmâ, and never more than one made its appearance in each. The filaments seemed to be not merely a prolongation of the membrane of the gemma, but appeared to have proceeded from its interior, and to have burst the membrane. In only one instance did I remark that the protruded filament presented an articulated appearance, or rather its interior seemed to be divided by several septæ. After remaining more than a month upon the moist gauze, the gemmæ had made no further progress in germination. This might have been owing to the gauze not presenting a proper medium for their growth, or perhaps rather from exposure to too strong light; at the end of this time also, the green fecula had disappeared in all of them, and they resembled Fig. 6. While engaged in these observations, I remarked, that a leaf of *Bryum*, which had accidentally fallen on the gauze, and remained there for some time, had thrown out several slender transparent radicles near its place of attachment to the stem, and from the angle between the midrib and the limb of the leaf. May not this be another way in which *B. androgynum* is propagated? or even this may be true of every moss. Sir W. J. Hooker says, (British Fl. Vol. ii. p. 74,) that from the points of the leaves of *Hookeria lucens* roots are often emitted.

V.—*On a peculiar structure in Shells ; with some observations on the Shell of Sphærolites.* By JOHN EDWARD GRAY, F. R. S., &c. Plate VIII.

IN a paper published in the Philosophical Transactions for the year 1833, I have described three kinds of structure found in such shells as had then come under my observation ; but since that period Mr G. B. Sowerby has given me an oyster-shell, and Messrs Hudson and Bowerbank have lent me a fossil Sphærolites,* found in the chalk, each of which exhibits a form of structure which I had not before observed, and which may be designated by the name of cellular.

The shells of this structure appear to increase in size in the same manner as others,—the peculiarity consisting in a deposition of one or more series of reticulations, leaving more or less numerous hollow polygonal cells between each of the lamina of which the shell is formed. The two shells which exhibit this formation show it in a very different state and degree of developement. In the Sphærolites the entire parietes of the shell, (or at least the whole that is left in a fossil state, for some naturalists, as M. Deshayes and Desmoulin, believe that, from the form of the internal cast, the inner part of the shell is deficient,) are formed of series of continuous longitudinal and transverse ridges, leaving four-sided cavities, which are hollow in the specimens preserved in chalk, while in those that are found in limestone, they are filled up with infiltrated carbonate of lime. The concentric or transverse plates, which are best seen in a longitudinal section of the valves, and which represent the laminae of growth, though remarkably regular in appearance, vary in the distance they are apart from each other. They are usually much closer together at the lips of the valves, or, in other words, when the animal has nearly reached its full growth ; but sometimes we find them almost equally near in the middle of the cone, which may have been occasioned by some accidental check to the mollusc's regular increase about that period, and which removed or overcome again admitted the animal to progress at its ordinary rate.

* This appears to be the fossil which Mr Mantell has indicated, but not described, under the name of Hippurites Mortonii. I say *appears*, for on going to Brighton to examine his specimen, I could not obtain permission to have it taken from the case to compare it with that here described. It is certainly not a *Hippurites*, since it has neither the solid structure, nor the two internal longitudinal ribs of that genus. It is the shell figured as a fossil *Conia* by Mr Hudson in Loudon's Magazine of Natural History, Vol. ix. p. 103.

When one of these shells is cut across in the axis of the cone, it is then found that the transverse laminæ are continued, and the cells which appeared regular in the longitudinal section, are seen to be rather irregular in size and form, but mostly hexangular or pentangular. They are deposited on these transverse plates, the next transverse plate or lamina of growth being laid over them; and as the cells of the next and every succeeding series are exactly similar in form and numbers, there necessarily results that uniformity which we have mentioned in the appearance of the longitudinal fracture, since the parietes of the cells of the different transverse laminæ appear in that fracture to be as much continuous with one another as the transverse ones really are. An analogous peculiarity exists in some shells of other structures. Thus in the Pinna, and other shells of a prismatic crystalline structure, the transverse prisms of which the outer coat of the shell is formed, appear to be continuous, though they are each formed of the many transverse laminæ of growth which are in succession deposited as the animal enlarges its size: and it is the same with the rhombic crystalline structure.

The outer surface of this shell (*Sphærolites*) is lamellar and hard, being formed by the agglutinated outer edges of the transverse laminæ of growth; and the inner surface of the cone is covered with a thin hard plate, which is marked with minute close concentric lines more numerous than the transverse plates of the parietes of the shell; and the plate is raised at the mouth of the cone a little above the surface of the lip, from which it is separated by a slight groove.

The mouth of the lower cone has a smooth concave lip as wide, or rather wider than the thickness of the parietes of the shell, and is marked with some radiating branched impressions, exactly like the impressions which one may suppose to be made by a blood-vessel; the slenderer and branched part being directed towards the outer edge of the lips.

A similar structure is to be observed in other species of this genus fossilized in limestone, but from the size of the cells in these, as appears when specimens of the same magnitude are compared, it is obvious that the whole formation was on a much smaller scale; and the cells are always filled with infiltrated carbonate of lime, which makes them appear solid, unless the surface of the specimen is slightly disintegrated, or the fracture is wetted and examined with a lens.

I can scarcely attempt to explain how the parietes of these cells are formed, nor determine if any fluid has, in their living condition,

filled up the cavity between them, though it seems probable that they may have arisen from some peculiarity in the mantle of the animal, developed only when the new laminæ were about to be deposited, and not present or shrunk when the smooth upper surface of the lamina was formed, for it is evident, from the nature of the surface of some specimens, that the parietes of the cells are very gradually deposited on the smooth upper surfaces of the transverse plates of growth. The vein-like grooves above described do not seem to exert any influence over their form, for they are apparently not in any way connected with the distribution of their parietes, while yet they show that there must exist some peculiarity of the mantle to form such peculiar grooves.

These shells, and the Hippurites, have occupied considerable attention of late, on account of the difficulties which arise in determining their place in the animal kingdom; for although evidently bivalvular, yet they differ in several particulars from both the free bivalve shells of the Conchifera and the lamplike bivalves of the Brachiopodes, not having the ligaments nor the apical umbones of the former, nor the numerous muscular scars so characteristic of the Crania, which alone resemble them in form among the latter. Two French authors have attempted to explain this difficulty. M. De-france and others having observed that the cast on which the genus *Birostrites* has been formed is always found in the cavity of these shells, and that as there is a space between the cast and the parietes of the shell, M. Deshayes concludes that the *Sphærulites* are conchifera provided with a toothed hinge and ligament, and allied to the genus *Spondylus*, the inner coat of which is lost in the act of fossilization. M. Desmoulins on the other hand believes them to be the shelly cases of a new class of animals of which he ventures to give a theoretical description, allying them to the *Ascidia*, believing the space between the cast and the shell to be filled up with the cartilaginous mantle of the mollusc. Unfortunately none of the specimens, either from the chalk or the limestone strata, that have come under my notice, exhibit the internal cast as here described, but the specimens from the chalk certainly throw a doubt over both theories, for some have one or more oysters attached to the inner surface of their cavity, and others are pierced with minute branched worm marks exactly like the worm marks so common on the surface of existing shells. These facts prove that whatever may have been the structure of the substance which filled up the space said to have been lost in fossilization, (if any such substance ever was

present in the species under examination,) it must have been lost before the shell was submitted to the fossilizing process, since otherwise the holes could not have been drilled into, nor the oyster shells attached to, the surface.

A somewhat similar structure or appearance is to be observed in some Madreporæ, especially in the spaces between the sinuous compressed stars of *Meandrina*, but in these zoophytes the longitudinal places are continuous and first deposited, and the thin transverse laminae are interrupted and irregular, instead of forming the continuous plates which they do in the *Sphærulites*.

Some naturalists have compared the structure with that of *Conia* and the barnacles, but this must have originated in a very superficial view of the matter, for the valves of the barnacles are pierced with conical tubes gradually tapering from the base to the apex of the valve, and they are not cellular but tubular. The base of some barnacles is indeed cellular, and somewhat resembles the structure in question, but in them the longitudinal or rather radiating plates are continued, and the transverse ones, when present, unequal and disposed irregularly in different directions, showing even a more irregular cellular structure than in the *Meandrinae* before referred to.

II. The second form of this structure is found in a recent undetermined species of oyster which I do not know in a perfect state. This shell exhibits the usual lamellar structure of its genus, but the laminae of growth, which give the peculiar antiquated appearance to the common oyster, instead of being left free, are bent down so as to produce a nearly even outer surface. When these laminae are broken through, it is ascertained that the spaces under them are filled with a soft purplish spongy mass, composed of minute, rather irregular cells, placed perpendicularly between the plates. When these are near together, the cells extend from one plate to the other, but when they are wider apart, the cells are sometimes interrupted in the centre. They have somewhat the appearance of being casts of the interstices between the prisms of the prismatic structural shells, and are deposited in layers as the other parts of the shell are. I think they may be analogous to the opaque white chalky matter often found interposed between the laminae of the common oyster, but here, though the chalky matter is sometimes seen on the inside of the exterior imbricate foliations, as the cellular structure is found in the shell under more immediate consideration, yet it is to be observed more abundantly, and commonly forming a convex spot in the disk of the cavity of the oyster, just beyond the scar of the large

central adductor muscle ; and sometimes also forming a raised broad belt near the outer margin of the valve, just within the free lamellar edge. The chalky matter is deposited in these places in a succession of thin plates, perhaps at the periodical interruptions to the animal's growth ; and they are covered over with a hard and thicker calcareous plate, more dense and crystalline also in its composition.

Explanation of the Plate.

Fig. 1. The lip of the lower valve of *Sphærulites Mortonii*, showing the vein-like marks.—2. Part of a longitudinal section of *S. Mortonii*, showing the cancellated structure, nat. size.—3. A longitudinal section of *Ostrea purpurea*, showing the cells on the inner side of the outer plates.—4. A longitudinal section of *Ostrea edulis* showing the chalky matter ; *a*. on the inside ; *b*. on the inside of the outer plates.

VI.—*Localities of Scottish Coleoptera.* By the Rev. WILLIAM LITTLE.

A CONSIDERABLE number of the insects contained in the following list have not hitherto been recorded as Scottish. Others of them have been noticed as such in several entomological works, but without any precise locality, or authority being given. A few of the rarer species mentioned in *Entomologia Edinensis*, and Stephens's *Illustrations*, for which new localities have been discovered, are again inserted here. Several of the localities were furnished by entomological friends, whose names I have attached to their respective discoveries. It is proposed in some future numbers of this work to give short specific descriptions of all the Coleoptera not included in the *Entomologia Edinensis*.

Leiochiton arcticus. Moffat Hills, Dumfries-shire, where I have taken, at different times, upwards of a dozen of specimens.

Tarus basalis. This insect appears to be widely dispersed, as I have taken it on many of the hills in the west and south of Scotland, and have received specimens from Ben-na-muich-duih, Aberdeenshire.

Agonum emarginatum. Duddingston Loch.

———— *atratum.* Dalmeny Park.

———— *piceum.* Ditto.

———— *pelidnum.* Raehills, Dumfries-shire.

- Calathus crocopus*. Guillon Links. Andrew Murray, Esq.
Helobia nivalis. Ben Lawers ; near the summit.
Omaseus orinomum. Moffat Hills.
Steropus Aethiops. Raehills. In decayed birch-trees during winter.
Patrobis alpinus. Ben Lawers, near the summit. Rare.
Amara plebeia. Raehills.
Harpalus latus. Ditto.
 ----- *rubripes*. On the hills near Innerleithen.
Ophonus obscurus. Raehills.
Aepus fulvescens. " Berwick-upon-Tweed, in the crevices, and under slaty rocks between tide marks, never above tide mark, and the greater number of the specimens were procured near low water, but not covered above two hours each tide." Dr Johnston. I have lately found this insect in some abundance, in similar localities near Cramond.
Blemus paludosus. Raehills. Very scarce.
Ocys currens. Dalmeny Park.
Trechus parvulus. Raehills.
 ----- *ruficollis*. Moffat Hills.
 ----- *collaris*. Ditto.
Tachys binotatus. Raehills.
 ----- *obtusus*. Ditto.
Peryphus concinnus. Do.
 ----- *saxatilis*. Do.
 ----- *cnemerythrus*. Banks of the Annan.
 ----- *atrocæruleus*. Dalmeny Park.
Lopha minima. Raehills.
 ----- *assimilis*. Do.
Tachypus bipunctatus. Dalmeny Park. Very scarce.
 ----- *Andreae*. Coast of Argyleshire.
Bembidium paludosum. Borthwick Castle. Andrew Murray, Esq.
 ----- *pallipes*. Banks of the Nith, near Dumfries.
Hydroporus frater. Raehills.
 ----- *12-pustulatum*. Do. ; and Water of Leith.
 ----- *rufifrons*. Dalmeny.
 ----- *marginatus*. Raehills.
 ----- *fuscatus*. Do.
Colymbetes concinnus. Do.
 ----- *pulverosus*. Forfarshire.

- Colymbetes oblongus*. Raehills.
 ———— *affinis*. Do.
Gyrinus minutus. In a pool on Hawick Moor, in considerable abundance. Mr W. Lamb.
 ———— *villosus*. In the Jed, near Jedburgh.
Heteroceris marginatus. Dalmeny Park, in marshy ground near the shore.
Hydrochus crenatus. Braid Hill marshes. A single specimen, found along with *Hydrochus brevis*, the latter in abundance.
Ochthebius marinus. Dalmeny Park, in a marsh by the shore.
Enicocerus Gibsoni. Do. Do.
Limnebius affinis. Raehills.
 ———— *lutosus*. In the Annan, near Moffat.
Cercyon bimaculatum. Dalmeny, by the shore.
 ———— *terminatum*. Raehills.
 ———— *convexior*. Do.
 ———— *rustulatum*. Cramond.
Phalacrus aeneus. Raehills, in moss.
 ———— *ovatus*. Do.; and Cramond.
 ———— *pulchellus*. Do.
Leiodes aciculata. Raehills; Cramond.
 ———— *castanea*. Do.; and near Jedburgh.
 ———— *thoracica*. Do. The most abundant of the genus.
 ———— *badia*. Cramond.
 ———— *polita*. Raehills.
 ———— *testacea*. Do.
 ———— *ferruginea*. Do.; and at Cramond.
 ———— *litura*. Do. do.
 ———— *suturalis*. Cramond.
 ———— *nigricollis*. Do. I find the individuals of this genus chiefly in autumn.
Clambus enshamensis. Raehills.
Ptomaphagus velox. Do.
 ———— *fumatus*. Do.
Oiceoptoma sinuata. Corstorphine Hill, near Edinburgh.
Strongylus fervidus. Raehills. Rare.
Campta lutea. Do. abundant in putrid fungi.
Meligethes nigrinus. Do.
Trichopteryx minutissima. Do.
 ———— *nana*. Wall top, Barnton Park.
 ———— *perpusilla*. Raehills.

<i>Anisarthria melas.</i>	Raehills.
----- <i>nitida.</i>	Do.
----- <i>nitidula.</i>	Cramond.
<i>Atomaria thoracica.</i>	Raehills.
----- <i>carbonaria.</i>	Do.
----- <i>linearis.</i>	Do.
<i>Mycetæa fumata.</i>	Raehills. Rare.
<i>Tetratoma Ancora.</i>	Wall top, near Cramond. Rare.
<i>Ips 4-pustulata.</i>	Raehills ; found throughout the year under the bank of decayed fir trees.
— <i>ferruginea.</i>	Raehills ; found only during summer.
<i>Corticaria transversalis.</i>	Raehills.
<i>Paramecosoma bicolor.</i>	Cramond Park. Very rare.
<i>Latridius lardarius.</i>	Wall top, Barnton Park.
<i>Anthrenus musaeorum.</i>	Jedburgh.
<i>Byrrhus aeneus.</i>	Raehills. Rare.
<i>Hister 12-striatus.</i>	Raehills.
—— <i>nitidulus.</i>	Do.
—— <i>rotundatus.</i>	Do. About the stables, in June.
<i>Trox scabri.</i>	Jardine Hall. Sir William Jardine, Bart.
<i>Phyllopertha Frischii.</i>	Guillon Links.
<i>Elater brunneus.</i>	Raehills.
—— <i>serraticornis.</i>	Dalmeny.
—— <i>semiruber.</i>	Raehills, in decayed birch trees during winter. Very rare.
—— <i>balteatus.</i>	Raehills.
<i>Hypnoidus agricola.</i>	} Do. Banks of the Kinnel.
—— <i>dermestoides.</i>	
<i>Cyphon griseus.</i>	Do.
<i>Telephorus pulicarius.</i>	Raehills.
—— <i>ochropus.</i>	Do.
—— <i>lituratus.</i>	Do.
<i>Aplocnemus impressus.</i>	Do. Rare.
<i>Dasytes æratus.</i>	Do.
<i>Cis bidentatus.</i>	Do.
<i>Tomicus bidens.</i>	Do. ; also about Jedburgh.
<i>Hylesinus sericeus.</i>	Do.
<i>Baris atriplicis.</i>	Halleaths Loch, on rushes. Sir William Jardine, Bart.
<i>Ceutorhynchus melanocephalus.</i>	Raehills.
<i>Nedys floralis.</i>	Botanic Garden, Edinburgh.
—— <i>pallidactylus.</i>	Raehills.

- Nedys melanostigma*. Raehills.
 ——— *Quercicola*. Wall top, Ravelstone. Andrew Murray, Esq.
Rhinoncus pericarpus. Raehills.
 ——— *castor*. Do.
 ——— *crassus*. Do.
Orchestes scutellaris. Do.
 ——— *Ilicis*. Do.
Anthonomus pedicularius. Do.
Notaris bimaculatus. Banks of the Nith, near Dumfries.
Pissodes Fabricii. Banks of the North Esk, near Montrose. Mr G. Little.
Orthochaetes setiger. Ravelstone ; also in Roxburghshire.
Procas picipes. Near Moffat.
Hypera Polygoni. Cramond.
 ——— *sublineata*. Do.
Otiorhynchus maurus. Summit of Hartfell ; also in Halleaths Woods.
Trachyphlaeus scabriculus. Blackford Hill.
Strophosomus rufipes. Raehills.
 ——— *nigricans*. Cramond Park.
 ——— *retusus*. Raehills.
Rhynchites cylindricus. Do.
 ——— *cyaneopennis*. Do. Dalmeny Park.
 ——— *cupreus*. Do. On the Alder in September. Extremely rare.
Sphæriestes ater. Raehills. On fir-trees, but very rare.
 ——— *fovolatus*. Cramond. On the top of a wall under a row of beech and elm trees ; found only in October and the beginning of November.
Callidium striatum. Forfarshire. Mr G. Little.
 ——— *variabile*. Edinburgh, in a garden in the New Town.
Rhagium inquisitor } Raehills ; found in abundance during winter, in decayed fir, and birch trees.
 ——— *bifasciatum*. }
Leptura lævis. Lord Torphichen's woods, Mid-Calder.
Macrolea Zosteræ. Loch of Forfar. Dr Macnab.
Galeruca tenella. Raehills.
Mniophila muscorum. Do.
Phaedon aucta. Cramond.
 ——— *unicolor*. Raehills. Abundant on the birch.
Chrysomela Hyperici. Dalmeny.
 ——— *Banksii*. Ayrshire, Dr Macnab.
 ——— *haemoptera*. Hills, North Queensferry. Abundant

- Timarcha lævigata*. Galloway. Rev. Mr Lamb.
Melasoma aenea. Raehills, on the alder, in August and September.
Cryptocephalus 6-punctatus. Raehills, on the birch. Rare.
 ————— *Moraei*. Sutherlandshire. James Wilson, Esq.
Coccinella ocellata. Cramond, one specimen.
 ————— *hieroglyphica*. Do.
Tenebrio obscurus. Between Leith and Portobello. Dr Knapp.
Phylan gibbus. Southernness. Sir William Jardine, Bart.
Rhipiphorus paradoxus. Wall top, Barnton Park, in September.
Scydmænus elongatulus. Raehills. Rare.
Pselaphus Herbstii. Raehills, in April, under stones.
Bryaxis Juncorum. Do. in similar localities.
Arcopagus glabricollis. Do.
 ————— *puncticollis*. Do.
 ————— *bulbifer*. Do.
Bythinus Curtisii. Do.
 ————— *Burrellii*. In moss from Craiglockhart. Dr Greville.
Tachinus elongatus. Near Jedburgh.
Microsaurus lateralis. Dalmeny.
Dianous rugulosus. Raehills.
Syntomium nigroaeneum. Raehills; also near Jedburgh in considerable numbers.
Acidota crenata. Cramond.
Microlymma Johnstonæ. This insect, of which Dr Johnston was so kind as to send me specimens, I have since found at Dalmeny between loose layers of rock.



REVIEWS AND CRITICAL ANALYSIS.

Manuel de Malacologie et de Conchyliologie. Par H. M. DUCROTAY DE BLAINVILLE. Paris, 1825. 8vo. with an Atlas of 100 Plates.

Manuel de l'Histoire Naturelle des Mollusques et de leur Coquilles. Par M. SANDER RANG. Paris, 1829. 24mo.

The Genera of Recent and Fossil Shells ; for the use of Students in Conchology and Geology. By GEORGE BRETtingham SOWERBY. London, v. y. 8vo.

The Elements of modern Conchology ; with Definitions of all the Tribes, Families, and Genera, Recent and Fossil. For the use of Students and Travellers. By WILLIAM SWAINSON, Esq. Lond. 1835. Duod.

Elements of Conchology, according to the Linnæan System, illustrated by 28 plates drawn from Nature. By the Rev. E. I. BURROW, A. M. F. L. S. Lond. 1836. 2d edit. 8vo.

THE foundations of Conchology were laid by Aristotle on those broad and rational views which characterize all his works on the Natural History of Animals, and which are worthy of his own reputation as a philosopher, and of the inquisitive and intelligent society to whom they were delivered. The structure and habits of the creatures embraced in this section of natural science were the main objects of his study, while their relations to the other animated entities by which they are surrounded, and their own mutual affinities were not forgotten, although undoubtedly the classification of them appears to have been considered a matter of secondary importance, and, such as it is, was rather forced upon him than invented to give some degree of method and generalization to the expression of the results of his inquiries. To censure this Father for the incompleteness, or even his want of a conchological system, is inconsiderately done, for it must be obvious that no system can be otherwise than defective and artificial until discovery has, in a long and lingering progress, collected together a large magazine of ma-

terials, among which there shall at least be found a type of every modification of structure exhibited in the class. But in his age the number of Shells known was very confined, and to have advanced beyond the primary divisions of them into univalves, bivaives, and turbinated kinds, could be of no possible utility, and might have been hurtful to a further progress, for "the over early and peremptory reduction of knowledge into arts and methods" is an error from which, as Bacon has justly remarked, "time commonly receives small augmentation." * His views were higher, and his researches were pushed in the only direction in which they could be made available. He has left us a history of the Cephalopodes remarkable for its fulness and accuracy, and equally remarkable for its exemption from the marvels and puerilities which disfigure the same history as delivered by his successors; and although there may be less of observation and fact in his account of the shelled molluscans, yet we find the same ends kept ever in view, and the incessant effort to attain his object by attention to the habits of the animals, and an examination of their anatomy. The numerous defects, obscurities, and errors which a vain criticism might readily detect in his details under both of these heads, are justly attributable to the accident of position, for he was the first to track the road without the guide of a fixed nomenclature, and without the light which analogy could lend,—anatomy at this period being scarcely practised, and physiology almost unknown. By his own researches he was enabled to characterize several groups of Testacea with some degree of precision, and to acquaint himself with many valuable particulars of their structure and economy, and although some of his general corollaries from these are hasty, yet even in this minor department of study the Stagyrite claims our admiration for his industry and sagacity, and our gratitude for giving us an example of scientific inquiry which it were well to follow.

But the spring which welled so pure and copiously had no issue to its waters. Aristotle had no successor in testaceology among his countrymen; and when literature fled the shores of Attica, and found its unwilling way to Rome, it was unattended by the natural sciences. In the constitution of society among the Romans, it is not difficult to find causes for their total neglect of natural history; and these operated with peculiar force when Pliny began to collect together the materials of his great encyclopædia. Devoted in an especial manner to a public life, the Romans were negligent of a

* *Comp. Sprengel Hist. de la Médecine, Vol. i. p. 400.*

study, which, so far from enhancing their reputation with the people, required a comparative seclusion to be successfully pursued; while the disrelish for every science requiring a continuous and sober observation of facts and experiments was heightened, at the period we refer to, by a general luxury that had risen to an almost incredible pitch, and by the mental excitability produced by their foreign conquests and discoveries;—for the tales of their travellers, and the new and uncommon animals sent home from every quarter to supply the theatre and circus, had rendered the minds of the people—one and all—pliant to credulity, and apt to receive every monstrous tale, and equally indisposed to attend to the simple phenomena displayed in the ordinary economy of animal life. Pliny largely participated the taste and credulity of his age, and hence his work is the very antitype of the Greeks,—ample in its details of the use and value of pearls and Tyrian purple, of anecdotes of the follies of the rich in their dress, and in their dishes of snails and oysters, &c.; while he caters from every source wonderful stories of the feats of gigantic cuttles, and of the surprising intelligence and habits of these and other molluscans which God verily hath made, in harmony with their lower organization, feeble of instinct and power. To Conchology as a science he has added nothing which Aristotle did not supply; but he furnishes some anecdotes for a chapter on its economical applications, and has graced its history with some tramontane and amusing fictions.

Of the ancients, Aristotle and Pliny are the only names which merit quotation in a history of conchology, and many centuries elapse before we again meet with one whose writings give some indication of its progress. The turmoil of society which accompanied and followed the decline and fall of the Roman Empire,—the engrossing nature of the religion and superstitions of the dark ages,—the exclusive attention bestowed on the writings of the ancients at the revival of letters,—and the higher claims of higher studies when civility and wealth had begun to diffuse a taste for original compositions, and gave encouragement and leisure to men of science and letters,—were all oblitative of a pursuit which was solely ornamental, and had no attraction except to those chosen few who found in the contemplation of Nature's works their principal gratification. That this number was not inconsiderable is certain, for otherwise it seems impossible to account for the publication of the voluminous and expensively illustrated books on natural history, which issued from the press within, or shortly after, the first century after the discovery of printing. And indeed the monastic system, and its

institutions, must have been favourable to the growth of such feelings, giving the necessary leisure and seclusion, while nature, presenting daily her works and phenomena, and her seasonal changes to these recluses, dull but not dead to their influence, insensibly operated and gave direction to the employment of their minds. It may be that these earliest works were not devoted even in part to conchology, but Natural History as one never advances without advantage to every department, and even this minor branch had soon its due share of love and notice. The vast volumes of Albertus Magnus,* Rondeletius,† Gesner‡ and Aldrovandus§ contain each of them books devoted to it, and although the original facts they disclose are very few in proportion to the mass heaped up in their folios, yet the criticism they have often received as the receptacles of lumber rather than museums of well-arranged records, seems to be unnecessarily harsh and severe. The study of the ancients, and the elucidation of their difficulties, was still a favourite object with men of literature, and when these early naturalists betook themselves to the writings which had come down to them rather than to the observation of things themselves, they but followed the bent of their compeers, and consulted the taste of their age. Their works are laborious compilations, in which every thing, however remotely connected with the subject in hand, good or bad, true or false,—whether recorded by grave philosopher, or sung or feigned by poet or traveller,—finds a place without any nicety as to its probability, or conformity to the organization of the animals. On the contrary, there is evidently a strong predilection in their worthy authors to retail and believe every tale of instinct or use which might raise the object, however low and loathly, in our estimation,—a greater love of the marvels of Pliny than of the sobrieties of Aristotle. Still with all their faults, the reader will find them not void of novelty, either in philosophical remark or in the record of new creatures; and the plan adopted by them of giving figures of the species was a most important step towards facilitating the progress of the science. To look for any thing that deserves the name of System in their works appears next to absurd: they evidently had not yet felt its want, and had no distinct idea of the necessity or utility of any beyond what gave a convenient heading to their chapters. What little they do give us of arrangement may be said to be literally borrowed from Aristotle.

The writings of this period afford good evidence of a growing and

* 1495.

† 1554.

‡ 1558.

§ 1599.

considerably extended taste for the contemplation of Shells, which was kept alive and diffused by the activity of a daily enlarging commerce furnishing, to collectors and amateurs, numerous novelties of uncommon forms and beauty to gratify, and at the same time to stimulate their curiosity. Hence also the origin of museums, of which Aldrovandus is usually said to have set the example ; and of these Shells made a large and favourite part from their beauty and variety, and from the ease with which they were procured and preserved. These museums soon became rather numerous in Italy and Germany, and although they were undoubtedly formed more for the gratification of the taste of their owners, than with any views towards science, and hence arranged in fantastic and picturesque designs, still it is from their institution that we date the origin of Conchology as a separate branch of natural history. The catalogues published of a few of the most considerable of these museums are among the works generally enumerated as worthy of quotation in the history of Conchology, and it was the love of making collections of shells separately, that evidently gave origin to the works of Bonanni and Lister, the first which treated exclusively of these natural objects.

Bonanni's work was published in the year 1681, and from its title—"Recreatio Mentis et Oculi in observatione Animalium testaceorum"—was probably intended to be a book of luxury, exhibiting in its plates whatever amongst shells might please the eye or refocote the unoccupied mind. It is properly speaking, however, an introduction to Conchology, and in this view of it, the volume becomes interesting, since it affords the means by which the extent of the knowledge of Conchology at that period may be estimated. Of the writings of his immediate predecessors he speaks very slightly : they remind him, he says, by their boastings when these are compared with their deeds, of those birds which floating aloft in the heavens draw notice by the amplitude of their spread of wing and the fulness of their plumage, but captured and plucked, the exility of their corpse proves to the sportsman how much he had been deceived ! The treatise is divided into four parts : in the *first*, he proves, to his own satisfaction, that the study of shells is not a puerile but a wise and profitable occupation ; investigates the mode of generation both of living and fossilized species ; declares the fit materials from which they are formed, and takes occasion to talk learnedly of water, earths, nitre and petrifying humours ; he descants on their colours, forms, and properties by which the Creator renders them visible to the privileged minds of philosophers ; and lastly, enumerates their other uses to man, and what relates to them

as precious ornaments for museums, of the more remarkable of which we have a particular account in his 12th chapter. In the *second* part Bonanni describes each shell separately, noticing their parts, form, colours, names, and the seas which they inhabit.—In the *third* part he propounds about 40 problems or hard questions, annexing reasons or “an argument” to the dark and doubtful, by which a ray of truth may be thrown on them, and they may be made visible at least to the mental eye; he shews that pearls cannot be formed from dew, as Pliny would persuade us, that they are not the young but a disease of conchs; he explains why a shell applied to the ear seems, by its murmurings, to lament its native sea; inquires into the causes of shells being more abundant in the sea than on the land, and especially in the Indian Ocean, where they are also more beautifully pictured; why they are principally coloured on the exterior; wherefore they grow hard, seeing they are formed out of soft water; why they are twisted into many spires; why their snails have scarcely any diversity of members; why they are destitute of teeth, a heart, and bones; why nature denies them bile, and a liver and a spleen; why they grow lean on the wane of the moon; why they are slow and stoltish; why the juice of the *Pholas* is luminous at night; why among their various colours the cerulean is not to be found; and other such problems hitherto unargued or propounded,—not omitting to inquire learnedly whether the *Remora*, that stayed the ship sent from *Periander* on a cruel voyage to the Cape of *Gnidus*, was actually the shell called in consequence the *Venus-shell*, and “in regard whereof, the inhabitants of *Gnidus* doe honour and consecrate the said *Porcellane* within their temple of *Venus*.”—The *fourth* and last part is occupied with the plates and figures described in the second, distributed into three classes, viz. the univalves not turbate, the bivalves, and the turbate univalves.

This slight outline of Bonanni's book is all our space will permit us to give, and is perhaps sufficient to enable the reader to appreciate its value, and the character of the writer. He was a Jesuit, with attainments and natural talents which, though respectable, certainly do not raise him above the level of his age,—perhaps he was under it,—better acquainted with the writings of his predecessors than of his contemporaries,—with the tastes of a virtuoso rather than of the man of science, skilful in all the vain logomachies of the schoolmen, and willing to give a ready assent to every thing which had ancient authority in its favour, but jealous and distrustful of all that was novel, and of every discovery that would carry knowledge forward. Hence we find his anatomy of shell-fish in-

ferior to that of Aristotle's, and his arrangement of them the same ; hence his advocacy of the doctrine of spontaneous generation, when his contemporary Redi had demonstrated its absurdity ; hence his exclusive attention to the form and colour of shells to his total oversight of conchology as a branch of general physiology ; hence also his fondness in propounding, his copiousness in solving occult questions which, if resolved, were of no utility, but which were really beyond the province of human inquiry ; hence the discussion wherefore shellfish were defective in this and that organ, without the slightest effort to ascertain whether that deficiency was a fact ; and hence, in short, the reason that his volume contains not a single fact additional to the stock of knowledge in his own province, for we do not find that he has " treated of the formation of shells in a manner more philosophical than could have been expected at such a period," as Maton and Rackett have asserted. But we have no wish to depreciate Bonanni, who, as we have already mentioned, was a man of learning and repute, and it is not discreditable to an author that he is affirmed not to have anticipated his age : we have drawn his character as we think fairly, and it is a fair representation too, of the bulk of conchologists of his time, who obviously had little other object in the study than to indulge their love of virtuosity.

Philippo Bonanni and Dr Martin Lister were co-equals in the date of the publication of their works,* but in character they were men of remote eras. Lister was not less learned than the Jesuit, but of that he made no parade, and if he had drunk of the logic of the schoolmen, his tutored mind had seen its folly, for we never find him indulging in disquisitions about things inscrutable or useless. Full of the medical knowledge of the day, Lister betook himself, following the bent of his genius, to a patient anatomy of the animals which tenant and construct the shells that had won his admiration, and, allowing for the state of anatomy then, we do not hesitate to say that his *Exercitationes* deserve to rank beside those of Poli and Cuvier. They are replete with accurate descriptions, not unmixed it is true with error, and some things he had overlooked and mistaken, but to mark these as blots on his diligence or reputation were uncandid and unfair to him who leaves the olden ways and deviates into a new country, in which he has to open up the roads. In every page Lister proves himself a laborious and observant anatomist and naturalist ; while his disquisitions and digressions relative to the leaning of his discoveries on the physiolo-

* Lister's works were published between the years 1669 and 1697.

gical questions which divided the then medical world afford the fullest proof of his acuteness, judgment, and extensive learning.* His works deserve the attentive perusal of every student in conchology, who will not fail to reap advantage from the task, even though he should go to it acquainted with the subject from recent authorities.

Lister was a true naturalist, and the first conchologist of decided eminence. His anatomical works show how clearly he understood that the structure of the animals was the main object of our study,—its only sure foundation, and its best claim on our attention,—but he was also very observant of the habits, instincts, and peculiarities of snail and shell, and was at the same time zealous to acquire an extensive and accurate knowledge of species, to which end he sacrificed much. At his own cost, and with the labour of years, he completed and published a volume of plates, which is the pride of collectors, and is prized to this day for its utility. “His figures,” Dr Maton and the Rev. Mr Rackett tell us, “both in point of number and faithfulness, are with reason still held in such high estimation, that no person attached to this branch of natural history can advance in it without the constant use of them, nor without finding them preferable for reference to many more splendid engravings which have succeeded them.”†—“This admirable volume,” says Dr Turton, “contains one thousand and fifty-five plates, besides twenty-one of anatomical figures, all drawn from original specimens by his two daughters, Susanna and Anna. Considering the state of natural science at the time this work was first issued, one hundred and thirty-three years since, it is impossible to contemplate this stupendous effort of genius and industry, without admiration at the grandeur of the design, and the correctness of its execution.”‡

It was Lister's intention, after the publication of this volume of plates, to have proceeded with an anatomical description of every family or genus in its proper order, if God should grant him life and leisure, but from adverse health he was not permitted to do more than to anatomize the terrestrial slugs and snails, some fresh-water Turbines, one or two of the marine *Buccina*, and a part of the *Bivalves*. The design was worthy of the man, and is a fine example of unwearied assiduity, which nought but a genuine enthusiasm

* His opinions relative to the functions of the liver in *Mollusca* appear deserving of more attention than they have yet received. See the *Exer. Anat. de Cochleis*, p. 79, &c.

† *Lin. Trans.* vii. p. 138.

‡ *Conchological Dictionary*, *Introd.* p. xvi.

could have kept alive. If perchance, says he, a stranger should be told that this man had devoted his years to the dissection of animalcules and snails, it might provoke his contempt or laughter, unless, indeed, the dissector was another Harvey, Malpighi, or a Redi; but I do not vehemently yearn for the applause of any one, having had my reward, for these exercises which were my pleasure and delight in youth, now that I am old they are my solace. And now when I am, from a failure of sight, compelled to use the microscope, and find that by its aid I can again enjoy myself in those studies, which have been long denied to the unassisted eye, I rejoice greatly.* We do love to dwell on the character of this man. Learned in his profession, and attaining its highest honours,—for he was physician to Queen Anne,—we now see him refocating his jaded spirits in the contemplation of his collections of shells, and enjoying, with a rapture which minds framed like his only feel, all their beauties and symmetries and singularities;—again we see him examining with a fatherly pride and pleasure the drawings which his daughters, who stand beside him, had laboured to finish before the duties of the day permitted their beloved parent to retire to his ease and study,—and at a more leisured season we see him, bent somewhat with age and infirmities,† anatomizing with the zeal and skill of his youth the creatures which he loved so well to study, now his keen eye kindling as the thought crosses him, that in this structure there was a ray which shed light on some obscurity in his own frame, —now lost in wonder at some display of a mechanism which can have but one author, while involuntarily he breathes the hymn,—“ Oh altitudo! In his tam parvis, atque tam nullis, quæ ratio? quanta vis! quam inextricabilis perfectio!”

Lister then greatly advanced conchology by rescuing it from the charge of frivolity, by an unrivalled series of illustrations of species, by many novel remarks on their habits, by a very complete history of the species of his native land, and chiefly by giving us some excellent essays on the structure and physiology of the Mollusca which had been neglected since the time of Aristotle, for the isolated notices of a few species by Willis, Redi, Harderus, and Swammerdam, however good, had no influence on conchology, while those of Lister are epochal. He was fully aware too of the importance of system in this study, but he had not critically examined its real objects and use, and his classification, though elaborate, claims no praise of superiority. The *habitat* affords the character for his pri-

* Exercit. Anat. des Cochleis, p. 2.

† See the Preface to the App. Hist. Anim. Ang.

mary divisions or books,—hence shells are divided into the land, fresh-water, marine bivalve, and marine univalve classes; and the mode in which these are subdivided more resembles the synoptical tables which the French botanists now frequently prefix to their floras, constructed without any regard to the affinities of the objects they approximate, and solely intended to hunt down a species, than what is usually understood by a system in natural history.

So far as we remember (for his works are not all of them by us, and years have elapsed since their perusal,) the manner in which the shell is formed, and its relation to the snail, occupied no part of Lister's investigations, but previous to his decease the true solution of the problem was discovered by the illustrious Reaumur.* No experimental inquiry had hitherto been made on the subject, and the remarks in reference to it in conchological writers were scattered, vague, and hypothetical; while the opinion of better informed physiologists appears to have been that the shells were organized parts of the animal, which grew and increased with the latter by receiving nutriment and material from the body; that there was in fact nothing peculiar in the formation of shell, but that its growth depended, like the growth of other parts, on the circulation of juices within itself, and on the assimilation and addition of new matter. Reaumur was never content with reasoning on a point which experiment alone could solve, and with his usual ability and success he instituted numerous experiments on the subject under review. They were principally made on land snails (*Helix*,) but not restricted to them, for by confining fluviatile and marine species, both univalve and bivalve, in baskets framed so as to admit the water, and at the same time prevent the escape of the creatures, he was enabled to show that his theory was applicable to the whole class. He proved in this manner that the shell was enlarged by the deposition of calcareous matter to the edges of the aperture, and that this deposition was made in successive layers; that there was no increase from the intusception of calcareous matter, no additional increase from any action in the shell itself, but that the whole was a successive transudation from certain parts of the living tenant, to which the shell was an inorganic covering. It was objected to him that snails just issued from the egg had as many whorls as the parent, but the falsity of this observation was to Reaumur of easy proof, who found that these young had only one,

* “De la Formation et de l'accroissement des Coquilles des Animans tant terrestres qu' aquatiques, soit de mer soit de riviere,” in *Mem. de l'Acad. Roy. des Sc.* 1709.

or not more than a whorl and a-half ; and his theory, divested of the mechanical phraseology in which some of its details are explained, remains essentially correct. Besides the establishing of this discovery so important in scientific conchology, Reaumur enriched it with much curious and interesting matter. His inquiry into the mechanism by which the limpets fix themselves so firmly, and the byssiferous bivalves spin their silken cables ; his accurate description of the structure of the shell of the Pinna ; and his experimental essay on the purple dye of the Buccinum, suggested to him by the excellent paper on the same subject by Mr Cole of Bristol, are favourable specimens of his talent for observation, and real additions to the stock of our knowledge, while they captivate us by the elegant and copious style in which they are written, and by the clearness of their details.

These labours and discoveries, and the high character of their authors, render the conclusion of the 16th, and the beginning of the 17th century, unquestionably the most interesting period in the history of conchology. Ray, who discovered the peculiar hermaphroditism of the snail, was the intimate friend of Lister,—Petiver and Sloane, celebrated for their museums, had entered the field ere he retired,—Balfour and Sibbald in Scotland were his contemporaries, and the latter his correspondent,—Poupart and Mery, two French anatomists of deserved celebrity, carried their researches in the same direction,—and Swammerdam, Leewenhoeck, and Rumphius* in Holland,—all these men were each in their way advancing conchology with a rapidity hitherto unexampled and not yet surpassed. We are apt, dazzled by this galaxy, to fix our attention too exclusively on the anatomical and physiological branches of the science, but let us not forget to note the benefit it received by the zeal of collectors, who were now importing species in great numbers from every quarter of the globe, and congregating them in museums which became celebrated throughout Europe for their richness. In England those of Petiver and Sloane surpassed all others ; the collection of Sir Andrew Balfour of the University of Edinburgh was considerable ;† but it was in Holland that the passion of forming

* Or rather Scheinvoet, a Dutch physician, who was the real author of Rumphius' Thesaurus. See D'Argenville's Conchyliog. p. 27.

† Sibbald's *Auctarium Musæi Balfouriani* " does not treat of *Testacea* exclusively, but comprehends a variety of subjects, which were contained in the collection of Sir Andrew Balfour, Knight, M. D.—a collection presented to the University of Edinburgh, and considerably augmented by the intimate friend of the donor, who described the whole in the work above-mentioned. Unfortu-

cabinets of shells became most prevalent. " Rich individuals studied to outvie one another in that country, as much in the expensiveness and extent of their collections, as in the splendour of their equipages and retinue ; and the sums which were given for a *Cedonulli* or a *Wentletrap*, would appear too enormous to deserve belief, if such accounts were not authenticated by the most respectable writers of that day. Rumphius himself informs us in his preface to the ' Amboinshe Rariteitkamer,' that a shell described in this work cost no less than 500 Dutch florins."* In all this, of course, there was much less the love of science than the mere indulgence of a peculiar taste or rivalry that wealth or a natural disposition had engendered ; and it is not easy to determine whether the good which it cannot be denied conchology derived from this zeal of collectors, was not overbalanced by the character of virtuosity it was calculated to fix on all its cultivators, and the new direction which it unquestionably gave to their studies. † It was to this zeal that we owe several expensive books of plates which were now prepared for the press, and published under the auspices usually of some

nately for the reputation of this University among naturalists, a very small part of the collection is now remaining. ' Such,' says Mr Pennant, ' has been the negligence of past times, that scarce a specimen of the noble collection deposited in it by Sir Andrew Balfour is to be met with, any more than the great additions made to it by Sir Robert Sibbald.'—(Scotch Tour, 1766, p. 246.) Such is too often the fate of public collections ; and so slight or so transient is any respect for the laudable intentions of generous individuals towards public bodies, that common care is rarely taken to preserve from destruction what escapes the hand of speculation and robbery."—Lin. Trans. vii. p. 144.

* Lin. Trans. vii. p. 150.—" In 1753, at the sale of Commodore Lisle's shells at Langford's, four Wentletraps were sold for L. 75, 12s." Da Costa's Elem. of Conchology, p. 204.—" A specimen of *Conus cedonulli* has been valued at 300 guineas." Dillwyn's Catalogue, p. 376.—" *Ammiratum* varietates nitidas, *Turbinis scalaris* et *Ostreæ Mallei* æmulas nobilitavit docta ignorantia, pretiavit quam patiuntur opes stultitia, emittavit barbara luxuria."—Lin. Syst. 1167.

† They did not of course escape the observation and the lash of the satirist.

" But what in oddness can be more sublime
Than *Sloane*, the foremost toyman of his time ?
His nice ambition lies in curious fancies,
His daughter's portion a rich *Shell* inhances,
And Ashmole's baby-house is, in his view,
Britannia's golden mine, a rich Peru !" — YOUNG.

It is almost needless to remind the reader of the amusing papers in ridicule of the collectors in the ' Spectator' and ' Rambler,' but the irony of the latter in his No. 82, is more than compensated by his defence of these ' much injured' men in his Nos. 84 and 85.

wealthy amateur, and which, though too often occupying a prominent place in the history of conchology, have little merit excepting what they derive from the draughtsman and engraver. Hence also the repeated attempts on the part of the more studious to arrange the objects in quest after some novel or more convenient system, for without a regular specification of their contents it was evident no correct idea could be imparted of the extent and worth of the collection.

In indicating the progress of 'Method,' however, it is necessary to go back a little. We have seen that Aristotle had three orders of Testacea,—Univalves, Bivalves and the Turbinated,—but the class itself and these divisions were loosely defined; and the same vagueness is to be found in the writings of those authors who followed his method. Perhaps Dr Walter Charleton, Physician in Ordinary to Charles II. was the first who had a full conviction of the importance of system, but his attempt to arrange the Mollusca is very faulty.* The Limaces he places with apodous insects; and aquatic animals being divided as usual into the sanguineous and exsanguineous, the remaining molluscans are arranged under two classes—viz. the *mollia* or *molluscula* and the *testacea*. The first embraces all the cuttles and the *Lepus marinus* or *Aplysia*; the second the shelled tribes whose primary sections are the same as those of Aristotle's, while his genera, in general without definitions, rest on characters of little or no value. Jean-Daniel Major, Professor of Practical Medicine in the University of Keil, in the dutchy of Holstein, was the next to make the attempt, (1675,) which is pronounced by two critics, to whose opinion much deference has been shown, to be "infinitely too complicated and ramifying to admit of any useful application." Sibbald, Grew, Bonanni, Lister, Langius, Hebenstreit, Tournefort, D'Argenville, and Klein are perhaps the principal who followed in their wake, but it is evident that they had all entered on their task without a previous study of what the real object and use of method was, what principles were to guide them in framing the various sections, or what the relative bearing of these divisions on one another should be. The division of shells primarily into Multivalve, Bivalve, and Univalve had perhaps superseded the Aristotelian, and many new divisions of secondary rate were of course invented, but they were arbitrary, founded on no common principle, either too lax or too complex to be applicable in practice, cumbersome to the memory, and clumsy in writing. To analyse

* Onomastikon Zoikon. Lond. 1671. 4to.

these methods would be wearisome and unprofitable,—they were next to useless when promulgated, and have now no attraction even in the eyes of the pure conchologist. It is when we rise from their examination that we are in the best mood to appreciate the merits of Linnæus, and feel inclined to nod in complacent assentation to all the pæans which have been so often sung to his praise.

Linnæus having, with a tact characteristic of his genius for system, divided invertebrated animals into two great classes—*Insecta* and *Vermes*,—was less happy in his reduction of the latter into their secondary groups or orders. The testaceous mollusca occupy one order by themselves, in which there are four sections of equal value—the multivalve, bivalve (*Conchæ*), the univalves with a regular spire (*Cochleæ*), and the univalves without a regular spire.* In each section there are several genera defined with neat precision,—the characters of the multivalves being derived from the position of the valves,—of the bivalves from the number and structure of the hinge-teeth, or, in the absence of these, from a part influencing the opening of the valves,—of the *Cochleæ* from the unilocular or multilocular shell, but in most from the formation of the aperture; while in the last division the shape of the shell affords the means of discriminating them, excepting in *Teredo*, which is defined “*T. intrusa ligno*,” in evident contrariety to his principles and his better custom. The naked tribes are placed in the order denominated “*Mollusca*,” where they stand, in “*admired disorder*,” with radiated zoophytes, annelidans, parasitical worms, and the *Echinodermata*, which latter, however, are better in this strange miscellany, than they were when they stood either amongst simple or multivalved shells.

In estimating the merits of this system it is not fair to look back from our present vantage ground, and magnify its defects by a comparison with modern classifications: we are in candour to place ourselves behind its author, and looking forward, say how far his efforts have been useful or quickening.† Standing thus we trust to offend none of his admirers when we admit that there is nothing in its principle of a novel character: the soft mollusca were previously recognized and better assorted by Charleton; and every one of the sections, and, if

* The expounders of Linnæus' system do not adopt this last division,—why it is difficult to say. By disregarding it they have injured the naturalness of the method.

† The first edition of the ‘*Systema Naturæ*’ was published in 1735, but 1758 is properly the year which gave birth to his conchological system, when the 10th edition was published. It was perfected in 1766.

we mistake not, of the genera also, of the shelled tribes had been already recognized. It labours under the censure of having too small regard to the animal, a censure in some degree just, for assuredly more was known of these than the definitions of the "Systema" would lead us to suppose; and it had still less regard to the position of the groups in reference to their organical affinities. It often associates species of dissimilar habits; and species are found in almost every genus at variance with the character of this, and where consequently the student ought not to have sought for them. The superiority of it lies in its simplicity; in the regulated subordination of all its parts; in the admirable sagacity with which the families or genera are limited; in the assumption of more stable characters for these, and for the clear distinct manner in which they are applied; in the suitableness of its nomenclature; in the invention of trivial names which gave a facility in writing hitherto unknown, and was a welcome relief to the memory; in the conciseness of the specific characters and the skill with which those characters were chosen; in the regular indication of the stations which the species occupy on the globe; and in the beauty of the more extended descriptions, and the peculiar felicity of language in which the thoughts suggested by any remarkable structure in the species under review are conveyed to us. That merits of this kind should secure him something more than approbation was natural: there was much excellencé in it which prejudice or jealousy only could not see, and which folly alone would have rejected; and while every collector and amateur found it easy to be understood, ready in practice, and neat in nomenclaturing their cabinets, their pursuit assumed the garb of science when they could tell the scorner that they were following the steps, and had the sanction, of a man whose genius has justly won him a place in the first rank of those whom succeeding ages continue to venerate for the good they have done in the promotion of useful knowledge.

While the eyes of almost all were turned to this northern luminary for light to guide them in their pursuit, or as an object by barking at which a few drew notice on their littleness, Jussieu of Paris, the admirer of Linnæus' genius and industry, and his correspondent, was explaining to his select but few disciples the principles of what has been commonly called the "Natural System." Jussieu's profound studies were confined to botany, but he had colleagues and contemporaries who attempted their application to conchology, and whose want of success is to be ascribed mainly to the meagerness of the anatomy of the mollusca then attained, to the few-

ness of the observations made on the living species, and in part also to the imperfection of the views of the authors. Daubenton, the colleague of Buffon, so early as 1743, insisted on a knowledge of the animal as necessary to form a natural classification of shells; and in 1756, Guettard, who was the personal friend of Jussieu, not only gave his sanction to this opinion, but shewed its practicability and excellence by defining, from the peculiarities of the animal and shell combined, a considerable number of the univalves, comprehending among these, in evident agreement with their relations, though contrary to general use, the slugs, the *Aplysia*, and the *Bullæa*. But the fullest attempt of this kind was made by Adanson, whose work on Senegal was published some years before Linnæus had given the last revision to his system. Impelled by an indomitable enthusiasm, Adanson visited Senegal, under many disadvantages, to examine and describe the natural productions of a tropical climate; and for this purpose he made very extensive collections in every department of nature, but of his great work the first volume only, containing the outline of his travels and his account of the shells, was ever given to the public. The character of this volume has risen with the progress of the science, and it is more valued by the conchologists of the present day than it was by the contemporaries of its author. He had some personal peculiarities—too visible in his writings—which could not fail to hurt his popularity: an austere temperament, which caused him to treat his fellow-labourers with contemptuous acerbity,—a mind that would neither bend to nor treat with respect the prejudices as he deemed them of his age,—an unflinching severity in criticising the writings of others, and a pertinacious tenacity of his own views,—while some barbarisms he attempted to introduce into the nomenclature of conchology repelled the naturalists of a too nice taste, and the very extent of his requirements from those who claimed to be naturalists operated against him, for it was not to be supposed that mere collectors or virtuosos were to enter on so difficult a path, or would be willing to allow themselves to be pushed aside as idlers, and put without the pale of the scientific circle. That very beauty, he exclaims, which by its variety has attracted the regards of men to shells has become an obstacle to their knowledge. “*La coquille seule dépositaire de cette riche parure, a fait mépriser l’animal auquel elle servoit de couverture, et est devenue seule l’objet de l’admiration de quelques naturalistes. Epris, comme les curieux, de la beauté frappante de ses couleurs, ils n’ont pas jugé que l’habitant fût digne de leurs recherches, et le difficulté de se le procurer à chaque instant, n’a pas*

peu contribué à augmenter leur dédain. Ils se sont donc bornés à l'examen des coquilles, ils n'en ont considéré que le forme, celle de son ouverture, on le nombre de ses pieces ; c'est d'elle seule qu'ils ont voulu tirer leurs caracteres primitifs et distinctifs : de-là cette foule de systèmes aussi peu satisfaisans les uns que les autres."*

At a season when 'Systems' were all in vogue Adanson, with characteristic boldness, declared himself their enemy as being worse than useless, fit only to amuse triflers, certain to lead to error and alienate us from true views of the objects in question, and so easy of invention to boot that several equally good might be made by one of common experience and capacity. The history of conchology had already offered too many examples of the truth of this assertion, and he was not slack to give additional specimens in its illustration. But notwithstanding his philippick against them, Adanson, in some measure, forgot his own principles, and was little less of a systematist than those were whom he censured. Shell-fish were, according to him, distinguishable in the first place into "Limaçons" and "Conques;" the former were subdivided into univalves and operculated univalves, and the Conques into bivalves and multivalves; these primary families were still further divided into smaller groups from the position of the eyes in the Limaçons, and from the figure of the respiratory tubes in the Conques. Now it was a pure arbitrariness in him to fix upon the operculum as a part or organ of primary value, for there is nothing in its use or position to justify the choice, nor did he attempt, by any analysis, to show that it was a regulator of structure and habits; and it was equally arbitrary to divide the bivalves into two sections on the mere existence of a few additional pieces over the hinge, for these pieces were not proved to be an index to the animal's economy. But Adanson's services to conchology are very great,—of those its labourers who have passed in review we place him next to Lister. He has the merit of having altogether removed from the Testacea the Lepas and Balani, whose structure he saw was modelled after the type of another category; his interesting discovery of the Vermetus was a fine illustration of the shell being of itself useless as a character in natural history; and his knowledge of affinities was made evident by the acuteness which lead him to approximate the Teredo to the Pholas. If not the first to point out the importance of the operculum, he was undoubtedly the first who knew its value as an index to natural relationship between genera; perhaps the first who was fully aware that the entireness or canali-

* Hist. des Coquillages, pref. v.

culate formation of the aperture of the shell gave an insight into the habits of the snail in regard to food ; the first too to point out fully the influence of age and sex in altering the shape of the shell, and more especially of its aperture ; the first to describe and delineate the animal tenant of many genera ; and although his attention was exclusively directed to external characters, yet we are above all indebted to him for his strong advocacy of the maxim that the anatomy of the animal was the sole sure foundation of a rational arrangement which had in view the mutual affinities of the objects it attempted to classify, and present them not fancifully commixed as they might be placed in a museum, but according to those characters which nature itself had given them of affinity or dissemblance. " There is then," he says, " in shell-fish something more to consider than their shells ; the snail which tenants them ought to guide our methodical arrangements, to be our only regulator, since it is the principal part, that which gives to the exterior skeleton its form, size, hardness, colours, and all the other peculiarities in it which we admire. If we attentively examine this new and forgotten race, if we consider individually the members of it, we shall discover in their manners, in their actions, in their movements and manner of life, an infinitude of curious circumstances, of facts interesting and fitted to arrest the attention of every zealous and intelligent observer ; we shall perceive in the organism of their bodies a great number of parts remarkable in their structure and use ; and in entering into details we shall soon be compelled to grant that this study is no childish play, but as thorny and full of difficulties as any other in the wide range of natural history."*

The example of Adanson was followed by Geoffroy who, in a history of the shells found in the vicinity of Paris, attempted to arrange them on the external anatomy of their animals ; and by Muller, who described in the same manner the mollusca of the north of Europe. The writings of Muller are still deservedly held in high estimation. They contain the descriptions of many novelties, and his descriptions of them, as well as of species previously known, are remarkable for their accuracy ; they are thickly strewed with notices of the external anatomy and habits of those he had examined alive ; and his style of writing is interesting, rising occasionally to eloquence. As an observer and teller of what he had observed, he claims a place among the first, but he was the discoverer of no fact in their structure or physiology of any consequence—we speak in reference to the mollusca only ; and his systematic efforts were limited and partial, al-

* *Lib. sup. cit. pref. x.*

though he sometimes drops a hint on the subject, which makes us almost believe that he was capable of better things, had he had courage to have made the attempt.* In relation to the mollusca he clearly saw the impropriety of making the presence or absence of the shell an ordinal character; and he knew, vaguely it may be, the affinity between the bivalvular mollusca and the Tunicata. "For what"—we translate his words—"are the Testacea but mollusca furnished with a shell, and what are mollusca but Testacea destitute of it? There is the most exact agreement of the tenants of the univalve shells which are called Helices with the naked slugs; and an agreement not to be overlooked of bivalves with the Ascidia; and the very error of our predecessors, who said that slugs were merely snails which had crept out of their shells, proves their near affinity. Besides the insensible but evident transition of nature from the naked Limax to the testaceous—passing from the former, which at most has the mere rudiment of an internal shell to the latter by means of the Buccinum (*Lymanæa*) glutinosum, which conceals its membranous shell under a fleshy mantle, supports plainly our opinion. Therefore I do not doubt that a future age will join together the naked slugs and the shelled snails, which authors have separated into different orders." "If we wish," he writes in another place, "properly to know and discriminate natural objects, they must be considered in every point of view and in all states, so far as human imbecility will permit. The attainment of knowledge is thus indeed rendered more difficult, but at the same time more pleasant and accurate; genera indeed are multiplied, but by this way only, if by any, can species ever be determined. This is the alpha and omega of our labours, since systems and methods and genera are arbitrary and framed by the narrow limits of our knowledge. Nature acknowledges one division of created bodies only—the living and brute matter—spurning for the most part the arrangements of systematists into classes and orders, families and genera, and her productions are often so affined that their limits can never be strictly fixed. Characters derived from the interior and exterior structure of bodies deceive us not solely in the higher divisions; and even the manner of life and the mode of propagation do not afford any certain distinctions either in those races which are visible or in those which are invisible to the naked eye. There is therefore only one family, and one Father of all, who has marked with a constant character all species whatever from the Monad to the turret-

* His 'Method,' as detailed by himself, is as artificial as the Linnæan, and actually less in harmony with the animal organization.

bearing Elephant, and has distinguished Man alone with a reasonable soul." *

The celebrated Pallas was another who at this period had obtained a glimpse of the true relations of the mollusca as a class even clearer than Müller, † but he did not pursue the subject, and as his slight incidental notice, though it might have originated inquiry in a predisposed mind, was not otherwise of a nature to produce any effect, so the pains of Geoffroy and Müller were equally unproductive. The authority of Linnæus prevailed every where. The force of his genius having swept away all previous systems, there was no other safety for a naturalist, than to take refuge in the Linnæan ark, which floated on the surface proud amid the ruins,—the systems of his contemporaries also sinking one after another in the waters of forgetfulness. His disciples were distinguished by their enthusiasm in the pursuit of nature, and their love of their master; and the facility with which they found their discoveries were registered, and the easy nature of the discoveries which sufficed to give them a certain reputation, requiring nought but zeal, opportunity, and a knowledge of the ‘Systema’ not difficult to be acquired, rivetted their attachments. In England nothing was tolerated that was not according to the letter of Linnæus: his works were a code of laws which, like an act of Parliament, was to be interpreted verbally, and the spirit of them was unseen or overlooked. Under his reforming hand, Conchology having passed “from confusion and incongruity to lucid order and simplicity,” the slightest attempt to alter this order was treated as an attempt to replunge us into the chaos, whence he had brought us, and further improvement or alteration was declared to be futile, since the “beauties” of the Linnæan “must perpetuate its pre-eminence.” Were it shewn that, from the very subsidiary station the animal was made to occupy in this system, there was a fear attention should be drawn from the object most worthy of it, we were seriously told that the animal, even could it be procured, which was doubtful, would never present those “permanent and obvious points of distinction” indispensable in the application of a system meant to be practical. Wherein does the animal differ, it was asked in a tone of triumph, signifying that reply was impossible,—“wherein does the animal differ from an unshapen mass of lifeless matter when coiled up within its shelly habitation? And how are its natural shape and appendages to be examined, but by the knife of an anatomist?” ‡ Were it proved, what indeed was most palpable, that species of opposite

* See the Præfatio to his *Verm. Ter. et Fluv.* Vol. i. 1773.

† *Misc. Zool.* p. 72, 73. *Lug. Batav.* 1778.

‡ *Lin. Trans.* vii. p. 177.

habits and habitations were huddled together under a common head, it was answered that to derive characters from such particulars was contrary to axiom and unphilosophical; and if it were demonstrative that the class of Testacea, as a whole, was constituted of heterogeneous disparates,—as for example when Pallas indicated the difference between this class and the Serpulæ,—what then? Nature gloried in variety and oppositions, and was herself systemless,* as if it were possible to believe that He who made every thing in wisdom and order had shook His creatures from His hand, with the same wanton unordered profusion that the poet has represented the jocund May, flinging the flowerets from her teeming lap. Such were the futile reasons by which this System was upheld, and so firm was its despotism that, until within these twenty years, there was little or no relaxation on its hold of public opinion; and its evil effects are too evident in the superficialness of the productions which emanated from this school.

Even in France the Linnæan system soon became little less predominant under the leading of Bruguiere, but the regard the French paid to it was of a less slavish character than it had assumed in Britain. Bruguiere, though a Linnæan in principle, carried forward in some degree the system of his master by intercalating several new and obviously necessary genera; and he was otherwise a conchologist of higher attainments than any England could at that period boast of. He cannot be said to have promoted conchology in any very sensible degree, but he made no effort to arrest it, or detain the science at the stage where Linnæus had left it. Nor indeed is it perhaps possible to stop the march of any, however trivial the branch of science, to perfection. Like the operations of Nature in her living productions ever tending to maturity, there are periods of acceleration and delay, and causes may for a season induce a sickly weakness that waits long for a remedy, but come at last this will. Conchology was now in her sickly time,—nevertheless in a state of constant advancement. Ellis, Baster, Bohadtch, Pallas, Muller, Forskal, Solander, and Otho Fabricius, all of whom might have seen Linnæus in the flesh, and were his immediate successors, drew attention to the naked molluscans in particu-

* “ Nature does not seem to have observed *any system*, and an artificial one will ever be attended with anomalies. Whatever method therefore most readily leads to the subject under investigation, is certainly the best, and in this case it is of small importance where that subject is placed, or how far it is removed from others to which it seems to bear a general resemblance.”—Maton in Pulteney’s *Life of Linnæus*, p. 238.—Sir J. E. Smith also allows himself to talk of the “irregularities of Nature,” as an apology for some inconsistencies in the zoological works of Linnæus.—*Tracts*, p. 136.

lar whose curious variety was enticing and provocative to further quest ; Herissant, Scopoli, Bruguiere, and Olivi, described many species with their animals, and entered too into physiological questions which it was worthy reasonable men to solve ; Knorr, Davila, Martini and Chemnitz, Schröter, Born, Pennant, Da Costa, and Martyn, set forth at intervals volumes of figures more numerous in species and more correct than had been hitherto attempted ; and the minute or microscopic species, which notwithstanding their littleness have played a most important part in the revolutions of our globe, were well illustrated in the works of Soldani, Plancus, Boys and Walker, and of Fichtel and Moll. Yet this array of names only proves a wider spread of the study,—the students may have been, and we think were, mediocrists,—many of them were simply ichniographers and collectors.* We can remember no discovery by which to distinguish the period, for the developement or improvement of an artificial system, the accumulation of species, and their more accurate discrimination, though points of considerable importance, are not sufficiently so to mark an era. Perhaps the most curious and interesting discovery that was made in it is that of the capability of the snail to reproduce its tentacula, eyes, and head, when these have been cut off,—the phenomena of which singular reintegration were amply elucidated by the experiments of Spallanzani, Bonnet, and others.

The first to raise us from this enchained slumber was Cuvier. Before this great naturalist entered the field, Poli, a Neapolitan physician, had indeed anatomized with admirable skill the bivalved mollusca of his native shores, and had constructed a new arrangement of them from the characters of the animal alone, but partly from the political position of Europe, partly from the very expensive fashion in which Poli's work was published, and its consequent extremely limited circulation, and in part also from the partial application of his system and its didactic character, the erroneousness of his general views, and the novelty of his nomenclature,—we cannot trace its influence either as diffusive or propulsive of conchology. The result

* It is most especially necessary to except from this remark John Hunter, but his labours and views were not published, and were not appreciated. "John Hunter was a great discoverer in his own science ; but one who well knew him has told us, that few of his contemporaries perceived the ultimate object of his pursuits ; and his strong and solitary genius laboured to perfect his designs without the solace of sympathy, without one cheering approbation."—D'Israeli's *Literary Character*, Vol. i. p. 146. See Abernethy's *Physiological Lectures*, p. 193, for a list of the Mollusca anatomized and exhibited in Hunter's Museum ; also p. 217, 263.

of Cuvier's labours was happily very different. In 1788, when he was scarcely nineteen years of age, circumstances fixed Cuvier for a time at Caen in Normandy. His sojourn on the borders of the sea induced him, already an enthusiast in natural history, to study marine animals, more especially the mollusca, and the anatomies of them which he now made conducted him to the developement of his great views on the whole of the animal kingdom. With unwearied zeal he collected the materials which were at no distant date to become the basis of a classification which run through all its details in a harmonious parallelism with the developement of organization, so that the student of it when in search of the name and place of the object in his hand was necessitated simultaneously to acquire a knowledge of its principal structural peculiarities, on which, again, as Cuvier beautifully explained, all its habits in relation to food, to habitation, and to locomotion were made dependant. The Linnæan system of avertebrated animals, even in its primary sections, rested on a single external character. The Insecta were *antennulated*, and the Vermes were *tentaculated* avertebrates. Had the character been constant or even general, it might have had some claim for adoption, but to a want of constancy was added the fundamental defect of its inappreciable influence over the organisms of the body. Cuvier's object being to give us not merely a key to the name, but to make that key open at the same time a knowledge of the structure and relations of the creature, such arbitrary assumption of a character was to him useless. After innumerable dissections had made him familiar with many structures, and after a careful consideration of the respective value of characters, as shown in their constancy and influence on the economy of the species, Cuvier resolved to divide the animal kingdom, not as hitherto into two, but into four principal sub-kingdoms, drawing their lines of separation from differences exhibited in the plan on which their muscular, their nervous, and their circulating systems were formed. "There exist in nature," he says, "*four* principal forms, or general plans, according to which all animals seem to have been modelled, and the ulterior divisions of which, whatever name the naturalist may apply to them, are but comparatively slight modifications, founded on developement or addition of certain parts, which do not change the essence of the plan." Of these forms the mollusca furnish the second, of which the essential character is derived from the peculiar arrangement of the nervous system, consisting of some ganglions scattered as it were irregularly through the body, and from each of which nerves radiate to its various organs. As there is no skeleton, so the muscles are attached to the skin,

which forms a soft contractile envelope protected, in many species by a shell. The greater number possess the senses of taste and sight, but the last is often wanting. "Only one family can boast of the organ of hearing; they have always a complete system of circulation, and organs peculiarly adapted to respiration; those of digestion and secretion are nearly as complicated as the same organs in vertebrated animals."* The sub-kingdom, characterized and limited by those important features, is next divided into six classes, the characters of which are mostly derived from the organs of locomotion, or others not less influential. Thus the Cephalopodes bear their feet and arms like a coronet round the summit of the head; the Pteropodes swim in their native seas by fin-like oars; and the Gasteropodes crawl on the belly by means of a flat disk or sole. Reaching now tribes among whom the organs of motion are less developed, and accordingly less influential on their manners, Cuvier resorts to others. Thus the fourth class is named Acéphales, because it is strikingly distinguished by the want of head and amorphous form of its constituents; the Brachiopodes are equally acephalous, but near the mouth they have two fringed fleshy organs which simulate feet; and the Cirropodes have several pairs of subarticulated fringed feet, in addition to a multi-valved shell of a peculiar construction. The orders of these classes, when the class admits of further subdivision, rest upon distinct differences in the structure and position of the branchiæ or respiratory organs; and when we reflect a moment on the paramount necessity of these to the animal, and their necessary co-adaptation to its locality and wants, it is scarcely possible to conceive that a happier choice could have been made.

It were unsuitable to our purpose to explain at greater length the Cuvierian system. Enough has been said to show its vast superiority to all that had preceded it; and the solidity of its basis is proved by the fact that the numerous recent discoveries in this department have not shaken it, or altered its principles. The lower divisions and sections have been improved and increased, the definitions have been rendered more technical and precise, but every method which has followed, both in its outline and main features, are merely modifications, and very slight ones, of Cuvier's. He always regarded his labours in this field with peculiar satisfaction, and watched their offspring with some degree of jealousy, unwilling that the parentage should be either doubtful or divided. "It is well known," he says, "how much care and time I have devoted to the anatomy of the mollusca in general,

* *Memoirs of Cuvier by Mrs Lee, p. 107-9.*

and in particular to the knowledge of the naked mollusca. The determination of the class, its principal divisions and subdivisions, all repose upon my own observations, for the magnificent work of M. Poli aided me no further than by some descriptions, and some anatomies useful to my end, and these were confined to the multivalves and bivalves. I have verified all the facts which that able anatomist has furnished me, and, as I think, have determined with more accuracy the functions of some organs. I have also sought to characterize the animals to which the principal forms of shells belong, and to classify these in accordance with the organization of their inhabitants, leaving the ulterior divisions of them into genera and subgenera, to those who devote themselves in particular to this kind of work.” *

Did not our pages, on which we have already too much transgressed with this subject, forbid the attempt, we would gladly go on to trace the effects of Cuvier's example and views. It must suffice to say, that they raised the character of the conchologist, and gave a more philosophical tone to his pursuit; they originated a new school, with better directed zeal, and a higher aim, and numbers became disciples when they saw that here as much satisfaction and profit was to be reaped as in the study of almost any other class, for it may be laid down as an axiom that no branch of natural history, however apparently trifling, “but may be ennobled by the manner in which it is pursued; and when the student carries all its wonders back to the one Great Source, the smallest worm and the most beautiful of his own species will afford him subjects for the deepest contemplation.” For some years Cuvier's system, even in France, divided the favour of naturalists with the more artfully constructed one of Lamarck, remarkable for the precision and neatness of all its details, and its better adaptation to the purposes of the mere nomenclaturist; and in Britain we knew little of Cuvier, until the peace of 1816 had restored a friendly correspondence between the men of science of Europe, and it was some years later still until his merits as a naturalist were appreciated, and his system began to weaken and dissolve our Linnæan prejudices. To indicate the modifications which this system has been made to undergo in the hands of Lamarck, Gray, Blainville, Oken, Latreille, &c. is here impossible;—the same with the improvements proposed on the arrangement of the Cephalopodes and Brachiopodes by Owen, of the Pteropodes by Sander Rang, of the pulmoniferous Gasteropodes by De Ferrusac, of the Bivalves by Deshayes, and of the shellless Acephales by Savigny. We must pass over in the same silence the

* *Regne Animal*, i. Pref. p. xxvi.

anatomical and physiological discoveries which so remarkably distinguish the few last years, and have given that fulness and perfection to the knowledge of molluscans which Linnæans were never weary of telling us was unattainable. Berkeley, Blainville, Bojanus, Carus, Chamisso, Deshayes, D'Orbigny, Dumas, Grant, Gray, Jacobson, Milne-Edwards, Muller, Owen, Lund, Sander Rang, Roux, Savigny, Sharpey, Unger, Vanbeneden, Armand de Quatrefages, Prevost,—to these naturalists our homage is justly due for their labours in this field, which, however, we should remember, was comparatively barren, until Cuvier made evident its natural productiveness, and taught us to plough deeper in the soil.

Such is a very hurried sketch of the history of a department of the animal kingdom, to which we confess our partiality, and to which the works placed at the head of this article are intended to introduce us. None of them come up to our ideas of what an 'Introduction' ought to be, and in none of them will the student find a compendious view of the actual state of conchology in reference to the anatomy, physiology, economy, and systematic classification of its members. Blainville's *Manuel*, indeed, is the only one which makes this pretence, and had it been complete (which it was not) at the date of its publication, subsequent discovery would now have rendered it defective. It is, however, even in its plan and design discommendable as an introductory work. The division of it into two books, one appropriated to the animals, and the other to the shells, seems to us unfortunate, as tending to divide what ought ever to be studied in close connection; and his plan of describing the anatomy of the organs in distinct and widely apart chapters, from the functions of them, is liable to the same objection. His chapters considered separately are dry and sketchy,—no spirit in his style, nor vigour in his delineations, no wandering into pleasant digressions, no indulgence in higher and aberrant contemplations, when the wonders of structure—its beauties and singularities open upon him in such a manner as might seem enough "to excitate the earthiest soul." Indeed Blainville has made his book rather an exposition of his own views, and of his own system, than an introduction to what was known and done by others; and as his system has not been adopted, nor his nomenclature approved, the value of the work is thus much lowered to a student. With these deductions, however, he will find in it much information not accessible otherwise in so compendious a form,—a manual he will not often read, but which he must frequently consult.

Sander Rang might, without a charge of immodesty, have inscribed on his title-page, the "*parva sed apta*" which Mr Swainson has,

with so little propriety and a good deal of vanity, adopted. This excellent volume is an exposition of Cuvier's system of molluscans, with such alterations and additions as recent discoveries seem to have rendered advisable and necessary. It contains a very ample character of the classes, orders, families, and genera, in which, as is becoming, the attention is principally directed to those exhibited by the living animal. He informs us that his materials were chiefly taken from the works of Adanson, Poli, Cuvier, and Blainville; but from his proper study, and during his travels as an officer of marines, he had been able to compare their descriptions, made in general on dead specimens, with the animal in life, and had hence been able to rectify some errors and add new characters. The "discours sommaire" contains a rapid but spirited and correct review of the exterior anatomy and principal internal viscera; and throughout we have scattered notices on the habits of numerous species of great interest. Some of these we would have willingly transferred to our review, had our space allowed; and this is the less necessary as the volume ought to be in the hands of every conchologist. It is, however, too systematic in its plan to be considered elementary, for those details of structure, function, and habits, which are not subservient to system, have been purposely excluded, while they must constitute the base of every introduction worthy of attention.

The "Genera" of Sowerby is just the opposite of Rang's. The latter is a very small and a very cheap volume, the former is a work of large extent and great expence; the one treats of living creatures, and in every page there is evidence of a warm enthusiasm in their study, the other concerns itself with the shell only, and the letterpress is sobered down to suit the gravity of science. Sowerby's book is in fact intended rather for the collector of a cabinet of shells, than for the student of living mollusca, and to the geologist it is perhaps indispensable. The genera are carefully defined, and the limits of each exactly pointed out, and illustrated by a series of admirable figures drawn from characteristic specimens. It is to be regretted that this work has been so long in course of publication, now we imagine some twelve or fourteen years,—for the incompleted state in which it is left detracts from its usefulness, and renders its consultation very irksome and inconvenient.

We refrain from giving an opinion of Mr Swainson's Elements, for humble critics are incompetent to estimate the worth of a pamphlet which the author avows was written because he excels in the knowledge of the subject, and because he had not met with any introduction which his children would not hereafter have to *unlearn!*

To this severity of censure his predecessors may naturally demur, and, perhaps, there is some ground for retaliation, but that is an affair between themselves with which we need not meddle. To our children, or readers, we cannot for our part recommend the boastful "Elements," because we would wish them to be something better than amateurs, and to know something more of conchology than the names of the things they collect. The work is written in evident obedience to the adage—"a great book is a great evil;"—and in 62 duodecimo pages we find an explanation of the few terms used in describing shells, a distribution of these after the quinary plan, not more successful than Oken's was when he arranged them after the sacred number of four, with definitions of all the genera simply and neatly done, but the characters derived exclusively from the shells; and lastly a chapter on collecting, preserving, and arranging these bodies, and a plan of study. We shall defer our exposition of Mr Swainson's system until the publication of "the Conchological volume of Dr Lardner's *Cabinet of Natural History* shortly to be published."

"It is easier to refute error than to establish truth:" quoth the Rev. Mr Burrow with sententious profoundness, "thus, the several writers who have dissented from the Linnæan school have, indeed, satisfactorily pointed out some flaws in the great fabric of the 'Systema Naturæ;' but in attempting to eradicate the faulty parts, and to supply their place more fitly, they have injured some of the main supports, and have nearly involved the whole edifice in ruin. (Very pretty!)—The following pages are devoted to the task of facilitating the study of conchology, on the method of the Swedish naturalist; and they are written under the firm persuasion, that a material change is dangerous even in speculative matters, when *the principle* has stood the test of general consent, and when the means of reaching perfection are not yet, or, perhaps, may never be, attainable."—Such is the *twaddle*—and there is much more of the same sort of stuff—with which Mr B. recommends his 'Elements,' containing, in this year A. D. 1836, nothing more than a dry unprofitable exposition of the Linnæan system, the spirit of which the author does not comprehend. Living remote from "public haunt," and consequently in ignorance of the progress of conchology among the metropolitan connoisseurs, we had concluded that the race of Linnæans had become extinct, but it seems we have erred in our haste, and that some of them are still in a living active state, for it were otherwise a sad prospect to his publisher were this reverend gentleman to be alone left like

"The late-blown rose

"Lingering after all the rest."

It is from a full conviction that such productions as the one before us lessen and degrade a favourite pursuit in the eyes of all rational men, and make it a laughing-stock to the satirical, that we feel called upon to protest upon their being received as evidence touching the nature of our studies. So we willingly consign this one to our highest shelf, where it shall remain to gather the dust that already covers, with a thick and undisturbed repose, the very similar volumes of Mr Brookes and Captain Brown, and the "exquisite Conchologist's Companion" of Miss Mary Roberts, who, however, sometimes enlivens her pages with a sort of quixotical sentimentalism and a blundering absurdity that provokes a smile;—and thus only doth she surpass her competitors.

BIBLIOGRAPHICAL NOTICES.

Fauna Japonica. Auctore PH. FR. DE SIEBOLD.—Ophidii elaborantibus C. J. TEMMINCK et H. SCHLEGEL. Fol. Lugduni Batav.

THE Erpetologie of Japan has hitherto been sparingly illustrated. The present number of this interesting work, commencing the *Ophidii*, is therefore an important addition to our knowledge of the natural history of the Japanese empire. Former naturalists have borne testimony that that department of the Fauna was very circumscribed, and the present researches, in the words of Temminck and Schlegel, have produced "collections à la vérité riches en individus, mais où les espèces sont toujours bornées à un nombre très-limité." The species here described are only ten in number: 3 species of Coluber, 2 of Tropidonatus, 1 Trigocephalus, and 4 Hydrophis. The plates are lithographic and nicely executed, but uncoloured; hence all the generic characters, and the expression of the scaling are distinctly seen, while we have to regret the want of those vivid tints which generally adorn the exterior of these creatures.

A part of the introductory portion of the whole work is also given, which we shall notice more in detail at an early period.

A Synopsis of the Birds of Australia and the adjacent Islands. By JOHN GOULD, F. L. S. Part II. Royal 8vo. 1837.

The second number of this peculiarly managed work has just been forwarded to us. It equals its predecessor in the beauty of its finishing, and we have illustrations of the characters of forty species, comprised in the genera *Monarcha*, *Amadina*, *Pardalotus*, *Platycercus*, *Nanodes*, *Meliphaga*, *Acanthorhynchus*, (a genus formed from the

Meliphaga tenoriostris of Vig. and Horsf. ;) *Coturnix*, *Hemipodius*, *Ægialitis*, (a name proposed by Vieillot for a family among the Grallatores, here used as a generic title for the form of Charadrius represented by the little ring-dotterel *Ch. hiaticula* ;) *Himantopus*, of which the species described, *H. palmatus*, Gould, is extremely interesting, as exhibiting a complete palmation or web between the toes, and thus running into the avosets, *Recurvirostra*, *Oxyura*, and *Sterna*.

Catalogue of the Cellulares or Flowerless Plants of Great Britain, or those included in the Linnæan class Cryptogamia; compiled from Sir W. J. Hooker's English Flora, Vol. V.; Sir J. E. Smith's English Flora, Vol. IV.; Mackay's Flora Hibernica; Henslow's Catalogue of British Plants, and other sources. By W. A. LEIGHTON, B. A., F. B. S. Ed. 8vo. London, Longman, 1837.

This sheet, as indicated by the title, is a mere catalogue, which has been deemed necessary on account of "the increased and increasing study of the Cryptogamic tribes." It is intended to facilitate the interchange of species, to afford a convenient index for the herbarium, and, if interleaved, to serve as a book for memoranda, regarding some of the rarer species. For the above purposes this catalogue cannot fail to be useful, and, being printed on a single large sheet, it can be transmitted by mail at the charge of a single postage, and afterwards cut and folded, as its possessor may find most convenient. The price of the sheet is sixpence.

A History of British Birds, Indigenous and Migratory, including their organization, habits, and relations, remarks on Classification and Nomenclature; an account of the principal organs of birds, and observations relative to practical Ornithology. Illustrated by numerous engravings. By WILLIAM MACGILLIVRAY. Vol. I. 8vo. London, 1837.

The work bearing the above title is a thick octavo volume of 631 pages, having for its object "to lay before the public, descriptions of the birds of Great Britain, more extended and, if possible, more correct than any previously offered."* We do not wish to appear unnecessarily critical regarding the manner in which Mr Macgillivray has accomplished this object, but we should not act fairly to our subscribers were we to say that it is done successfully. The writing appears to us an affected attempt to imitate the styles of Isaac Walton and of Audubon, which, being extremely peculiar, can only be relished

* Preface.

in the originals,—and here, as in the case of similar imitations, we desiderate their freshness, and dislike the misplaced quaintness of expression. It appears trifling, while the meaning is by no means distinctly conveyed. The incidental remarks and digressions liberally dispersed through the volume, (often totally irrelevant to the subject, see p. 125,) are sometimes expressed scarcely with a kindly feeling, and seem to show an inclination to undervalue the opinions of others when a unison of ideas cannot be found.

This book is composed of two parts: The first, introductory; the second commences the history of the birds themselves belonging to four of the orders, which our author has thought necessary to form on principles of his own, and which are “doubtless excellent and admirable in the eyes of their inventor.”

The introductory portion* contains, first, “remarks on classification and nomenclature,” and “samples” of systems are given in outlines of those of Linnæus and Vieillot. Next follows an exposition of our author’s own system. This is “primarily divided into four groups, sections, or sub-classes, determined by their mode of life,” and they come in the place of the familiar divisions of “land and water birds.”† They are, I. Aërial birds, *Aves Aëriæ* or *Volitoriaë*; II. Terrestrial, *Aves Terrestres* or *Ambulatoriaë*; III. Amphibious or wading, *Aves Littorales* or *Grallatoriaë*; IV. Aquatic birds, or *Natatoriaë*. These again are separated into no fewer than Nineteen Orders, each section containing four, except the second, in which seven have been placed. We cannot consider this system more simple or comprehensive than many of its predecessors, and we do not think the nomenclature improved by the introduction of sectional or generic titles, such as, *Volitatores*, *Deglubitores*, *Raptatores*, *Palpatores*, &c. or in another language, of *Plunderers*, *Cooers*, *Huskers*, *Gropers*, *Probers*, &c. &c.; but “methods spring up and die like mushrooms, and for the same reason; they are composed of flimsy and unsubstantial materials easily elaborated.”‡

Of the concluding part of the introduction, “Remarks on the structure of birds,” we have a higher opinion. It is a subject interesting from the little attention which has hitherto been given to it, particularly in this country, and from the great importance which the knowledge of structure is in our generalizations upon the functions of the different parts, and the economy and habits of the individuals. This part, though short, is well done. The anatomy is con-

* Introduction, p. 15.

† Ibid, p. 16.

‡ Ibid, p. 19.

cisely detailed, without any of the affectedness of style which we dislike so much elsewhere, and it is illustrated by nine engravings well wrought from the pencil of the author, exhibiting views of the osteology, the muscular arrangement, and the digestive organs in the principal divisions.

The second part of the book, occupying 500 pages, is devoted to the history of four of the orders "Rasores, Scrapers. Gemitores, Coers. Deglubitores, Huskers. Vagatores, Wanderers." This description or historical part wants condensation; it is much too lengthened, without bringing together the information which is really of use to the student of British ornithology. It is illustrated by woodcuts of most of the parts which are essential in the system, as generic, many of which are well drawn and executed. We are treated also with "Practical Ornithology," in chapters 1, 2, 3 and 4, but these lessons we dislike *in toto*, both in substance and in spirit.

Report by MM. De Blainville, Isidore Geoffroy, and Dumeril, on M. Percheron's work entitled Bibliographie Entomologique.

Those who particularly devote themselves to the study of one branch of natural history, have a great interest in becoming acquainted with the works already published on the special object of research or observation with which they are occupied. Accordingly the greater part of authors make it a rule to indicate in general works the sources whence they have derived their information, and are careful at the same time to arrange their citations in chronological order.

M. Percheron, who has long been assiduously engaged in the study of insects, on some genera of which he has already published some very good monographs, such as those on *Cetonia* and *Passalus*, has strongly felt the necessity of arranging the works from which he obtained useful intelligence, in a series according to their dates. He had accordingly drawn up at first for his own use, a catalogue of all the entomological books whose titles he had become acquainted with, and undertook laborious researches to ascertain as many as possible: this he conceived it would be of advantage to the science, and to those who cultivate it, to publish for general use. He has made it his object to inscribe all the writings relating to insects, considered under the different relations of form, structure, classification, manner, habits, utility, injuries, &c. in a word, all the works on entomology.

Such is the work which M. Percheron is about to publish, and of which all the sheets hitherto printed have been examined by the above-named commissioners. It is a simple catalogue, in alphabetical order, of the names of authors, with the indication of the complete

title of their works, the date of their publication, and, where that was practicable, a notice of the period and the place of the birth and death of these naturalists. Unfortunately these simple indications contain no abridged notice of the contents of these works, and are unaccompanied with critical observations, yet such additions are of great interest on account of the judgments which they embrace.

After this first part of the work, which forms nearly three-fourths or a volume and a half, the author has drawn up a table of the articles in the order of the subjects and chronology; this is divided into chapters. The first comprehends the names of the authors who have written on insects, but under certain points of view only, such as the damages they may occasion, which our author names their *nocibility*; then in relation to their utility in agriculture, in the arts, in medicine, or in the general economy of nature, regarded in a philosophical manner. The second chapter indicates the books which treat of insects in regard to their general natural history, zoological or entomological. It is here that we find inserted travellers, museographers, micrographers. The third and last chapter makes us acquainted with the works which have treated of insects exclusively, such as memoirs relating to the formation and preservation of entomological museums; the generalities of their modes of life and metamorphoses; special works on the anatomy, physiology, and classification of insects; such as contain only observations on their different countries; and finally, all the works which have treated of the orders in particular, whether relating to all the genera, or those of some particular country, or such productions as have appeared under the title of monographs. Such is the order in which the name of every author is here inserted and repeated according to the date of publication.

We cannot disguise the fact, that the execution of this *Bibliographie* still leaves something to be desired, for we have remarked in it several important omissions, and we find books and memoirs inserted which have no relation to insects. However, the work may be of great benefit to entomologists: it will no doubt greatly facilitate their researches, and really promote the ulterior progress of the study of that branch of natural history.*

* *Comptes rendus Hebdomadaires des Séances de l'Académie des Sciences*, 6th February 1837.

TRANSACTIONS AND PERIODICALS—*British.*

Transactions of the Philosophical and Literary Society of Leeds, consisting of papers read before the Society. Vol. I. Part I. 8vo. Longman & Co. London. 1837.

Before noticing this volume, it may be satisfactory to our readers to be informed of the progress of the Society whose Transactions it proposes to detail. The following sketch was forwarded to us for insertion in our last Number, but circumstances prevented us then availing ourselves of the kindness of its author.

“ In Leeds, above forty years ago, a Philosophical Society was established, which consisted of only a small number of members, and of whose proceedings no records remain. Amongst the number, two names have come down to us, Dr Priestley and William Hey, Esq. F. R. S. The society, however, did not meet with that support which its founders had expected, and, like many similar ones, gradually fell off, and became extinct. It is perhaps not too much to conjecture, that, although we have no certain or regular minutes of their meetings, yet at some of these, the splendid discoveries of Dr Priestley might have had their origin, and that, in consequence of some discussion, he might have been stimulated to make experiments, which, but for such discussion, would never have been made. When the Doctor left Leeds, he was succeeded at the Mill Hill Chapel by the Rev. William Wood, F. L. S., &c., whose name as a botanist and general naturalist is well known. He was author of *Zoographia*, and for some time conducted the natural history department in the Annual Review, as well as many of the articles on botany in Rees’s Cyclopædia. Mr Wood died in 1809, from which period, for many years, there does not appear to have been any attempt, either individually or jointly, to promote scientific pursuits,—at least, if such were the case, it is now forgotten. In the autumn of 1818, however, a reaction began to be manifest, and a letter appeared in the Leeds Mercury, signed *Leodiensis*, suggesting the formation of a Philosophical Society. The proposal was received with approbation by a number of intelligent and public-spirited individuals, and a meeting was held at the Court-House, December 11, 1818, to concert measures, with a view to the accomplishment of so desirable an object. The venerable William Hey, Esq., whose memory will ever be associated with the history of the intellectual, religious, and local interests of Leeds, presided on the occasion, when, after a protracted discussion in reference to the object and scope of the projected institution, it was resolved that a so-

ciety should be founded on the most comprehensive principles, and should include all branches of science and literature, excluding all topics connected with politics, religion, and ethics. For a short time the meetings were held in the Court-House, after which a subscription was opened for the erection of a suitable building, which, in a few months, amounted to a sum so considerable as to justify the purchase of land, and the commencement of other active operations. The first stone was laid by Benjamin Gott, Esq. the 9th of July 1819, at the south-east corner of the present handsome edifice, and underneath it were deposited several coins of the reign of George III. The progress of the building was slower than had been anticipated, in consequence of unavoidable circumstances. It was soon discovered that the sum originally specified as adequate to its completion was insufficient for that purpose, and the work was consequently at a stand. The munificent spirit of Benjamin Gott and John Marshall, Esqs., which reflects equal honour upon those respected individuals and the town to which they belong, interposed with a noble alacrity to extricate the rising institution from the alarming dilemma in which it appeared to be placed. These gentlemen generously took each five additional L. 100 shares, and by that seasonable effort of liberality, relieved the society from the difficulties which threatened it. The first meeting of the first session was held on April 6, 1821, on which occasion the late C. T. Thackrah delivered an introductory essay. This has since been printed for the society. The building is of stone, with two fronts, and surrounded with pallisadoes, and consists of a lecture-room, laboratory, library-room, waiting-room, entrance hall, and resident curator's apartments on the first floor, above which are three apartments, one devoted to geology and mineralogy, in which are arranged about 4000 specimens of minerals and fossils,—the former arranged according to their chemical affinities after *Phillips*,—the latter according to the stratification after *Smith*. The nucleus of these collections were principally the gifts of one of its late curators, E. S. George, F. L. S.—The minerals were a few years since considerably augmented by an extensive purchase of the sale of Sir Alexander Crichton's minerals, by which very fine specimens were added of malachite, chromate of lead, Vauquelinite, Lapis lazuli, emerald, tourmaline, garnets, &c. One of the gems of the collection is an aërolite or meteoric stone weighing 1 lb. 7 oz. which fell at Aigle, in the department of Orne, France. The geological department, although containing some very fine and unique specimens, is very far from what it should be, considering the vast facilities offered by the coal-pits and stone quarries so numerous in the immediate vicinity, abounding as they do with organic remains. With such advan-

tages at its disposal, the Leeds collection ought to possess one of the finest series of carboniferous remains in the kingdom. Such a series could only be formed by the united labour of several individuals interested in the science, who would visit the localities, of which, however, in most provincial institutions, there are unfortunately but few,—the majority contributing to the funds, but prevented by mercantile affairs or other pursuits from giving their time to the fagging department. Amongst the specimens are two unique heads of *Megalicthys Hibberti*, and a portion of its body; many fine Calamites, Asterophyllites, Lepidodendra, Sigillariæ, Lepidostrophi, Pecopteris and Equiseti, from the coal measures; a *Sigillaria* nine feet in height, from the sandstone near Wakefield; remains of Ichthyosaurs from Whitby; fine mass of *Ophiura Milleri* from Scarbro'; bones of the Mammoth of the banks of the Ohio; splendid lily encrinite from the Dutchy of Brunswick; a tolerably good series of shells from the calcaire grossiere of the Paris basin, besides illustrations of the organic remains of the mountain limestone, Kelloway rock, coralline oolite, chalk crag, &c. The second room 43 feet by , and 20 in height, surrounded by a gallery, is devoted to zoology, the first nucleus for which was a collection of 135 species of British birds, by the liberality of its first and lamented curator, John Atkinson, F. L. S. Surgeon. To the ornithological department, considerable accessions have since been made, both foreign and British. Amongst the most attractive are, perhaps, a case of South American birds from Charles Waterton, Esq. the well known author of the *Wanderings*, a specimen of the rare *Trogon Pavoninus*, Trinidad goatsucker, king of the vultures, ostrich, Argus pheasant, and several of the Rhamphastidæ. The collection of Mammalia, like that in most provincial museums, is but small. It contains, however, a very fine skull of the Asiatic elephant, a wild boar, lion, tiger, leopard, jaguar, Polar and brown bear, wolf, kangaroo, seals, head of the walrus, porcupine, several simiæ, examples of the genera *Galeopithecus*, *Dasypus*, *Ornithorhynchus*, *Nasuta*, *Didelphis*, *Procyon*, *Bradypus*, &c. The fish are nearly all in spirits, and principally from the Mediterranean. The greatest rarity is a specimen of the spiny shark, in a bad state of preservation, caught near Scarbro', and which is, I believe, the only British example in the kingdom. There is also a fine sturgeon, 9 feet in length, caught near Selby, and a specimen of *Malthe vespertilio*. The department of comparative anatomy is very limited, consisting of about thirty skeletons of animals, birds, and fishes, and a highly interesting series of forty-two wet and dry preparations, exhibiting the anatomy and physiology of the genus *Limax*. Among the invertebrate tribes, the

museum possesses some interesting examples of the different classes of the Zoophytes. The most prominent is a specimen of *Meandrina labyrinthica*, weighing 16 stone : of the *Pteropods*, there is *Cymbulia Peronii* : of *Gasteropods*, *Glauca* *Scyllæa*, *Doris*, *Aplysia* : of *Echinodermata*, there are *Sipunculus*, *Holothuria*, several genera of the Echinides, *Asteria*, *Ophiura*, *Euryale verrucosa* and *Comatula* : of *Acalepha*, *Actinea* and *Physalia*, &c. The insects, which occupy nearly two glass-covered tables, include some rare and beautiful examples of the orders, and are arranged according to the system of Dr Leach, which was the most popular at the time, uniting the exotics and natives in the same case, the better to keep up the chain of affinity, and exhibit the gradual approximation of one form to another. The Crustacea are arranged also according to the views of that lamented naturalist. The shells according to Lamarck, which three departments, although not numerous, are highly respectable ones. The third room contains antiquities, works of art, and the dresses, &c. of uncivilized nations. The object of principal interest in this room is a very fine mummy of a priest, who lived during the reign of Rameses V. upwards of 3000 years since, in a remarkably high state of preservation, enclosed in a coffin of elaborate workmanship. The head is bare, probably in conformity with the rites of priesthood. The pupils are distinctly visible in the orbits, and during an examination of the skull a few years since, the dura mater with its falx, was found to be quite perfect, the brain having been extracted through the nostrils, by breaking down the ethmoid bone. The muscles are by no means dry, but, on the contrary, allowed of being dissected, and the sciatic nerve traced. An account of this mummy was published by the Society five or six years since. There are also some curious remains of Terra cotta, from Cuzco, the ancient capital of Peru, together with some human skulls from the same spot. These have a singular appearance, from being artificially flattened on the right side and top towards the back part. The library has never created that interest which such a feature of the institution must have been expected to do, and, consequently, is not extensive, containing only about 600 volumes on the various branches of science, with the transactions of public bodies and journals of the day. Here is also deposited the chemical, electrical, and galvanic apparatus. The Society consists of about 67 proprietors, 125 ordinary members, and 100 subscribers ; the first, having paid L. 100 towards the erection of the building, are shareholders, with the power of transferring or bequeathing the share, and exempt from all annual subscriptions and fines ; the ordinary members, those who hold a three guinea share, with an annual sub-

scription of two guineas; and the last, subscribers annually of one guinea, having no interest in the property of the Society, or voice in its deliberations. Meetings are held the first and third Fridays in every month, from November to May, inclusive, for the reading of papers and essays by the members, to which each has the power of admitting a stranger. In addition there are annually two or three courses of lectures, by some public lecturer of eminence, amongst whom there have been Dr Dalton, Professor Grant, Professor Phillips, James Montgomery, Esq. Edward Taylor, Esq. &c. From the commencement of the Society 240 papers have been read on various branches of literature and science.

The private collections in Leeds are, first, a valuable museum of Natural History, &c. in Commercial Street, the property of Mr John Calvert, admission 1s.;—very extensive collections of shells, corals, and minerals, belonging to Miss Banks and Miss Rhodes;—the collection of comparative and human anatomy, belonging to the Leeds School of Medicine, and a collection of comparative anatomy and Natural History, especially of the Invertebrata, belonging to Mr Teale.”

H. D.

The well “got-up” volume before us is the first part of a proposed series of Transactions, and it gives us pleasure to know that the circumstances of the Society are now so prosperous as to enable it to publish a portion of the valuable papers which have and may hereafter come before it. From the abstract of the papers read since 1819, given in a short introduction to the volume, we perceive that the leaning of the great proportion of its members is more towards literary pursuits than the study of zoology and botany. Nevertheless, there is a fair proportion of papers devoted to interesting subjects in both these branches. We have now printed “on the Bed of the Mississippi, by the late JOHN LUCCOCK, Esq., read in November 1824, prepared from a personal knowledge of the course of the river obtained in a lengthened journey made in the previous year.” An interesting paper in favour of the theory of the gradual corrosion or wearing of the barriers which stem the great common lakes, with the author’s opinion of the former probable extent of water on the surface of the now existing North American continent.—On the varieties of water, by WILLIAM WEST, read November 1829.—A description of the internal structure of various Limaces, found in the neighbourhood of Leeds, by THOMAS NUNNELEY, read November 1834: illustrated by seven plates lightly but distinctly executed.—Abstract of a notice of certain Roman Coin Moulds, by JOHN HEY.—On the Anatomy of *Actinea cori-*

acea, by THOMAS PRIDGIN TEALE.—On *Alcyonella stagnorum* by the same author—both good papers. Of the latter we have already had occasion to speak in a former Number of this Journal. Four plates are devoted to the illustrations of these papers.—On the Yorkshire Coal-field, by Mr EDWARD S. GEORGE, F. L. S., read November 1836.

Loudon's Magazine of Natural History. New Series. May and June 1837.

I. Zoology.

SHUCKARD on Generic Nomenclature, p. 248.—WESTWOOD'S Observations in Reply to Mr Shuckard, p. 316.—BLYTH on the Reconciliation of certain apparent Discrepancies observable in the Mode in which the seasonable and progressive Changes of Colour are effected in the Fur of Mammalians and Feathers of Birds; with various Observations on Moulting, p. 259 and 300.—Dr MOORE on the Climbing and Gallinaceous Birds of Devonshire, p. 227.—MOORE on the Wading Birds of Devonshire, p. 319.—CHARLES-WORTH'S Notice of the Teeth of *Carcharias megalodon* in the Red Crag of Suffolk, p. 225.—On the Structure of the Fossil Saurians, p. 284.—WESTWOOD'S Description of a new Genus of British parasitic Hymenopterous Insect, p. 257.—J. E. GRAY on the enlargement of the Eggs of some marine Molluscans during the period of their hatching, p. 247.

II. Botany.

BIRD on the Existence of electric Currents in Vegetable Structures, p. 240, and p. 293.—BROWN on the Preservation of Botanical Specimens from the attacks of Insects, p. 311.

Companion to Botanical Magazine. By Sir W. J. HOOKER, Professor of Botany in the University of Glasgow.

THE continuation of this work from our last notice, p. 87, contains, first, A sequel to the illustrations of Indian Botany by WRIGHT and ARNOT, with a plate of *Acalypha Alnifolia*.—New Ceylonese Melastomaceæ, by G. A. W. ARNOT. The species described were collected by Colonel Walker, and transmitted to Drs Hooker and Graham. Seven species of *Sonerila*, and the same number of the Genus *Osbeckia*.—Characters of new species of Indian Acanthaceæ, by Professor CH. GOTTFR. NEES VON ESENBECK.—Synopsis of the East Indian species of *Drosera* and *Parnassia*, by G. A. WALKER ARNOT.—Notes on a collection of plants made in the Province of Asturias, in the year

1835 by M. Durien, by N. I. WINCH, Esq. &c. This is continued into the following number, with remarks on the distribution of each species to Britain and Ireland. 412 species are noticed in whole, of which 162 belong to the Cryptogamia.—*Floræ insularum novæ Zelandiæ* precursor; or a specimen of the Botany of the Islands of New Zealand, by ALLAN CUNNINGHAM, Esq., continued from a former number, contains the Fucoideæ, Lichenes, and Musci Calyptrati.—Remarks on M. Spach's memoir on the Cistaceæ, a letter from Dr Lindley in defence of some allegations made upon that gentleman's accuracy in a former paper.— Botanical information:—1. A favourable notice of the Musci Angusiani, or a collection of the dried mosses of Angus and Forfarshire, preparing by Mr W. GARDINER Jun. Dundee, a work to be comprised in 7 or 8 12mo fasciculi, at the price of 3s. 6d. each.—2. Dr J. F. Lippold. We formerly mentioned the intention of this gentleman to proceed to Madeira with the view chiefly of collecting plants, but also to prepare other objects of natural history. A letter has been received from the Doctor intimating his safe arrival at the island, his friendly reception by Mr Lowe, and his delight in witnessing the luxuriance of vegetation. Collections of plants are expected during June. It is not proposed that Dr Lippold should remain longer than the present summer at his present station, and his new expedition has not yet been fixed on; but we shall doubtless have due intimation of the time and the terms of subscription, through the worthy periodical we are now reviewing.—3. Notice of the "Herbarium of the late John D. Prescott, Esq. of St Petersburg, an eminent merchant of that place, and who has lately died suddenly. His leisure hours were devoted to the study of plants and enriching his herbarium, which latter is perhaps exceeded by few in Europe, especially that portion of it relating to the Russian Empire." It is warranted to contain 25,000 species, and is now offered for sale at the price of L. 1000.—4. The announcement of the first arrival of dried Brazilian plants from Dr Gardner, who visited South America to collect species for subscribers, accompanied by a long letter, which cannot fail to be most interesting to them, and to botanists in general. He was about to start for the Organ Mountains at the date of his dispatches, and an account of the expedition and his degree of success may be shortly expected.

TRANSACTIONS AND PERIODICALS.—Foreign.

Annales des Sciences Naturelles. Zoologie, MM. AUDOUIN et MILNE-EDWARDS. Botanique, MM. AD. BRONGNIART et GUILLEMIN. Crochard & Co. Paris, Octobre, Novembre, et Decembre 1836.

I.—Zoology.

The October Number begins with a continuation of DUGES' interesting and elaborate *Observations sur les Aranéides*, which are now apparently brought to a close. The other papers are,—*Note sur des animaux qui colorant en rouge les marais salans*, par M. PAYEN. —*Examen des Crustacés rapportés de la saline de Marignane*, par M. AUDOUIN.—*Observations préliminaires sur l'existence d'Infusoires fossiles et sur leur profusion dans la nature*, par M. EHRENBERG.—*Du Foie des animaux sans vertèbres en général, et particulièrement sur celui de plusieurs Crustacés*, par M. DUVERNOY.—*Analyse des travaux présentés à l'Acad. des Sc. pendant le mois d'Oct. 1836: viz. Notes sur quelques ossemens fossiles de l'Alsace et du Jura*, par DUVERNOY.—*Expériences sur l'électricité de la Torpille*, par M. MATTEUCCI.—*Expériences sur la Torpille*, par M. COLLADON.

The contents of the Number for November are—*Observations Zoologiques sur les Pagures et description d'un nouveau genre de la tribu des Paguriens*, par M. MILNE-EDWARDS.—*Quelques observations d'Helminthologie*, par M. CHARLES LEBLOND.—*Enumeration de quelques espèces de Reptiles provenant de la Barbarie*, par M. P. GERVAIS.—*Remarques sur l'évaluation de la Temperature de la surface du Globe pendant la période tertiaire, d'opres la nature des debris organiques qui s'y rapportent*, par M. E. DE BEAUMONT.—*Analyse des travaux &c. viz. MM. BLAINVILLE et DURAND sur un chameau fossile.*—*Lettres de M. DUJARDIN sur les Polypiers fossiles de la Craie.*

The Number for December is enriched with MILNE-EDWARDS' *Observations sur les Polypiers fossiles du genre Eschare*; and a notice, by the same eminent person, *sur un nouveau genre de Polypiers fossiles de la famille des Eschariens nommé Mécicérite*. These papers are illustrated by a series of excellent figures.—*Caractères du genre Plagiodonte et description du Plagiodontia Ædium*, par M. F. CUVIER. One of the Glires, little less than a hare, and nearly allied to Capromys, from which it is generically distinguished by some peculiarities in the structure of its teeth, which Cuvier fully details. The animals are called in Saint-Domingo 'Rat-Cayes,'

which signifies house-rats, whence the specific name: they do indeed approach inhabited places, but only during the night, for they shun the light of day. The male and female rarely separate. Their principal food consists of roots and fruit, and, like all the frugivorous Glires, they are very good for the table; and the Haitians, who are fond of dainties, search after them so carefully that the house-rat has now become very rare.—*Notice sur quelques Parasites et produits organiques du Lombric terrestre pour servir à sa physiologie, par M. SURIRAY.*—*Additions au Mémoire de M. DUGES sur les Araneides.*—*Analyse des travaux, &c. pendant le mois de Decembre: viz. Rapport de M. DUMERIL sur plusieurs mémoires concernant diverses espèces d'insectes par M. ROBINEAU DESVOIDY.*—*Rapport sur un mémoire de M. DESHAYES intitulé, Observations générales sur le genre Bélemnite, par M. DE BLAINVILLE.*—*Des Rapports de la teratologie avec les sciences anatomiques et zoologiques, par M. ISID. GEOFFROI ST HILAIRE.*—*Recherches sur les rapports qui existent entre les propriétés nutritives de diverses substances végétales et la proportion d'azote qui entre dans leur composition, par M. BOUSSINGAULT.*—*Rapport sur un mémoire de M. ROBINEAU DESVOIDY, ayant pour titre, ' Sur des chenilles qui ont vécu dans les intestins de l'homme, qui y ont subi leur mue et qui en ont été expulsées vivantes par l'estomac, par M. DUMERIL.'*

II.—*Botany.*

Octobre.—*Observations sur la propagation des Algues, par J. AGARDH,*—the son of the celebrated Swedish algologist, whose fame he promises to extend and increase. The following are the inferences which Agardh deduces from the observations detailed in this excellent essay:—1°. The division of the Algæ into the articulated and inarticulated, hitherto adopted in all classifications, is inapplicable in the present state of our knowledge of them, and destroys the most marked affinities.—2°. If it is wished to distribute the Algæ into two more natural groups, the following may be substituted:

- a. ZOOSPERMEÆ (*Nostochineæ, Oscillatorineæ, Confervæ, Conjugatæ, Ectocarpeæ, Ulvaceæ, et Siphoneæ.*) *Materia granulosa interna uniuscujusque loculi (cellulæ, articuli vel tubi) frondem constituentis, tandem in fructificationem abeunte; sporidiis maturitate motu præditis, et singulis loculis per porum unicum egredientibus, demum per extensionem evolutis.*—*Viridescentes, incolæ præcipue aquæ dulcis, marisque minus salsi (in scrobiculis sinusque, rarissime in aperto vel profundiori mari.)*
- b. FUCOIDEÆ (*Ceramieæ, Florideæ, auct. Sphacellariæ, et Fucoideæ, Ag.*) *Fructificatione vel receptaculis propriis inclusa vel soris plus minus extensis frondi immersis collecta. Sporis locomotivitate destitutis, ger-*

minatione per membranam exteriorem novos utriculos emittentibus.—
Roseæ et olivaceæ, omnes thalassiphytæ, illæ maris aperti et profundioris potissimum incolæ, hæc sinibus tranquillioribus (apud nos, an semper?) plerumque privæ.

3°. The movement of the sporules is not limited to the fresh-water Algæ, nor is it common to all Cryptophytes. It does not depend on any external circumstances, but on the contrary, is intimately connected with the vital phenomena of all the beings in which it is observed. It is not the expression of an animal life, although it has the appearance of this; and we ought not to compare it with the movements observed in the Diatomaceæ.—4°. Both kind of organs of fructification of the Florideæ are capable of propagating the species, and the one is never the rudiment or the young state of the other.—5°. The Algæ never grow from the reunion of several seeds, but each seed (seminule) produces its own individual.—6°. The theory of metamorphosis of modern algologists is based on facts which ought to be explained otherwise than they have yet been. The transformations of one species into another are illusory.—DURLÆI *iter asturicum botanicum, anno 1835 susceptum, auctore J. GAY.* — *Synopsis des Gerandiées, tribu des Scrophularinées, par M. G. BENTHAM, from the "Companion to the Botanical Magazine."* — *Notice sur quelques cryptogames nouvelles, par J. DESMAZIERES.* — *Observations sur les Diatomées, par M. DE BREBISSE.* — *Note de M. TURPIN, ajoutée aux observations de M. DE BREBISSE.* This observer has discovered that the shell of the true Diatomaceæ is composed of silex, in which he has been anticipated by Ehrenberg, but his experiments are nevertheless very valuable, as confirmative of a discovery which has given origin to some curious researches on the composition and formation of tripoli and similar deposits.— *Description de l'Euphrasia Jaubertiana, nouvelle espece du sous-genre Odontites, par A. BOREAU.*

Novembre.— *Organographie des Cistacées, par EDOUARD SPACH.* — *Quelques observations relatives aux genres Scilla et Urginea, — deux genres à établir dans la famille des Liliacées, et description d'une espèce nouvelle, par AD. STEINHEIL.* — *Sur le Lythrum alternifolium, par M. BOREAU.* — *Sur la faculté que possèdent les plantes d'absorber les infusions colorées par leurs racines, par J. G. TOWERS.* — *Sur la faculté d'absorption attribuée aux spongioles des racines par M. KNIGHT.* — This and the preceding are translations from the Transactions of the Horticultural Society of London. — *Note sur deux nouvelles espèces du genre Spitzelia, par M. C. H. SCHULTZ.* — *Enumeration des plantes decouvertes par les voya-*

geurs, dans les Iles de la Société, principalement dans celle de Taïti, par J. B. A. GUILLEMIN.

Decembre.—Notice sur les Plantes cryptogames récemment découvertes en France, contenant aussi l'indication précise des localités de quelques espèces les plus rares de la Flore Française, par C. MONTAGNE.—DURIAEI iter Austuricum Botanicum, continued. —Biasolettia et Kladnikia, deux nouveaux genres de la famille des Ombellifères, par le Prof. KOCH. A translation from the 'Flora.' —Conspectus Monographiae Cistacearum, auctore EDUARDO SPACH.—Rapport fait à l'Académie des Sciences par MM. de MIRBEL, DUTROCHET, et AUG. DE SAINT-HILAIRE, rapporteur, sur un Mémoire relatif à la structure et au développement des organes générateurs d'une espèce de Marsilea trouvée par M. ESPRIT FABRE dans les environs d'Agde.

American Journal of Sciences and Arts. Conducted by BENJAMIN SILLIMAN, M. D., LL. D. Vol. xxxii. No. 1. April 1837. New-haven. London agent, O. Rich.

The April number of this long established and important American periodical has just reached us, commencing the present year. The following is a condensed abstract of its zoological and botanical papers.

I. Zoology.

On the Economical uses of some species of Testacea, p. 53.—History of the *Mytilus Margaritiferus*, Linn., *Mya Margaritifera*, Linn., and *Pinna rotundata*? Linn. These historical accounts are compiled from various sources, to which references are given. We may remark, however, that the fishing, if such it may be called, of the second species, the "horse muscle," is much more general in the north of Scotland than the author supposes, and the shell much more plentiful, literally paving the bottoms of some of the streams. In many parts they are gathered into large heaps and either rotted, or the pearl immediately extracted. We here allude to what is provincially termed the "Horse Muscle" as mentioned by the author of the paper. We are not so sure that it is the *M. Margaritifera* of Linn. This paper will be continued.—Notice of the Shad and Shad fisheries of the river Delaware, by SAMUEL HOWELL, M. D. Not a scientific, but nevertheless an interesting paper. The shad (no scientific name for the fish is given) enters the Delaware for the purpose of spawning in prodigious numbers about the middle of March, and are fished in various ways, but chiefly by what are cal-

led "Gilling-Seines," from taking the fish in the meshes by the gills. The river continues at its height until the beginning of May, and the season terminates about the 20th June. The annual amount taken by those seines and drift nets is calculated at about one million five hundred thousand, worth, at the usual price, about one hundred thousand dollars. The principal market is Philadelphia.—We should like to see a scientific description of this fish with a little more detail given to his habits during the ascent of the river. We would recommend also the examination of the liquid contents of the stomach, which is said to contain nothing solid, with a high magnifying power.—Description of a new Trilobite, by JACOB GREEN, M. D., p. 167. *Calymena phlyctæinodes*, Green, considered analogous to the *C. variolaris* of Dudley in England.

II. *Botany.*

Account of an excursion to mount Katahdin, in Maine, by Professor J. W. BAILEY, p. 20. The excursion seems to have been undertaken rather hurriedly, and the time at the disposal of the party was much too short. The country, however, was wild and interesting, and might furnish materials for a valuable paper, were the journey undertaken at leisure, and the members of the expedition active and enterprising, rigidly examining the mountain and its encircling cypress swamps.—Remarks on the natural order Cycadeæ, with a description of the ovula and seeds of *Cycas revoluta*, Wild. by A. J. DOWNING, p. 45. A lithographic figure accompanies the paper. The remarks chiefly refer to the impregnation of the female flowers, and the alliance of this family to the Coniferæ.

There are several mineralogical and meteorological papers in this Number.

INTELLIGENCE.

ZOOLOGICAL.

Irish Hare, (*Lepus Hibernicus*, Yarrell.)—Mr Yarrell was, I believe, the first zoologist who observed that a considerable difference existed in the external character of the Irish and common hares. His account will be found in the proceedings of the Zoological Society for July 23, 1833, since which time Mr Bell, in his History of British Quadrupeds, has described both of them, characterizing the Irish hare under the name of *L. Hibernicus*. I am not, however, aware that any observations on the anatomical distinctions of the two species have been made public. With a view, therefore, of filling up the blank to a certain degree, this paper is written.

On placing the skeletons of the two species in juxtaposition, the most obvious distinguishing characters are the greater size altogether of the skeleton, the greater length of the lateral processes of the lumbar vertebra, the superior breadth of the scapula, the greater breadth of the ribs, the greater length of the humerus in proportion to that of the ulna, (which is scarcely longer than in the common hare,) together with the much larger size of the cranium and inferior maxillary bones in the Irish hare. These differences would probably distinguish it as a species distinct from the common hare, did no other characters exist.

In the numbering of the vertebræ and ribs they do not differ, except as to the caudal ones, which in the Irish hare are 13, and in the English 16; the sacral in both are 4, the lumbar 7, the dorsal 12, and cervical 7, making the total number in the Irish hare 43, and in the common hare 46.

The ribs in each species are 12. The males of both species are smaller than the females in all their admeasurements. The intestinal canal is in the male of the Irish hare nearly two feet shorter than in the female. The following table will shew the relative measurements in the female of each species, of some of the principal bones, and of the intestinal canal.

	<i>L. timidus</i> , F.	<i>L. Hibernicus</i> , F.
Length of the intestinal canal from stomach to anus, - -	14 ft. 1 in.	18 ft. 6 in.
Length from cæcum to anus, - -	3 6	4 1
— of cæcum, - -	2 0	1 7

Length of humerus,	-	-	$3\frac{2}{12}$ in.	$3\frac{8}{12}$ in.
----- ulna,	-	-	$3\frac{5}{12}$	$3\frac{6}{12}$
----- femur,	-	-	$4\frac{2}{12}$	$4\frac{5}{12}$
----- tibia,	-	-	$4\frac{8}{12}$	$4\frac{10}{12}$
----- cranium,	-	-	$3\frac{3}{12}$	$3\frac{7}{12}$
Breadth of cranium,	-	-	$1\frac{8}{12}$	$1\frac{9}{12}$
----- scapula,	-	-	$1\frac{5}{12}$	$1\frac{7}{12}$

T. C. EYTON.

Lutjanus rupestris.—A specimen of this interesting fish has been taken on the coast of North Wales.—T. C. EYTON.

Clausilia Rolphii.—Specimens of this interesting British shell have been forwarded to me by my friend, Mr C. Finch, who discovered it in the old habitat, Charlton Wood, Kent, last May.—DANIEL COOPER.

Ehrenberg's Infusoria.—In making a recent communication to the Academy of Sciences respecting the *double* nature of the organs of generation in the infusoria, M. de Humboldt announced that the great work of this author, on that singular class of animals, is very nearly completed, and will be published in a short time. It will contain engravings of 492 of the polygastric infusoria, and 163 of the rotiferæ, from drawings made by M. Ehrenberg.

Proposed New Work on American Skulls.—A work, to be entitled "Crania Americana; or a comparative view of the skulls of various aboriginal nations of North and South America," is noticed in the last number of Silliman's Journal, as having been for some time contemplated by Dr Samuel Morton. The work is proposed to be of a folio size, and to contain from twenty-five to thirty lithographic plates, on which "at least fifty skulls will be represented, with such national, individual, and anatomical illustrations, as can be obtained in reference to each. The work will be preceded by an *introduction*, embracing a general view of the five *great races* of men, and followed by an exposition of the probable origin of the American tribes."

Fossil footsteps in Sandstone and Graywacke.—Professor Hitchcock has discovered in the valley of the Connecticut River, the imprints of what he considers fourteen new species. Some bear so near a resemblance to the feet of living saurians, that they have been denominated *Sauriodichnites*. The Professor says, "I have

no certain evidence as yet that any of these impressions were made by four-footed animals, although, in respect to two or three species, I have strong suspicions that such was the fact. I have sometimes thought they might have been made by pterodactyles; yet they have in general fewer toes than those described by Cuvier and Buckland. Within a few weeks past I have found on the flag-stones, in the city of New York, some marks, which I suspect were made by the feet of a didactylous quadruped, which, like the Marsupialia, moved by leaps. The rock is slaty graywacke, from the banks of the Hudson, between Albany and the Highlands." Drawings of these marks, with the tracts of living birds, have been prepared, and will be published so soon as the localities are again examined.—*Silliman's Journal*, April 1837.

BOTANICAL.

Blysmus Compressus.—I was not aware, until informed by my friend, the Rev. W. Wood, that this plant had been found in the neighbourhood of London, (not having seen any station for it.) It is, however, most plentiful in a bog at Beddington Park gate, near Carshalton, Surrey.—DANIEL COOPER.

BOTANICAL SOCIETY OF EDINBURGH, January 12th 1837.—Professor Graham in the Chair. The following members were elected:—*Resident*, Mr J. H. Branfoot, Mr R. Wilbraham Falconer, Mr George A. Martin, Mr J. W. Mudge, Mr John Percy, Mr Thomas R. H. Thomson, Mr Edward Wells. *Non-Resident*, The Right Hon. The Countess of Dalhousie, Dalhousie Castle; Dr Allman, Dublin; Mr H. Baber, Trin. Coll. Cambridge; Dr Frederick Farre, London; Professor Henslow, Cambridge; Mr G. Quekett, London; Mr C. A. Stevens, Trin. Coll. Cambridge.—

Specimens were stated by the Secretary to have been received since last meeting from Dr Alexander, Dr Macreight, Mr N. B. Ward, Mr Baber, Mr Stevens, Professor Henslow, Mr Babington, Mr Lloyd, Mr Mack, Mr Lindsay Carnegie, Dr Walker Arnott, Dr Van Rensselaer, Mr Veronge, Mr R. W. Falconer, Mr White, Mr Christy, Mr Munby, Dr Graham, Dr M'Nab, Mr J. M'Nab, Mr Brand, Mr Stables, Mr Martin, and Dr Pollexfen.—Donations to the library were announced from David Steuart, Esq. and C. C. Babington, Esq.

Mr Percy read an account of an excursion to the "Jardin de la Mer de Glace" at Chamouni, which was made in July last, with the view of exploring the botany of that elevated spot in the Alps

of Savoy. Mr Percy strongly recommended the Brezon, a mountain about fifteen miles from Geneva, to the attention of botanists who commence their excursions in Savoy, as it not only presents a great variety of alpine plants, but affords the greatest facilities for obtaining them. The "Jardin" was described as consisting of a few exposed and almost naked masses of rock, occupying only a small triangular area, which is bounded by the "Moraines" of the adjacent glaciers; and the appellation "garden" was stated to be merely applied by comparison with the desert around. An enumeration was given of 33 Phænogamous and 6 Cryptogamous species, which were collected at the Jardin, from an elevation of 9000 feet above the level of the sea.

Mr Campbell read a letter from Mr R. Ball, Dublin, to Sir W. J. Hooker, mentioning that *Erica vagans* had been discovered by Dr Burkett, on an islet on the coast of Waterford, near Tramore in Ireland.

Dr Barry exhibited specimens of the plants collected by him in his ascent of Mont Blanc, 16-18th September 1834. A list of the plants collected by Dr Barry, so far as named, was communicated by him; dividing them first, into those from below the snow line, which was stated to be in that Lat. 8000 feet above the sea; and, second, those from the Grand Mulet rock, about 9000 feet above the sea, or nearly 2000 feet above the line of perpetual snow.

The Curator, Mr J. M'Nab, exhibited specimens of *Cinclidium stygium*, a moss new to Britain, discovered by Mr John Nowel, of Halifax, on a moor near Maltham Tarn, in Yorkshire; communicated by Mr Leyland.

Mr M'Nab also read a communication, giving an account of some remarkable forms of Norway spruce, (*Abies communis*,) growing on the property of Whim, in the county of Peebles.

Feb. 9th.—Dr Balfour in the Chair. The following members were elected:—*Resident*, Mr A. Mack, Mr. Edward R. Roberts, Dr Alexander Van Rensselaer, Mr Julius Veronge, Mr Frank Isa White.—*Non-Resident*, Professor Royle, London.—*Foreign*, Colonel Brown, Thun, Switzerland; M. Guthnick, Berne, Switzerland; Professor Meisner, Basle, Switzerland.

In accordance with certain resolutions come to at an extraordinary meeting of the Society held on 4th inst., providing for the election of honorary members, and fixing the number of these at six British and twenty-five Foreign, the following noblemen and gentlemen were elected, viz.—*British*, His Grace the Duke of Bedford, His Grace the Duke of Devonshire, Robert Brown, Aylmer Bourke

Lambert, Nathaniel Wallich.—*Foreign*, Prof. Agardh, Lund ; M. Bieberstein, St. Petersburg ; Prof. Brongniart, Paris ; Prof. Fries, Lund ; Prof. Hornemann, Copenhagen ; Baron de Humboldt, Berlin ; Prof. Koch, Erlangen ; Prof. Ledebour, Dorpat ; Prof. Link, Berlin ; Dr Martius, Munich ; Prof. De Candolle, Geneva ; M. De Lessert, Paris ; Dr Fischer, St Petersburg ; Prof. Mirbel, Paris ; Prof. Nees Von Esenbeck, Breslau ; M. Auguste St Hilaire, Paris ; Prof. Tenore, Naples ; Prof. Torrey, New York ; Prof. Treviranus, Bonn.

Specimens were stated by the Secretary to have been received since last meeting, from the Rev. Mr Gordon, Dr Walker Arnott, Mr Shuttleworth, Professor Meisner, Mons. Guthnick, and Colonel Brown. Donations to the library were presented from R. J. Shuttleworth, Esq. and Professor Meisner.

Dr Balfour read a communication, addressed to the President of the Society, from the Rev. Gerard Smith of Chichester, accompanying specimens of *Lycopodium pallescens*, and explaining the property which it possesses, in common with several other species of the same genus, of expansion in water, and of recollapsing when dried, subsequent to immersion ; a power which it retains for many years, if not too long exposed to moisture, in which case the spikelets rot, and fall off upon drying. Specimens were exhibited in different states ; some which had been immersed and were fully expanded ; others in the act of expansion ; and others again, in the dried and collapsed state.

A remarkable variety of *Lamium purpureum*, from Dr Greville's herbarium, was exhibited, which, from its deeply incised leaves and general appearance, approached very near to *L. incisum*. A beautiful series of drawings prepared by Dr Greville for the *Algæ Britannicæ* were also laid before the society, and attracted much interest.

March 9th.—Professor Graham in the chair. The following members were elected: *Resident*, Mr Henry Mapleton, Mr William Walker. *Non-resident*, Mr George J. Lyon, Glasgow ; Mr James Stuart Menteth, yr. of Closeburn ; Dr G. A. F. Wilks, London.

Specimens were presented from Mr M. J. F. Sidney.

Dr Graham read a letter from the Countess of Dalhousie, intimating her intention of presenting to the society her East Indian Herbarium ; and at the same time exhibited one of the fasciculi of this most valuable collection, as illustrative of the admirable manner in which the specimens had been prepared and preserved. The thanks of the society were unanimously and warmly expressed to Lady Dalhousie for her splendid donation ; and the proposal, that her Ladyship should be elected an honorary member, having met with the most cordial approbation, it was carried by acclamation.

Mr Nicol read a paper on the microscopic structure of the wood of various species of *Rhamnus*, showing that in various instances marked peculiarities of internal structure bore reference to obvious external characters. The species examined were the *Rhamnus catharticus*, *hybridus*, *infectorius*, *oleoides*, *alpinus*, *Alaternus*, *latifolius* and *Frangula*; the first six of which have the vessels, as seen in transverse sections, arranged in a similar and very peculiar manner. The two last, *R. latifolius* and *Frangula*, present a structure so strikingly different from that of the other species, as to have suggested to Mr Nicol the possibility of a difference in the botanical characters, the farther investigation of which he said it was not for him, but for the botanist to undertake.

The first part of a paper by Mr Shuttleworth was read, containing an account of a Botanical excursion to the Alps of the Valais in Switzerland. In this paper Mr Shuttleworth gave an interesting account of an unsuccessful attempt to cross the Glacier of Taesch, where he was compelled to remain upon the ice during the night, and had the danger of his return greatly increased by a fall of snow. The remainder of the paper, giving an enumeration of the species collected, with observations upon them, was postponed till next meeting.

April 13th.—Dr Balfour in the chair. Mr Henry Melville and Mr William Richardson were elected Resident Members.

The remainder of the Countess of Dalhousie's East Indian Herbarium was presented, accompanied by a letter from her Ladyship to the President, authorizing the arrangement and disposal of the specimens in whatever manner might be considered most useful, and most conducive to the advancement of botanical knowledge. Several donations to the library from Dr Walker Arnott were presented.—The thanks of the Society were directed to be given to Lady Dalhousie and Dr Walker Arnott for their respective donations.

An abstract of the second part of Mr Shuttleworth's paper was read by Dr Balfour. This portion of the paper contained an enumeration of 430 species of plants collected by Mr Shuttleworth in the Canton of the Valais, with occasional remarks; and of these Dr Balfour had selected for his present purpose such as seemed to him more immediately interesting to the British botanist.*

Mr Carpenter made some remarks on the different forms of the organs of respiration in different classes of plants, and at different periods of their growth. After pointing out the analogy in elementary structure between the leaves of vegetables and the pulmo-

* This paper will be found in the Mag. of Zool. and Bot.—No. vii. et seq.

nary or branchial apparatus in animals, he stated that the cotyledons in the higher plants appeared to perform all the functions of true leaves, and to be analogous to the temporary gills so remarkable in the Batrachian reptiles. In ferns, the frondose expansion, which is formed by additional cells produced from the original spore, and which decays when the gyrate frond is evolved, may be viewed as similar to the cotyledonary body in phænogamous plants. In other cryptogamous plants, as *Marchantia polymorpha*, this primary frond does not decay, but remains permanent, and may be looked upon as a persistent cotyledon. Mr C. then went on to show that the development of the offspring, which takes place during the ripening of the seed in phænogamous plants, is analogous to that which in the cryptogamous follows the germination of the spore; thus fulfilling a law which appears to pervade organized nature, that the different organs of the higher beings in the progress of their evolution pass through a series of forms analogous to their permanent states in the lower.

Dr Balfour read a communication regarding several species of British ferns, in which he particularly alluded to the observations recently made by Mr Don in the Linnæan Transactions. Specimens of all the species and varieties of the ferns alluded to were exhibited by Dr Gilbert M'Nab,—including *Aspidium dumetorum*, *dilatatum*, *irriguum*, &c. *Cistopteris dentata*, both from England and Scotland, also *C. regia* and *alpina*.

Dr Balfour mentioned having found *Scabiosa columbaria* last autumn, in considerable abundance, on the sea shore near North Berwick.—W. H. CAMPBELL, *Sec.*

MISCELLANEOUS.

Blumenbach.—"The great lion of this university (Goettingen) is Blumenbach, Professor of Natural History, by whom I was most graciously received, though without any formal introduction; yet I have heard he is not always so courteous. He speaks English fluently,—in fact, he is the only professor who appeared to have any knowledge of the language, which surprised me much, considering the intimate connection that exists between Hanover and our own country. The venerable Professor, though he has reached his eighty-second year, still retains all his faculties perfect. He spoke of the kindness of George III. during his visit to England, forty years since, at which period he also went to Oxford. One of his apartments is fitted up as a museum; it is by no means large, but contains rather an odd medley of preparations, and a numerous collection of skulls of negro tribes, as well as specimens explanatory of

comparative anatomy. He called my attention more particularly to a tattooed head of a New Zealand Chief, which was presented to him by the Duke of Northumberland, and on which he appeared to set a very high value.

“ His lecture commences every day, except Saturday, at three ; his class did not exceed forty. He stoops considerably, usually wore a shaggy great coat, with a small green velvet cap on his head, his hair hanging in long silvery locks. He was particularly fond of laughing at his own jokes and anecdotes, which he mentioned during his lecture, sometimes raising his voice to a stentorian pitch, whilst at others it could scarcely be heard. He could read his notes without the assistance of spectacles, and often explained his subject in terms not quite adapted to ‘ ears polite ;’ expressing his astonishment or admiration at the wonders of nature in no measured language—making use of a phrase, which, though of very unusual occurrence among us, still is very common among the Germans,—that of “ Herr Jesus ;” which is, however, only an expletive, and occupies the place of *mon dieu* of the French. He exemplified his subject with preparations either dried or in spirits, as well as by plates or drawings ; some of which, from their age and roughness, were very curious.

“ A specimen he valued much, and which he prized above all others, was the fœtus of a bear in spirits, which is very rarely seen ; and it was certainly a most misshapen object, of very diminutive size ; it was quite, as the old Professor expressed it, an ‘ unlicked cub.’ Another rather interesting specimen was a young porcupine in spirit, before the quills had commenced growing ; in which he pointed out, on the outer side of the scapula, the two mammæ. An ostrich egg, arrived at the full period of incubation, was also curious, where the young bird had half-escaped from its shell : it was of large size, and its neck of very considerable length. He always appeared particularly delighted in mentioning any anecdotes connected with occurrences or incidents he had met with in England ; thus he used to speak of the size and value of the horses employed in the breweries of London, as well as those bred for the turf, or chase, in terms which no doubt excited the surprise, and perhaps, even the unbelief of many of his hearers.

“ On the subject of the turtle, he gave some account of its excellencies with respect to the table, saying that when he was in England, he had seen whole courses served up in various forms and dishes, adding, at the same time, that the dessert consisted entirely of turtle, casting an apparently longing eye on the shell before him, as if he still remembered the bygone repast !!

“ On the subject of cocks, he gave an account of their fighting in England, exhibiting to his class a pair of steel spurs, as used by them in their battles. Of the flamingo* he had never seen a single specimen, though, at one of the museums at Oxford, he was shown a dried leg and foot.

“ Blumenbach’s lectures were by far the most interesting of any I attended at Göttingen. He exhibited one day a machine for hatching eggs, which he had frequently used, and which only required the heat of a spirit-lamp, and constant attention to keep all in order.”—*Viator* in *Medical Gazette*, April 15, 1837.

British Museum.—A grant of L. 1575 has been voted by the House of Commons to enable the trustees of the British Museum to purchase the collection of shells belonging to W. J. Broderip, Esq. offered by him at the price of 1500 guineas, and valued by Messrs Turner and Sowerby, at L. 1640, 12s. 6d. Mr Gray says,—“ The collection consists of nearly 3000 specimens, and contains about 200 species, or very distinct varieties, that are altogether wanting in the already extensive collection of the British Museum: Such is the beauty of the specimens, in consequence of the great attention paid by Mr Broderip to the purchase of none but the finest that could be procured, and so remarkable are the deviations in form and colouring in the several series of the more variable species, that nearly every individual specimen of the remaining portion will also be valuable to our collection, either in replacing a much inferior specimen, or as rendering more complete the series which we already possess. The duplicates to be displaced will be few, and will, for the reasons above given, be taken in every instance from our present collection, and not from among the specimens in the new acquisition. A very large proportion of the species contained in this collection, and wanting in the British Museum, are among the rarest shells that are known to exist, and many are absolutely unique.”†

Wernerian Society Prize Essay.—It gives us much pleasure to announce that the honorary premium of Ten Sovereigns, or a piece of plate of that value, offered by the Wernerian Society of Edinburgh, for the best account of the fishes of the district of the Forth, has been awarded to Dr Richard Parnell, so well known to every

* The *Dodo* is evidently what *Viator* should have written.

† Lord Stanley stated in his place in the House of Commons on Friday last, That on Easter Monday, in the course of eight hours, 23,985, and on Whit-Monday, 30,000 persons had visited the British Museum without doing the slightest mischief.

one interested in British Ichthyology by the numerous additions he has made, within these two years past, to our native list.

OBITUARY.

PROFESSOR AFZELIUS.—“ Professor Adam Afzelius, the Nestor of scientific men in Sweden, died at Upsal, on the 30th of last January, aged eighty-six years. He was the last pupil of Linnæus, and was celebrated for his travels in Asia and Africa. His African Herbarium, we believe, is now in the Banksian collection in the British Museum.” *Athenæum*, April 22, 1837.—His name is commemorated in the genus *Afzelia* of Sir J. E. Smith. His papers on “ Three species of *Trifolium*,” and on the “ genus *Pausus*,” in the Linnæan Transactions, Vol. i. and iv., have been pronounced, by the Rev. Mr Kirby, to be “ as nearly as possible a perfect example of a monograph;” and are worthy the careful study of every one who engages in a work of that class. Afzelius is among those “ respectable names” mentioned by Dr Withering in his list of contributors to the third edition of the “ Arrangement of British Plants;” he “ looked over,” says Withering, “ great part of the Author’s collection, and afforded many valuable observations concerning the identity of several Swedish and English species.” At this time (1796) Afzelius was Demonstrator of Botany in the University of Upsal. He is the author of the following botanical works :

1. De Vegetabilibus Suecanis observationes et experimenta, resp. Wadsberg. 1 fasc. in-4. 1785.
2. Genera plantarum Guineensium, pars prima. 4to. 1804.
3. De Rosiis Suecanis tentamen primum. 1804. 4to.—Tentamen secundum. 1805.

E. DONOVAN, Esq. F. L. S.—In the Gentleman’s Magazine for July there is a record of this naturalist’s death, with, we believe, a complete list of his writings. He died February 1, 1837, in John-Street, Kennington-road, and “ has left a large family in destitute circumstances.” The high price of his books has limited their sale, and it is probable that few of them covered the expense of their publication. The principal of them are devoted to the illustration of British Zoology in almost every class: perhaps the best and most interesting is his ‘ History of British Fishes,’ in 5 vols. 8vo, which, however, is more valuable for its plates than the letter-press; and this indeed may be said of all his works, for they do not rank high in point of original observation or extensive literary research. Foreigners have occasionally ascribed to Donovan the discoveries of Montagu.



MAGAZINE

OF

ZOOLOGY AND BOTANY.

ORIGINAL COMMUNICATIONS.

I.—*Historical Notice of Antoine Laurent de Jussieu.* By M. AD. BRONGNIART.*

THE History of Science shows us that there are men who have been occupied during their whole life with a single idea, but that, an idea of great importance and fruitful in results—men who have exercised, even by works of apparently less extent than those of many other inquirers, a vital influence on the progress of science, because the works which they produce are often the base of the edifice which their contemporaries and successors only serve to complete.

Such may be said to be the case with the individual to whose memory the following pages are devoted; an individual celebrated throughout the scientific world, and venerated by every one who knew him. It may be affirmed that all his reputation was acquired by the publication of a single volume: his preceding works were only a prelude to this, and those that followed merely the development of it; and, notwithstanding their importance, every one will acknowledge that they were not necessary to add to the fame of the author of the *Genera Plantarum secundum ordines naturales disposita*. This unique volume contains the most profound exposition of the whole vegetable kingdom, and is as remarkable for the excellence of its principles as the perfection of its details. It is doubtless sufficient to confer on its author the high reputation which he

* Translated from the *Annales des Sciences Naturelles*, Tom. septième, Jan. 1837.

enjoyed, and which has continued to increase in proportion as his work became better known and its principles more fully understood, discussed, and applied, whether by A. L. de Jussieu himself, or by those botanists who have followed his steps.

What more convincing proof can be given of the superiority of the principles on which this work is founded, than its general adoption by all the most distinguished botanists of Europe, who have no doubt sometimes modified it and brought it nearer perfection, but who have all assumed Jussieu's work as the point of their departure, and most of them may even be said to have deviated but little from it?

It may, however, be asked, if this natural method, as it is explained in the admirable work alluded to, is destined to a lasting reign—if it is, in short, the method most accordant with nature—or if, like so many other systems, it is likely to enjoy but a limited duration, and be replaced by some other method. If we consult only the history of the sciences, and in particular that of botany, we shall be inclined to believe that the predominance of the Jussieuan method will be temporary, like those of Ray, Tournefort, Linné, &c. and that it will be superseded, at a nearer or remote period, by a method more adapted to the progress of the sciences.

When we consider only the systematic portion of Jussieu's work, it may be perceived that important changes may be introduced in many parts of it; and modifications more or less commendable have in fact been already proposed by the numerous inquirers who have devoted themselves to this branch of study. But does their modified method owe its origin to the rules established by Bernard and Antoine Laurent de Jussieu? I think it may be affirmed, that every system which may hereafter be proposed, will be founded on the fundamental principles admitted by these illustrious philosophers, and will therefore be only their method brought to perfection, rather than one entirely new.

This is what will naturally flow from the examination of the principles which have guided these celebrated botanists in their works, and from the progress made in this branch of the science since the publication of the *Genera*. But let us examine for a moment the origin of this method; the first attempts made to attain to some parts of it; and in what state this branch of botany was placed, when A. L. de Jussieu effectually introduced it into science.

The greater part of classifications preceding that of Jussieu, had for their object the distribution of vegetables in some method calculated to facilitate their determination, rather than to arrange them

in natural groups. Some eminent botanists, however, had not failed to perceive the importance of characters best calculated to divide the vegetable kingdom into a few great natural classes. Thus Ray in 1682, and Boerhaave in 1710, had recognized the importance of the characters furnished by the embryo, and adduced the distinction of monocotyledones and dicotyledones, although they often made an inaccurate application of this principle. But their classification in other respects, although preserving, like all other systems, a considerable number of natural groups, is too systematic to avoid the introduction of many which are completely artificial. All the older methods, besides, admit the separation into trees and herbs, which, for the most part, interrupts all natural relations.

Linné, who so greatly advanced the progress of botany by the precision he introduced into the science, by the simplicity of his sexual system, and by his sagacious researches into the most interesting phenomena of vegetable life, is pre-eminently entitled, from the enthusiasm of his numerous disciples, to be regarded as the head of a systematic school, although he has positively declared that he used every effort to lay the foundation of a natural method. Of this he has presented us with a sketch in his *Classes Plantarum* in 1738, and a new edition in his *Philosophia Botanica* in 1750.

He always esteemed this method preferable to every other, and considered it as the essential object of science; but it must be admitted that if he was the first in attempting to indicate some fragments (as he himself expresses it) of the natural method, these fragments were extremely imperfect in many respects; for of the sixty-seven groups he established, only the half nearly correspond to such as have been retained, while the others are united to genera pertaining to very different families.

Moreover, Linné has neither indicated the characters of these groups, nor pointed out the principles by which he was guided in forming them. It may even be supposed that he has allowed himself to be directed rather by the natural perception of affinities which a botanist of such discrimination necessarily possessed, than by a profound and comparative study of the organization of the different genera associated in each of his groups. It is easily perceived that he was guided by no fixed principle in the formation of his different natural orders, for in some of them, the *Sarmentaceæ*, for example, the dicotyledones and monocotyledones are mingled almost in equal numbers; while in other instances, this is the case with the monopetales and the polypetales, as in his *Dumosæ* and *Vepreculæ*.

To Linné succeeded Adanson and Bernard de Jussieu, who de-

voted themselves to the study of the natural method nearly at the same period.

Adanson was struck with the diversity of the systems hitherto established, and perceived that, notwithstanding the different principles on which they rested, the greater part agreed in preserving untouched certain groups which the intuitive perception of natural affinities led every one to recognize as natural groups. He therefore conceived, that, by purposely multiplying systems, and founding them on all the organs, and on every consideration which these organs could supply, the different relations existing between different vegetables would be thus rendered apparent; and that by bringing together into one family such of these genera, as were found to correspond in the greatest number of particulars in these artificial systems, we should attain to a true natural classification. Proceeding on this principle, he established sixty-five different systems, founded sometimes on characters of importance, at other times on characters of little value, and almost impossible to define. The result of this was, that by assigning nearly an equal value to these different systems, the general classification he deduced from them, instead of being more perfect than that of Linné, interrupted the natural affinities even more frequently. In fact, if we apply to them, in order to form a comparative estimate of the two methods, the principle admitted by Adanson himself in judging of the systems antecedent to his—that is to say, if we examine how many of these groups there are, which, notwithstanding the progress the study of natural families has made, continue to be admitted or correspondent to two or three families which our methods still permit to stand by the side of each other,—we will find that, of the sixty-seven Linnean families, thirty-four have undergone scarcely any alteration, while of the fifty-eight families of Adanson, twenty-six only have been able to withstand the same proof. Thus the tedious and laborious investigations of Adanson, at a period, too, when the science had made a great advance, led him to a result which is no nearer approximation to the truth than that of Linné.

It may only be remarked that Linné, aware of the imperfect knowledge which could be obtained in his time respecting the natural classification of plants, had appended to his method, under the title of *vagæ et etiamnum incertæ sedis*, a considerable series of genera either little known, or whose position appeared to him doubtful; while Adanson, in the belief that his method was infallible, attempted to classify them all, and this pretension to outstrip the knowledge of his time was perhaps the cause of many of the impro-

per alliances he has been led to form. It would be unjust, at the same time, not to acknowledge that there is to be found, in many parts of his work, the indication of affinities previously overlooked, and which he very happily perceived.

While Adanson was engaged in these complicated labours to arrive at the natural method, Bernard de Jussieu, examining nature with a sagacity which may be judged of from the few memoirs he has published, established the principles of this method, not in a book, but by nature itself, namely, in a series of plants in the garden of Trianon, or in a still more perspicuous manner, in the catalogues used in the formation of that garden; for the manuscript lists he has left, the most complete of which has been published at the head of the *Genera* of Antoine Laurent de Jussieu, indicate the position of many genera, which at that period were not cultivated in gardens.

It is sufficient to compare this simple list with the attempts at a natural method by Linné and Adanson, to see how much it is superior to both, and what a profound knowledge and sagacity it implies in this learned botanist, whom Linné was pleased to designate as one of the masters of the science. As a proof of this, upwards of two-thirds of the groups established by Bernard de Jussieu have remained untouched, notwithstanding the progress of botany, or have only been subdivided, without these subdivisions being disjoined from each other. The examination of the genera united in each of these families, as well as the series which he has established, shows that Bernard de Jussieu had assumed as a character of the first order, presenting no real exception, the structure of the embryos, acotyledon, monocotyledon and dicotyledon; for it is evident that the few instances where he has included in the same family, plants differing in this particular, result from the still imperfect knowledge which we possess of the nature and structure of fruits.

It may be seen, in like manner, that he had appreciated the importance of the characters furnished by the relative insertion of the different parts of the flower, and that he had even made this the subject of a careful examination, for he has very rarely united in the same family plants presenting any notable differences in this respect; and the order of these families, as well among the monocotyledones as among the dicotyledones, is founded on the insertion of the stamina, or of the corolla, on the pistil, the calyx, or the receptacle.

Although Bernard de Jussieu, therefore, has not made us ac-

quainted with the rules which directed him in his researches after the natural method, it cannot be doubted that he acted on two principles of this method which are still admitted as the most essential and least liable to exception, namely, that the differences in the structure of the embryo furnish characters of the first order, and the different modes in which the parts of the flower are inserted, supply characters of the second order. But when we examine the various catalogues which preceded the planting of the garden at Trianon, we perceive that it was not by one trial that he arrived at this result, and that he successively brought to perfection both the grouping of genera into families, and the distribution of these families.

Such was the state of botany, viewed in relation to the natural method, when Antoine Laurent de Jussieu, who was born at Lyons in 1748, came to Paris in 1765, to complete his medical and scientific studies, under the direction of his uncle, Bernard de Jussieu. The first years of his abode in this city were entirely devoted to these studies, and he terminated them in 1770, by a thesis for the degree of doctor in medicine. The subject of this thesis, and the mode in which it is handled, show the direction already given to his studies, and the philosophical spirit which animated him at first entering upon his scientific career. That subject was, *An economiam animaleam inter et vegetalem analogia?* and it is, in fact, a concise, elegant, and perspicuous exposition of what was positively known at that period respecting the structure and functions of vegetables, and a comparison of them with the phenomena of animal life. The manner in which this question is treated was evidently a brilliant outset for a young man of twenty-two; and when Lemonnier, then professor of botany, became unable to attend at the Royal garden, in consequence of the duties entailed on him by his situation as first Physician to the King, Bernard de Jussieu proposed his nephew as his substitute, which was agreed to. Antoine-Laurent de Jussieu then devoted himself, with renewed ardour, to the study of that branch of science which he was thus called upon to teach.

The memoir on the family Ranunculii, which he read to the Academy of Sciences in 1773, proves how speedily he had turned his studies to some account, and how thoroughly his mind was imbued with the excellent principles, which, as above-mentioned, had evidently directed Bernard de Jussieu in his attempts at natural classification.

In this memoir, which procured for its author admission into the Academy of Sciences, and in a second memoir, presented the follow-

ing year, on the new arrangement of plants in the royal garden at Paris, we find, for the first time, the fundamental principles of the natural method explained with perspicuity and precision. We there find a just appreciation of the grand principles of subordination of characters, and their unequal value ; a principle unknown to Linné and Adanson, evidently recognized by Bernard de Jussieu, but of which Laurent de Jussieu was the first to perceive the full importance, and he afterwards applied it with singular judgment.

Thus, in the first of the above-mentioned memoirs, we find this passage :

“ We have seen, by some general principles developed in this memoir, the affinity which exists between the parts of fructification ; in this affinity different degrees are perceptible : all these characters have not the same value, or the same efficacy in uniting or separating plants. Some are primitive, essential, and invariable, such as the number of the lobes of the embryo, its situation in the grain, the position of the calyx and of the pistil, the attachment of the corolla and stamens ; these serve for the principal divisions. The others are secondary ; they are sometimes variable, but never become essential, unless when their existence is connected with that of some of the preceding, and it is their assemblage which distinguishes the families.”

Such, then, from the date of 1773, were the fundamental principles by which Antoine-Laurent de Jussieu was guided in drawing up the *Genera Plantarum*. They are expressed with much precision ; and if he sometimes deviates from them, it may be perceived that he does so as a concession to facility of study, or to the old systems, rather than from real conviction. Thus in the memoir read in 1774 on the new arrangement in the Garden of Plants, he has evidently departed from the rigorous principle of the insertions, as Bernard de Jussieu had admitted them in the catalogues of Trianon, by dividing the dicotyledones into apetales, monopetales, and polypetales ; but we have only to read his memoir to perceive, that his only object was to multiply the great classes, and to establish some relations between the new order and the method of Tournefort which it replaced, and which was generally known, not only to the pupils, but to the majority of the botanists of that era. We must not therefore lose sight of the origin of this part of Jussieu's classification when we wish to appreciate the method followed in the *Genera Plantarum*, which does not sensibly differ from it.

From this period up to 1785, Antoine-Laurent de Jussieu always arranged the plants in the botanic garden according to this method.

The lists used in his demonstrations, worn out by use, often renewed, covered with notes and additions, and at last presenting not only the list of the genera and species cultivated, but the characters of the families and most frequently those of the genera concisely and perspicuously indicated,—all shew that these eleven years were diligently employed in bringing his natural method nearer perfection. From the year 1770, Bernard de Jussieu, now 71 years of age, ceased entirely to take any charge of the garden, which he wholly entrusted to his nephew; his health, and particularly his sight, became feeble, and in 1777, after having experienced several attacks of apoplexy, he finished his long career—a career which had in reality so much influence on the progress of botany, although in appearance it had been productive of little.

A comparison of dates will suffice to show what portions of the natural method, as explained in the *Genera Plantarum* of 1789, are due to Bernard de Jussieu, and what to his nephew. The arrangement at Trianon, formed in 1759, proves that the classification of the families according to the cotyledons and the insertion of the stamens, is due to Bernard de Jussieu; Antoine-Laurent de Jussieu, while studying this series, and receiving his early botanical education from his uncle, probably drew up the first principles of the science; but every thing proves that the influence of Bernard de Jussieu on the works of his nephew is limited to this.

In fact, Bernard de Jussieu's three note-books relative to the order of the garden at Trianon, contain not a single character either of the classes, families, or genera; there is not even an indication of any of the classes except those of the Monocotyledones and Dicotyledones. In his notes on the cards we find some generic characters accompanied with sketches of the section of the seed; but these cards, carefully preserved by his family, are far from numerous.

This method of description on cards (*cartes*) was followed by his nephew; they are frequently dated, and amount to a great number in 1774.

Finally, the oldest notes used in his demonstrations by Antoine-Laurent, bear the characters of the families, which are not found in any of those belonging to Bernard.

Thus the first principles of the classification are due to Bernard de Jussieu, but the profound and sagacious application of these principles and the true institution of the natural families are to be ascribed to Laurent.

In 1785, Desfontaines succeeded Lemonnier, and A. L. de Jussieu discontinued his demonstrations as the substitute of the latter.

He immediately commenced to draw up his *Genera Plantarum secundum ordines naturales disposita*, which was nothing else than the developement of the writings used in his demonstrations, and which he had been bringing to perfection from the year 1774. The materials prepared for the work, may, in fact, be seen in a catalogue of genera, to which is added a list of all the new genera indicated in recent works, and which were to be arranged in their proper order in the *Genera* when completed.

The four years that intervened between 1785 and 1789 were thus employed in digesting the materials which were to enter into the composition of the *Genera*, and in the actual completion and printing of the work. The printing went on as the author drew it up, and yet the successive and definitive completion of the different parts led to no important error, so carefully had the general plan and the series of the genera been previously elaborated.

The fifty years which have now nearly elapsed since the publication of this work, and the numerous investigations of the natural method which have taken place since that period, allow us to regard the opinion of the learned world regarding it as the opinion of posterity, and this opinion is so general and so unanimous in its favour, that it would be fruitless to insist here upon its merit and importance. However, without presuming to form a judgment on what has been already determined by the most distinguished botanists of all countries, we may be permitted to inquire, to what kind of merit the *Genera* of Antoine Laurent de Jussieu owes the influence it has exercised, not only on the progress of botany, but likewise on that of every other branch of natural history.

Up to the time of the publication of the *Genera Plantarum*, it may be said that the natural method had not entered the field of public inquiry. The series of Linné and Bernard de Jussieu, very incomplete, and merely nominal, had no other effect than suggesting some speculative reflections to men who were in a condition to guess at their principles. The work of Adanson, destitute of general principles, and destroying natural affinities in the majority of cases, was presented besides in a form which necessarily rendered it difficult to consult, and afforded no opportunity for the author to explain the reasons which led him to form such and such relations. Thus from the date of 1763, the time when Adanson's Families of Plants were published, up to 1789—a period of twenty-six years—the natural method had made no progress in the learned world. Neither in France nor in any other country had it acquired new fol-

lowers ; merely a passing glimpse had been obtained of it ; its nature was not yet demonstrated.

The *Genera* of 1789 had, on the contrary, a speedy influence on the direction of botanical studies. This influence was not indeed immediate, for the public attention was then turned to events of high importance altogether foreign to science. But at the end of a few years the work had come almost into general use throughout France in public teaching, not only in the instructions of the faculties and the Garden of Plants at Paris, but also in the majority of the central schools, those foci of general and varied instruction which were too speedily destroyed.

Of the botanical works in ordinary use, the *Flore Française* of Lamarck and of Decandolle, as well as many local floras, were arranged according to this method, and made it more generally known ; and scarcely twenty years had elapsed, when an eminent botanist declared himself one of its most devoted champions, and contributed materially to bring it to perfection. Since that time it has spread over Europe, and it may be even said the whole world. Its superiority over artificial methods is generally acknowledged, and the latter are now admitted only in their proper character, namely, as more or less convenient keys for opening a way to the nomenclature of vegetables.

We may add, with Cuvier, that the influence of the *Genera Plantarum* is not confined to botany. Every branch of natural history, and zoology in particular, have derived benefit from the principles which guided Jussieu, and which he has so well explained in his admirable introduction ; and we are inclined to think that Cuvier, in expressing this opinion, founded it on his own experience, and that the principles alluded to regulated him in the changes he introduced into the zoological system. To exercise in a gradual and durable manner so positive and generally acknowledged an influence on the progress of science, a work must necessarily unite two different kinds of merit ; general ideas of a varied, important, and novel character, and as perfect an application as possible of these principles in all their details. These, in fact, are the qualities we find united in the *Genera* of Antoine-Laurent de Jussieu. The introduction, written in the most perspicuous and elegant Latin ever employed on scientific subjects, presents an exposition not only of the fundamental principles of the natural method, but as perfect a view of the structure of vegetables as the existing state of botany permitted.

The characters of the classes and families afford an opportunity

for applying and developing these principles; and the exactness, perspicuity, and precision of these characters, particularly such as apply to the families, still authorize us, if we keep in mind the period when they were framed, to consider them as models which few authors have equalled, and none surpassed.

Finally, the notes appended to the greater part of these families form, perhaps, that portion of the work which most evinces the judgment and extensive knowledge of the author.

It was in them that he often corrected the artificial tendency which a linear series always assumes, that he pointed out the multiplied relations of families to each other, and that he indicated the doubts left upon his mind by imperfect observations which he had been unable to verify, or which led to the presentiment of remote affinities, a foresight which greatly outstripped, so to speak, the actual state of the science. Many of the improvements subsequently introduced into the natural method, are in reality, foreseen or indicated either in these notes, or in the sectional divisions of the families, or by a word placed at the end of the generic character.

This last part of the work, the characters of the genera, considered by some superficial authors as a simple compilation, is not in our estimation, the least remarkable feature of it. Certainly the work would have presented, after the characters and notes on the families, a list of the genera comprised in each of these families, as every one has since done who has followed in the same track, and this of itself would have rendered an immense service to the science, and sufficed to elucidate the natural method. Yet, without generic characters, a table of the families would have only been a subject for study and reflection, and would not have been adapted to actual use, nor formed a manual, so to speak, for the botanist; and the natural method would have been disseminated much more slowly among the learned.

But in introducing generic characters, it may be asserted that they could not in general be taken by compilation, even from the most esteemed works of the period; for characters simply distinctive, suitable for an artificial system, would often be quite unadapted to a natural method; or a character which might appear trivial to the author of the former, might acquire great importance in the eyes of him who studies natural relations. Accordingly, the characters of the *Genera* have been generally traced by the hand of Jussieu, either after nature, or after the published or manuscript descriptions of botanists in whom he could place confidence, and the

mention of the sources from which he has derived them, always enables us to judge of their value.

If the characters of the genera, then, are partly a work of compilation, it is a kind of compilation which is indispensable in a production of this nature, and often requires more talent and discernment than direct observations.

It may therefore be affirmed that the *Genera Plantarum*, published in 1789, was a work as perfect in its execution as the state of botany admitted of, and this execution is entirely due to Antoine-Laurent de Jussieu.

With regard to the principles of the classification, the fundamental basis of the method, they were the same as those explained by the author in his memoir on the series of plants in the garden of Paris; that is to say, the same as those admitted by Bernard de Jussieu, and deduced from the number of the cotyledons, and the relative insertion of the parts of the flower, to which were added such as are derived from the presence and structure of the corolla.

The adoption of these characters, as the base of the first classification of the dicotyledones, has perhaps contributed to interrupt the relations which Jussieu no doubt perceived to exist between the apetales and the polypetales, and in some rarer instances between the monopetales and these two last classes. But it is necessary only to refer to the memoir above-mentioned, to perceive that the desire of multiplying the number of the classes, to render the natural method of more easy use, determined the author, in this instance, to depart from what he considered the rigorous principles of his method. If any blame attaches to the author of the *Genera* relatively to the classification he has adopted, it arises, I conceive, from his having made this concession for the purpose of rendering his work of easier application; for it is probable that the characters furnished by the corolla will one day be dispensed with, to a greater or less extent; and this, to appearance, will be the most important modification which the method of the *Genera Plantarum* shall have undergone, although in reality it will merely consist in reverting to the original principles of the author.

The public events which almost immediately succeeded the publication of the *Genera Plantarum*, necessarily diverted the author's attention from his botanical studies. The period which elapsed between 1789 and 1800, was but little adapted to the peaceable study of natural history: Jussieu employed it in rendering himself useful both to his own species and to science, by lending his aid in improving the hospitals, and in organizing the museum of natural history.

In 1790, he was nominated by his section member of the municipality of Paris, and was entrusted, under that title, with the management of the city hospitals: he fulfilled these duties till the year 1792.

In 1793, the garden of plants, or King's garden, was remodelled under the name of the museum of natural history. All the persons appointed, under different titles, to teach or take charge of the collections were raised to the rank of professors, and entrusted with the management of the establishment. M. de Jussieu who, like Vaillant and Bernard de Jussieu, had hitherto been merely a demonstrator, was appointed, with the title of professor of rural botany, to teach that science in the country. He thus shared the task of teaching botany with his colleague Desfontaines; and his herborisations, attended by a crowd of young students, and distinguished amateurs, contributed to spread a taste for the study, and to diffuse the enlightened principles which he had introduced into the science; and his followers were predisposed to give a favourable reception to the latter, when they witnessed the simplicity and kindness of him who demonstrated them.

Having been chosen successively by his colleagues to be director and treasurer in the administration of the museum, he rendered important services to the establishment in these capacities, particularly at the difficult period of its reorganization, when, notwithstanding the obstacles which political events often opposed to the prosperity and even the existence of the museum, he found means, by his zeal and activity, to perform services of the highest advantage to it.

He resumed the publication of his botanical researches when the *Annales du Museum* were commenced in 1802.

Besides a series of notices on the history of the Museum of natural history, we find in the early volumes of this collection many memoirs on new or imperfectly described genera; or on families which recent discoveries or more exact observations have enriched with new genera. Thus the *Amaranthæ*, the *Nyctagineæ*, and the *Onagraræ* were successively submitted to a new examination.

It may be perceived that his object in these investigations was to bring the *Genera Plantarum* and the natural method nearer perfection; but this purpose became more evident in the fifth volume of the collection, in 1804, when he began to publish a series of memoirs devoted to the examination of the general characters of the families derived from the fruit, and confirmed or rectified by the observations of Gærtner. He mentions at the same time the additions which these families had received since the appearance of the *Genera*, and discusses questionable points of organization or synonymy-

my, always displaying remarkable skill in the examination of obscure genera, often ill described by their authors, and whose structure he refers to their true type with singular discrimination, as appears from his decisions having been almost invariably confirmed by more recent observations.

This revision forms the subject of fifteen memoirs, published between the years 1804 and 1819, and embraces all the families of the apetalous, and monopetalous dicotyledones, as well as the epigynous, and hypogynous polypetales.

Always desirous to complete the view of the vegetable kingdom presented in his *Genera Plantarum*, and to make that work keep pace with new discoveries and the progress of science, Jussieu published successively other memoirs, in which he established new genera, occasioned either by his having become better acquainted with their structure since the publication of his original work, or by the numerous discoveries resulting from recent scientific travels, which had introduced into collections so many forms either wholly new, or associating with genera hitherto insulated, and which he had not therefore ventured to consider as the types of particular families. It was thus that the author of the *Genera*, by being the first to add to the edifice he had himself reared, showed that he considered it susceptible of modifications and improvements; for, like every one of an elevated mind, he was aware that the sciences are never stationary, and admitted that the natural method must become more perfect in proportion as botany becomes more extended.

In this way he added to the families already established in 1789, those of the Loaseæ, the Passifloreæ, the Monimieæ, the Lobeliaceæ, the Polygaleæ, and the Paronychieæ. Finally, many of these memoirs are occupied with the examination of obscure genera, whose relations to known genera and natural families could be with difficulty established; of this description are the memoirs on the *Phelipæa* of Thunberg, the *Hydropityon* of Gärtner, many genera of the Laurineæ which ought to be united into one, and on different genera of Loureiro. Perhaps there are few memoirs of great extent which evince more strikingly than these short notices, the extensive knowledge and discrimination of Jussieu: we perceive at every instant how the appreciation of characters, their value, their subordination, or their incongruity, proved a safe guide to him in this difficult investigation. We there see disclosed, so to speak, the method he followed in ascertaining the alliances of numerous exotic genera, often very imperfectly known, and which he has almost always succeeded in classing correctly in his immortal work.

The last memoir published by Jussieu appeared in 1820, in the sixteenth volume of the *Memoirs of the Museum*. It related to the family of the Rubiaceæ, and presented all the genera arranged and described, after the manner the author intended to follow in a new edition of the *Genera Plantarum*, which he then projected, and for which he had constantly been employed in providing materials. This last work, published when he was seventy-two years of age, is worthy of its predecessor of 1789: we find in it the same arrangement, the same distinctness of ideas, the same simple and precise definitions.

From this period Jussieu's sight became so weak that he was obliged to relinquish the examination of nature, and confine himself to studying the works of others. His only contributions to science are some articles inserted in the *Dictionary of Natural Sciences*, relating either to the families of plants, or such as are mentioned by travellers under their vulgar names, which he endeavours to refer to their proper genus or family. These consisted of materials collected long before, and we still recognize in them a mind which joined a most extensive erudition to an intimate knowledge of nature.

We ought also to mention the article on the natural method, in the same collection, published in 1824, in which the same skilful hand has given, with his usual perspicuity, the history of the natural method in botany, and explained the principles on which it is founded.

Finally, in the last years of his life, from the date of 1826, his duties relative to the *Museum of Natural History* having been undertaken by a son worthy of such a father, he passed a great part of the year in the country, and divided his time between the reading of the most modern books on botany, and drawing up an analysis of such of his works as appeared to him of most utility to science.

Combining these recent discoveries with the knowledge he had acquired in the course of his long career, he made them the subject of a new edition of the introduction to his *Genera Plantarum*.

In this *proemium*, which is written in the same pure and elegant Latin as the first Introduction, we find some of the same ideas as he advanced in 1789, particularly those on classification: but it at once appears that he was a stranger to none of the modern discoveries in anatomy and physiology, for he conceived that they all should concur in perfecting the natural method, the base of which should be formed by all the parts of the organization of vegetables. He was engaged almost to the close of his life in completing this work, which turned his attention to his past studies, and agreeably occupied his mind. But his sight had by this time become so weak that it could no longer direct his hand, and he was often obliged to employ the

pen of another ; but this impediment did not make him discontinue his exertions.

We conceive that this, the last work of so illustrious a man, written when he was about 83 years of age, and yet worthy of the author's best days, will be read with interest by those who may have a desire to compare it with the introduction to the *Genera* of 1789. It is besides an homage which ought to be rendered to the memory of an individual who has contributed much to the fame of our country, to lay it before the public ; and we are happy to have it in our power to add it to the present notice.*

If the labours of M. de Jussieu entitle him to a place in the first rank of savans, he may in addition be held up as a model for amenity of character. He was full of kindness to those who devoted themselves to the study of the sciences, and gave every encouragement to such as distinguished themselves in the pursuit. Entirely devoted to the advancement of botany, and searching only for truth, he candidly acknowledged his own errors, and pointed out those of others without asperity. He was never drawn into the polemics of science : no example can be cited, either in his work or in his numerous memoirs, of a single word calculated to injure any of his contemporaries, and yet he was the means of advancing the science much more than those who have combated in support of their views. His were founded on truth, and needed no adventitious support ; left to themselves they have gradually wrought their way into science, till they are now generally admitted. He had the happiness, therefore, to join to the distinction he acquired by his scientific superiority, the friendship of all who were able to appreciate him ; and the young, to whom he was remarkably kind, entertained a most filial veneration for him.

Surrounded by the marks of esteem and friendship, entirely devoted to the study of the sciences, and never extending his ambition beyond this circle ;—happy in the bosom of a numerous family, and seeing himself survive, so to speak, in a son worthy to bear his name, and who had become even during his lifetime his colleague and successor,—he passed his long career in the enjoyment of a happiness which he owed as much to himself as to the circumstances in which he happened to be placed ; and at last, in the eighty-eighth year of his age, on the 15th September 1836, a short and not very painful disorder brought to an easy termination a life which had been spent in so much usefulness and tranquillity.

* It will appear in the same volume of the *Annales des Sciences Naturelles* from which the above biographical notice has been extracted.

II.—*Notes on the Ornithology of Norway.* By W. C. HEWITSON, Esq.

HAVING long wished to explore the breeding places of those birds (periodical visitants of our shores) which leave us during the time of incubation, Norway was fixed upon as the country which we supposed most likely to gratify our hopes; and, could we have placed dependence on ornithological works, they would not have been disappointed. It seems however to have been, (as I fear it is still,) the custom with ornithologists to refer the breeding-places of those birds about which they know nothing either to Norway or some other northern country. Relying too much upon them, we had promised ourselves a long list of acquisitions, comprising nearly all the rarer British birds. On the other hand, all the books of travels in that country which we consulted agree in describing the scarcity of birds in the Norwegian forests.

Never was a country in appearance more fitted as the resort of every class of birds,—with its extensive fiords,*—its numerous lakes and rivers,—its unbounded forests,—its mountains and marshes,—its lofty precipices,—and its unnumbered islands.

For weeks we explored those ceaseless forests, over paths at one time the track of a mountain torrent, at another the margin of a lake or river, penetrating wilds untrodden except by the bear hunters, climbing in turn the tops of the snowy mountains, but with so little success that we ceased to carry our guns,—almost the only living creatures which we saw being the hosts of black ants with which the woods swarm, and by the tracks of which (as clearly defined as the footpath in our fields) they are everywhere intersected.

The fieldfare was the only bird which we ever saw in abundance in the forest; a thrush, a chaffinch, or a yellow-hammer, would sometimes, though rarely, cross our way.

Four-legged animals were alike rare; no bear or wolf ever appeared to peril our path, and the total number of quadrupeds seen during our rambles consisted of three foxes, a hare, a few squirrels, a rat, and a mouse.

With little better success we visited upwards of a hundred islands, and though they were each of them occupied by a few of the black-backed, heron, or common gulls, we never saw these, or any of the sea birds, (with the exception of the puffin, eider duck, and common gull,) in the same abundance that they are seen at the breeding places upon our own coasts.

* Arms of the sea.

Anxious to arrive in Norway at the first breaking up of winter, we proposed to make the fieldfare our guide, and to take our departure about the same time ; it was not, therefore, without feelings of uneasiness that we watched its protracted stay upon our shores long after the blackbird and the thrush had been busied in incubation. May had commenced, and yet the fieldfare tarried, and on the 6th we sailed, and on our passage out were overtaken by several small birds, which, after resting a few minutes on our rigging, shot rapidly ahead of us. The solan goose was observed during the whole time, and at the greatest distance from land.

The weather on our arrival was bitter in the extreme, the day following was sunny and delightful, and in a few minutes walk from Drontheim we found ourselves on the borders of the forest, surrounded by the delicious notes of several of our own sweet songsters.

With the exception of a few eagles, birds of prey were scarcely ever seen ; once or twice only we observed a species of buzzard, a harrier, and the hobby, while the kestrel and merlin were seen but a few times.

Both the British eagles were, however, not unfrequent upon the coast, the white-tailed the more common of the two. Few of the large rocky islands were without them, to particular spots of which they seem to form an attachment,—daily taking their stand for hours together upon some points of rock to prune their feathers, or to sit in motionless inactivity.

Mr John Hancock, who was one of our party, succeeded at midnight in watching a white-tailed eagle to its eyrie, which was upon a ledge projecting from the side of a perpendicular precipice, and inaccessible. With much difficulty Mr B. Johnson and myself succeeded in gaining a position above. In doing so we had climbed up a deep ravine, and had passed so near the nest, displacing fragments of the rock at every step, that we had given up all hopes of surprising the old bird ; and having laid down our guns beside us when the old bird left the nest, which had been hidden by a bush, and was not many yards below us, we were then holding on by one hand to tufts of grass to prevent our sliding down the oblique surface of the rock, and it was to no purpose that we discharged our guns with the other. We could now discern an egg and a newly hatched young one.

Whilst one day wandering in the forest, we were attracted by the anxiety evinced during our loitering in the neighbourhood by a pair of merlins ; and although at home we only know them as breed-

ers on the ground upon the heaths of the north, we felt assured that their nest must be in one of the trees, although we failed in our endeavours to find it. Of this I have now no doubt, since I find by reference to Temminck that they breed in trees.

Upon mentioning our surprise at the scarcity of the larger hawks, we were told that they were now breeding far in the country, remote from human dwelling places, and approachable only by several days journey over snow, and that they are seen only in the winter, or accompanied by the great eagle owl, following and feasting upon the amazing troops of the marmot, the periodical processions of which are so wonderful:—all the information we could learn respecting them was, that they commonly come in the autumn, and that the ground for a great space is completely covered with them.

Of the owls we only saw two alive, the great eagle-owl and the short-eared owl. Dead and nailed against the houses during the previous winter, we had frequently the mortification of seeing the former.

The raven is in plenty upon the larger islands, and surprised us by its tameness, contrasting with most other birds of the country, and with its habits of extreme caution in our own.

The hooded-crow is also abundant by the sea coast, in the rocks of which it breeds. One nest which we found was in the cliffs of a small island covered with sea gulls, in the very camp of its enemies, which unceasingly torment and harass it.

The magpie is one of the most abundant, as well as most interesting, of the Norwegian birds,—noted for its sly cunning habits here, its altered demeanour there is the more remarkable. It is upon the most familiar terms with the inhabitants, picking close about their doors, and sometimes walking inside their houses. It abounds in the town of Drontheim, making its nest upon the churches and warehouses. We saw as many as a dozen of them at one time seated upon the gravestones in the church-yard. Few farm-houses are without several of them breeding under the eaves, their nests supported by the spout. In some trees close to houses, their nests were several feet in depth, the accumulation of years of undisturbed and quiet possession.

The inhabitants of Norway pleased us very much by the kind feeling which they seemed to entertain towards them, as well as to most species of birds, often expressing a hope that we would not shoot many. Holes are cut in many of their buildings for the admission of the starlings, and pieces of wood are nailed against them to support the nest of the house martin. At Christmas, that the

birds may share their festivities and enjoyments, they place a sheaf of corn at the end of their houses.

The jay occurred once or twice.

The starling (next to the fieldfare) is the most abundant bird in the country, breeding in almost every house.

Of the thrushes, the fieldfare is very common, although rather local, not generally dispersed through the forests, but occupying particular parts of them, to which it seems to return year after year, —nests of previous years being mixed amongst those of the present. In these localities it abounds, breeding in society. The nests (a hundred of which might be found in a very limited distance) are placed in the spruce fir, at distances from the ground varying from four to forty feet or upwards. They as well as the eggs very much resemble those of the blackbird; the latter were often five, and not unfrequently six in number. Their hurried flight from tree to tree, and their loud harsh cries, very soon point out their locality. Mr Swainson, in an article on the nests of birds in Lardner's *Cyclopædia*, in order to support a rule laid down by him, that all insectivorous birds are solitary builders, states that the fieldfares are never known to breed together. In this statement, as I have shown above, he is quite mistaken. How does he reconcile the habits of the house and sand martins to this rule? They (especially the latter) are not solitary builders.

The redwing was but seldom seen, and then perched upon the summit of one of the highest trees, pouring forth its delightfully wild note. It was always very shy, and upon seeing our approach would drop suddenly from its height, and disappear amongst the underwood. Its nest, which we twice found with young ones, (although our unceasing endeavours to obtain its eggs were fruitless,) was similar to that of the fieldfare, but nearer the ground.

The redwing is called the nightingale of Norway, and well it deserves the name.

The song thrush and the blackbird were occasionally seen. The ring ouzel often, frequenting many of the wooded rocks, and enlivening the most bleak and desolate islands with its sweet song. It shares with the redwing the name of nightingale, and often delighted us in our midnight visits amongst the islands.

The water ouzel was noticed a few times.

Of the swallow tribe, the swift and the swallow were seldom seen. The house martin was in the greatest numbers, breeding in the lofty rocks, through which the celebrated archway at Forghattan passes. The sand martin was breeding unmolested in the walls of

the town of Drontheim, at an elevation of two or three feet only from the ground. The house martin was the only species which was observed beyond 65° north.

Of the flycatchers we saw both the British species, though seldom.

The whiterump and the whinchat were amongst the most numerous of the small birds in those limited parts which are clear of wood.

We noticed also the redbreast, the redstart, and the blue-throated warbler, the sedge warbler, the blackcap, the white-throat, the chiff chaff, and the willow wren, the latter upon the islands, as far north as the Arctic Circle, from the coppices of which we were sometimes delighted by its soft sweet song. The golden crested-wren, the greater, blue, marsh, cole, and long-tailed titmice. Of the wagtails, the pied and neglected. Of the larks, the skylark, and of the pipits, the meadow, rock, and tree species.

Of the buntings, the yellow, black-headed, and snow buntings. The latter was in its beautiful summer plumage, of black and white. We found a single nest with young under some loose stones.

The house sparrow was very local, and confined to a few farm-houses at a distance from each other.

The chaffinch we saw throughout the whole of the inland district which we traversed. The mountain finch at one place only, where it was breeding. The siskin, the lesser redpole, and the green linnet seldom. The crossbill would now and then cross our road through the forest, but in such rapid flight, that it required great exertion to keep pace with them as they passed from tree to tree, examining the cones of the pines. Of the parrot crossbill we obtained two specimens.

Of the green woodpecker, we saw several near one of the churches, in the steeple of which (being of wood) they had bored several holes in which to deposit their eggs. In two instances only the great black woodpecker was seen at a distance, but so wild, that it was impossible to approach it.

The welcome sound of the cuckoo was seldom heard.

The periodical visits of the grouse (*Tetraonidæ*) to this country are very interesting. In one year the ptarmigan, which comprises two species, (*Tetrao lagopus* and *saliceti*), and the black grouse (*T. tetrix*) abound in amazing numbers, breed around the houses of the natives, and are extremely tame. The next year probably they are scarcely to be met with. The season we were there was unfortunately the year of scarcity; and although we took infinite pains, and used every exertion to obtain the ptarmigan, it was

of no avail. Whether or not this part of Norway is supplied with birds emigrating from Russia or other parts of the continent, or by more partial emigration from its own mountains, during the severe months of winter, I will not pretend to say. The previous winter had been such for extreme mildness as was not remembered, so little snow having fallen that the sledges were useless, and the communication from the inland country cut off.

The capercaillie we had only twice the satisfaction of seeing alive in the woods; on the hospitable board of the merchants of Drontheim more frequently. They are scarce and very difficult to procure, and are only obtained by the natives with the greatest perseverance, being nearly always shot with the rifle, and either during the night or at the break of day: it is considered in consequence a very good night's work to bring down one. They breed in the mountainous parts of the forest far from any habitations, and it was with the greatest difficulty we could procure the eggs. They are very similar to those of our black grouse, but larger. The other species of game are the black grouse; the British ptarmigan (*T. lagopus*,) ought scarcely to be included in a list which is intended to contain those birds only which we ourselves saw, not having met with a single specimen, although extremely abundant in some seasons. Of the willow grouse (*T. saliceti*) we shot a pair upon one of the larger islands; they were remarkably tame, and could not be urged to take flight.

The note of the corncrake was once or twice heard.

The golden plover and the dotterel were in small flocks upon the patches of cultivated land. The ring-dotterel often upon the sea shore, the colouring of a specimen which we shot appeared to us unusually bright and beautiful; indeed, we observed this with regard to several of the birds which we shot while there. Of the waders, we noticed occasionally, the curlew, the whimbrel, the greenshank, redshank, ruff, dunlin and purple sandpiper. We were much amused with what was to us quite new, with regard to some of the birds just mentioned. One day we were pursuing a bird of this class, and after hunting a marshy place towards which it had flown to no purpose, we discovered it, much to our astonishment, seated above our heads on the top of a tall tree. We found afterwards that it was a common practice with the redshank and the greenshank, and what surprised us more, the long legged curlew would frequently alight on the top of the pine forest, and would pass from tree to tree uttering its loud note.

The oyster catcher was frequent everywhere. Numbers of them

were apparently idlers, and flying together in flocks during the whole summer.

We were rewarded for many a toilsome search by finding the nest and eggs of the turnstone. They were admirably sheltered from the many storms to which the bleak islands where they breed are exposed, being placed beneath the branches of the juniper bushes, which creep closely along the surface of the rocks. We afterwards found several of their nests; and it was an easy matter for us to ascertain (before landing) upon which island we should be successful in discovering another of their nests, by the daring attacks they made upon any of the larger gulls which approached them.

The coot was only once seen.

The bean goose was rather numerous upon one of the huge islands near the Arctic Circle, where it had been breeding during the previous month.

Of the ducks we noticed the velvet duck, scoter, common wild duck, teal, widgeon, shieldrake, long-tailed duck, golden eye, and eider duck. The last mentioned by far the most numerous, breeding in great numbers upon some of the islands; the male birds, which were floating around them in hundreds, together giving the sea a lively and most beautiful appearance. They are a valuable property to the natives, and are in consequence strictly protected by them. Upon one island which we visited in company with the keeper, the females were sitting in great numbers, and were so perfectly tame, and on such familiar terms with him, that they did not appear to be in the least disturbed whilst we stood by to look at them, and some of them would even allow him to stroke them on the back with his hand.

Of the golden-eye we had the satisfaction to find a nest, and, for a bird of its habits, most singularly situated. It was in a tree, in a hole lately occupied by the great black woodpecker, at the height of ten or twelve feet from the ground, and so small that it was with difficulty we could insert the hand.

Of the goosander we frequently observed small flocks, almost entirely male birds, accompanied rarely by one or two females. The females must have been breeding somewhere in the neighbourhood, but it was in vain that we made every search for the eggs. Upon inquiry of the best informed people, we were told that the females are never seen during the summer, nor until (accompanied by their young ones) they join the male birds in the autumn.

The red-breasted merganser was frequent upon most of the lakes

and rivers, laying its eggs under the shelter of the spruce fir tree, either upon their margins or their numerous woody islands.

The great northern and black-throated divers were seen, though rarely, in the fiords; the red-throated diver often upon almost every piece of water. We frequently heard their loud singular scream in an evening at a great distance.

The pretty black guillemot gave an interest to almost every island where crevices in the rocks or loose stones were to be found as breeding places.

Amongst the numerous islands which we visited it is a singular fact that we never once saw either the common guillemot, the razor-bill, or the kittiwake,—all birds the most frequent upon our own coast. This was owing, no doubt, to the scarcity of those rocks which, rising perpendicularly from the water's edge, afford them the necessary security.

The puffin was alike rare, except upon one island, where they abounded in incredible numbers. The island rose in its centre to the height of several hundred feet, one side being composed entirely of rocks and large stones, piled upon each other in the wildest confusion, and under these the puffin was breeding, and so numerous were they, that we could distinctly see them the evening before, from the hut in which we took up our night's residence, although at the distance of upwards of a mile. Whilst scrambling over the rocks, we could hear them beneath us uttering a most singular groaning kind of sound. They would frequently start from under our feet, and join the dense throng which was unceasingly passing around us. It was a sight which astonished at the same time that it delighted us. I had never before seen so many kinds of one species together, and probably their numbers are scarcely exceeded by the combined numbers of guillemots and gulls which frequent one of the largest breeding places upon our coast. We seated ourselves upon the rocks to enjoy the scene, and numbers of them settled near us, forming themselves into the most beautiful groups; every rock or large stone was covered with them, and hundreds were at the same time within the range of our guns; some were seated low upon the whole of the foot, others erect upon the toes only; some struck out their crops, and strutted about exactly in the manner of pigeons.

Of the terns, the arctic was the only species we noticed.

Of the gulls, the greater and lesser black-backed, the heron, and the common gull were numerous, the latter especially upon one island, the owner of which had laid up a store of their eggs for win-

ter's consumption, consisting of about 2000, from which we had the pleasure of selecting specimens for our cabinets.

Some of the arctic gulls (*Lestris*) passed over us, apparently on their way further north. The *Lestris Richardsonii* was abundant, one or two pairs breeding upon almost every island. Birds in the different states of plumage being indiscriminately associated together, the many nests which we found were in turns the property either of two white-breasted birds, of two entirely of a uniform dark colour, or of a pair consisting of one of each.

III.—*The British Cerastia: a Supplement to a former Essay.* By C. C. BABINGTON, F. L. S., &c. Plate IX. Continued from p. 204.

CERASTIUM ATROVIRENS.—Leaves broadly ovate, petals much shorter than the calyx, sepals lanceolate-acute covered with glandular hairs their apex and margins narrowly membranous, bracteæ herbaceous, capsule obovate or subcylindrical shorter than the calyx, fruit-bearing peduncles two or three times as long as the calyx and erect.

The whole plant of a dark-green colour, and covered with short very viscid pubescence. Root small, fibrous. Stems numerous, ascending repeatedly forked, bearing a flower in each fork. Leaves very broadly ovate, somewhat pointed, the lower ones narrowed into a broad petiole, the others sessile. Flowers scattered, one in the axil of each fork of the stem, all their parts arranged in fours. Peduncles two or three times as long as the calyx, always straight and erect. Bracteæ totally without any membranous margin. Sepals lanceolate, acute, covered with short glandular hairs, with narrow membranous margins and apex. Petals about half the length of the calyx. Capsule almost always opening with eight teeth in conformity with the quaternary structure of the flower; in one instance I observed ten teeth remarkably short, never as long as the calyx, and usually about half its length, obovate, or subcylindrical, inflated below, and slightly curved towards the top, always erect, and never forming an angle with its peduncle. Seeds rather large, chestnut-brown, compressed and tuberculated.

Gathered by Dr G. Johnston on old walls in the immediate vicinity of Berwick-upon-Tweed, flowering in May and June.

This plant is very nearly allied to *C. tetrandrum*, from which it differs by not having an herbaceous line extending to the apex of the sepals, its very short capsules, erect, that is, not reflexed fruit, and the total want of a membranous margin to the bracteæ. It is

distinguished from *C. pumilum* by the same characters, (the membranous apex of the sepals excepted,) in addition by the shortness of its petals, its dispersed flowers, and long peduncles. From *C. pedunculatum*, with which it agrees in its dispersed flowers and glutinous pubescence, it may be distinguished by its difference of habit, much larger and nearly orbicular foliage, shorter internodes, total want of a membranous margin to the bractæ, and short capsules.

N. B. This species ought to have followed *C. tetrandrum*, described in my former paper on the *Cerastia*, p. 201, Vol. ii.

Plate IX. Fig. 1, *C. atrovirens*, natural size; the figure drawn from a dried specimen. Fig. 2, A leaf from a fresh specimen. Fig. 3, The flower. Fig. 4, The capsule and styles from a new blown flower. Fig. 5, The capsule open and full of ripened seeds. Fig. 6, The same, but older. Fig. 7, A seed. Fig. 8, A petal. These figures are all magnified more or less.

C. PUMILUM, *Curt.*—Leaves ovate-lanceolate, petals about as long as the calyx, sepals lanceolate acute their apex and margins narrowly membranous, bractæ herbaceous with a very narrow membranous margin, capsule cylindrical slightly curved upwards and longer than the calyx, fruit-bearing peduncles reflexed and scarcely longer than the calyx.

C. pumilum, *Curt. Fl. Lond.* ii. t. 92. *Reichen. Fl. excurs.* 4969.

C. semidecandrum, β . *Smith, Eng. Fl.* ii. 331.

The whole plant covered, in my specimens, with short viscid pubescence. Stems prostrate and ascending, branching at the root, but nearly simple afterwards. Leaves ovate-lanceolate, small, the lower ones narrowed into a broad petiole, the others sessile. Flowers aggregated into small terminal dichotomous corymbs. Peduncles very short, when bearing fruit reflexed, and scarcely exceeding the length of the calyx. Bractæ with a very slight membranous margin. Sepals lanceolate-acute, with narrow membranous margins and apices. Petals nearly as long as the calyx. Capsule usually much longer than the calyx, but only slightly so in some few cases, cylindrical and slightly curved upwards, reflexed together with its peduncle. Seeds tuberculated.

Near Croydon. Mr Dickson.

Having recently obtained, through the kindness of the Rev. T. Gisborne, some authentic specimens of the *C. pumilum* of Curtis, which were given to him by Mr Dickson, its original discoverer, I have been able to determine this little known plant. In general

appearance it closely resembles *C. semidecandrum*, but is at once distinguished by its very slightly membranous bracteæ and reflexed fruit. It is probably *C. semidecandrum* of Loiseleur, Fl. Gall. i. 323.

IV.—*The Natural History of British Zoophytes.* By GEORGE JOHNSTON, M. D., Fellow of the Royal College of Surgeons of Edinburgh. (Continued from Vol. i. p. 447.)

Class—ZOOPHYTA, Solander.

(Polypes, Cuvier.—Polypi, Lamarck.—*Z. polypifera*, Grant.)

Order I. HYDROIDA.

Character.—*Polypes compound, rarely single and naked, the mouth encircled with roughish filiform tentacula; stomach without proper parietes; intestine 0; anus 0; reproductive gemmules pululating from the body and naked, or contained in external vesicles.*—*Polypidoms horny, fistular, more or less phytoidal, fixed, external.*

“As for your pretty little seed-cups or vases, they are a sweet confirmation of the pleasure Nature seems to take in superadding an elegance of form to most of her works, wherever you find them. How poor and bungling are all the imitations of art! When I have the pleasure of seeing you next, we will sit down, nay kneel down if you will, and admire these things.”* Thus did Hogarth—our great moral painter—write to Ellis in evident reference to the zoophytes of the present order; and he must indeed be more than ordinarily dull and insensate who can examine them without catching some of the enthusiasm of the artist. They excell all other zoophytical productions in delicacy and the graceful arrangement of their forms, some borrowing the character of the prettiest marine plants, others assuming the semblance of the ostrich-plume, while the variety and elegance exhibited in the figures and sculpture of their miniature cups and chalices is only limited by the number of their species.

The Hydroida vary from a few lines to upwards of a foot in height. They are all, with the exception of the hydra or fresh-water polype, marine productions, and are found attached to rocks, shells, sea-weed, other corallines, and to various shell-fish. Many of them appear to be indiscriminate in their choice of the object, but others again make a decided preference. Thus *Thuiaria thuja* prefers the valves of old shells, *Thoa helecina* is more partial to the larger univalves, *Antennu-*

* Lin. Corresp. Vol. ii. p. 44.

laria antennina grows on rocks, Campanularia geniculata delights to cover the broad frond of the tangle with a fairy forest peopled with its myriads of busy polypes, while the Sertularia pumila rather loves the more common and coarser wracks. The choice may in part be dependent on their habits, for such as are destined to live in shallow water, or on a shore exposed by the reflux of every tide, are in general vegetable parasites; while the species which spring up in the deep seas must select between rocks, corallines or shells, the depths at which they are found being too great for the vegetation of sea-weed.*

The polypidoms are confervoid and more or less divided, the ramifications being disposed in a variety of elegant plant-like forms. The stem and branches are alike in texture, slender, horny, fistular,



* Lamouroux says,—“We find some polypidoms placed always on the southern slopes of rocks and never on that towards the east, west, or north. Others, on the contrary, grow only on these exposures, and never on the south. Sometimes their position is varied according to latitude, and the shores inclined towards the south, in temperate or cold countries, produce the same species as the northern exposures in equatorial regions: in general their branches appear directed towards the main sea.”—*Corall. Flex. Introd.* p. L.

and almost always jointed at short and regular intervals, the joint being a mere break in the continuity of the sheath without any character of a proper hinge, and evidently formed by regular periodical interruptions in the growth of the polypidoms. Along their sides, or at the extremities, we find the denticles or cup-like cells of the polypes arranged in a determinate order, either sessile or elevated on a stalk, (Fig. *a*.) Though of the same substance, the cell is something more than a simple expansion of the stem or branch, for near its base there is a distinct partition or diaphragm on which the body of the polype rests, with a plain or tubulous perforation in the centre through which the connection between the individual polype and the common medullary pulp is retained, (Fig. *b*.) * Besides the cells there are found, at certain seasons, a larger sort of vesicles, readily distinguished from the others by their size and the irregularity of their distribution.—The more robust tribes grow erect, and, being flexible and elastic, yield readily to the waves and currents; but some of the very delicate species avoid a shock for which they are unequal by creeping along the surface.

The polypidoms, when dried, are for the most part of a yellowish or horn colour. “When they are immersed in water, they recover the same form they appeared in when fresh in the sea; and soon become filled with the liquid. This gives them a semitransparent amber colour, and makes them very elastic.” † Their material appears to be analogous to horn or condensed albumen, which is moulded into a homogeneous investing sheath, in which no vessels or cells indicating a definite organization can be detected.‡ It seems to be in fact a sort of hardened epidermis, at first in contact and partial adhesion with the living interior pulp, from which it is subsequently detached, in the natural progress of its consolidation, by a process of shrivelling in the soft matter, and by the motions and efforts of the polypes themselves. §

The polypes are placed in the cells within which, with the exception of the Tubulariæ, they can hide themselves entirely when danger threatens. When at rest and in their native sites, they expand their tentacula and push them far beyond the rim of their cups, in readiness to arrest any small worm or crustaceous insect which may float within their circle. These tentacula are always simple but roughish, (Fig. *c*.) and in the centre of the disk round which they are arranged.

* Lister, in Phil. Trans. 1834, p. 371. † Ellis, English Corallines, p. 3.

‡ The contrary is maintained by Link, and it appears by Cavolini and Schweigger, who assert that they have seen vessels ramified in the stems and branches of Sertulariadae.—Ann. des. Sc. Nat. Part. Bot. V. ii. p. 321.

§ See Lister's Observations in Phil. Trans. 1834, p. 374.

ed we perceive the oral aperture (*d.*) leading to a stomachical cavity without intestine or other chylopoetick viscus. The body is somewhat globular, soft and irritable; and it is prolonged posteriorly down the stalk or tube to be united with the central pulp which fills the branches and stem, (*e.*) so that in this manner all the polypes of the same polypidom are connected together by a living thread, and constitute a family whose objects and interests are identical, and whose workings are all regulated by one harmonious instinct:

“ Unconscious, not unworthy, instruments,
By which a hand invisible was rearing
A new creation in the secret deep.”

Or if, with Linnæus and Cuvier, we suppose that the polypes of every polypidom constitute only one body or individual, this may be described as a sort of hydra divided, after the manner of a tree, into many or innumerable branches, from each of which pullulate one or more armed heads to capture and digest the prey that is to serve for the nutriment of their common trunk.

The reproductive gemmules of *Tabularia* and *Coryne* are generated in the interior and extruded near the base of the tentacula; but in all the other genera they are produced in external vesicles, which were therefore appropriately named by Ellis the ovaries, and which we have already mentioned as being larger than the cells and irregular in their distribution. They are produced at certain seasons only, most commonly in spring, and fall off after the maturity and discharge of their contents.* The number of the gemmules in each vesicle, and their shape, varies in every species. In the vesicle they are connected to a central placentular column, though there are some exceptions to this, and when mature they escape outwards by a disruption or fall of the lid which closes the top, being extruded in succession and, in some cases at least, after intervals of some hours. From the observations of Professor Grant, it appears to be proved that, after their discharge, the ova move about for some time in the water by the vibrations of minute cilia, but having in due course settled on a proper site, they throw out, in the manner of a vegetable seed, a root-like fibre to fix themselves, and then push up a shoot as a commencement to the future polypidom. Polype-cells and polypes are rapidly evolved on the sides of this shoot, and nourishment being now received from an external source, and circulating through the

* So that Hedwig's axiom, adopted by M. Virey, “ that the reproductive organs of animals are continuous with the life of the individual, while the reproductive organs of perennial plants, when their functions have been performed, are thrown off, and replaced in the succeeding season by others,”—must be received with some limitations.—See Tiedemann's *Comp. Physiology*, p. 76

whole animal, there is not merely an upward growth, but creeping tubes, "full of the same living medullary substance with the rest of the body," are projected from the base along the surface of the object of fixture. "These tubes not only secure it from the motion of the waves, but likewise from these rise other young animals or corallines, which growing up like the former, with their proper heads or organs to procure food, send out other adhering tubes from below, with a further increase of these many-headed branched animals; so that in a short time a whole grove of vesicular corallines is formed, as we find them on oysters, and other shell-fish, when we drag for them in deep water."*

There are many facts which prove that the growth of these polypidoms is very rapid, but not more so than might be anticipated when it is remembered how vast is the number of polype architects; and no sooner is a new branch extended than it becomes almost simultaneously a support of new workers which, with "toil unweariable," add incessantly to the materials of increase. Their duration is various: some have only a summer's existence, as *Campanularia geniculata*; many are probably annual, and the epiphyllous kinds cannot at most prolong their term beyond that of the weed on which they grow; but such as attach themselves to rocks are probably less perishable, for their size and consistency seem to indicate a greater age: it is thus with the *Tubulariæ* and some of the compound *Sertulariadaë*.

But the life of the polypes considered abstractedly is probably in no instance coetaneous with the duration of the polypidom, for the lower parts of this become, after a time, empty of pulp and lifeless, and lose the cells inhabited by the polypes, which, in an old specimen, are to be found in a state of activity only near the summit, or on the new shoots. The *Thuiaria thuja* affords a remarkable example of this fact; the branches which carry the polypes dropping off in regular succession as younger ones are successively formed, so that the polypidom retains, throughout its whole growth, the appearance of a bottle brush, the naked stem and the branched top being kept in every stage in a due proportion to each other. *Sertularia argentea*, *Plumularia falcata*, &c. are subjected to the same law,—the primary polypiferous shoots being deciduous, so that in them also the stalk becomes bare, while the upper parts are graced with a luxuriant ramification loaded with tiny architects. But in our eagerness to generalize, let us not forget that there are some species, as *Sertularia pumila*, *abietina*, &c., in which this process of successive denudation is not observable, perhaps, however, because of their form, which is not of a

* Ellis and Solander's Zoophytes, p. 33.

kind to be altered by it, and hence unnoticeable, or because the duration of the whole is too fugitive to permit the law to produce a visible effect.

There are facts which appear to prove that the life of the individual polypes is even more transitory than their own cells; that like a blossom they bud and blow and fall off or are absorbed, when another sprouts up from the medullary pulp to occupy the very cell of its predecessor, and in its turn to give way and be replaced by another. When speaking of flexible corallines Lamouroux says, "Some there are that are entirely covered with polypi through the summer and autumn, but they perish with the cold of winter: no sooner, however, has the sun resumed his revivifying influence than new animals are developed, and fresh branches are produced upon the old ones."* Of the *Tubularia indivisa*, Sir John G. Dalyell tells us that "the head is deciduous, falling in general soon after recovery from the sea. It is *regenerated at intervals* of from ten days to several weeks, but with the number of external organs successively diminishing, though the stem is always elongated. It seems to rise within this tubular stem from below, and to be dependent on the presence of the internal tenacious matter with which the tube is occupied. A head springs from the remaining stem, cut over very near the root; and a redundance of heads may be obtained from artificial sections, apparently beyond the ordinary provisions of nature. Thus twenty-two heads were produced through the course of 550 days, from three sections of a single stem."† The observations of Mr Harvey on the same, or a very nearly allied, species of zoophyte confirm the experiments of Sir J. G. Dalyell, so far as these have reference to the deciduousness of the polypes and their regeneration;‡ and it seems

* Corall. Flex. p. xvi.

† Edin. New Phil. Journ. xvii. p. 415.

‡ "The most singular circumstance attending the growth of this animal, and which I discovered entirely by accident, remains to be mentioned. After I had kept the clusters in a large bowl for two days, I observed the animals to droop and look unhealthy. On the third day the heads were all thrown off, and lying on the bottom of the vessel; all the pink colouring matter was deposited in the form of a cloud, and when it had stood quietly for two days, it became a very fine powder. Thinking that the tubes were dead I was going to throw them away, but I happened to be under the necessity of quitting home for two days, and on my return I found a thin transparent film being protruded from the top of every tube: I then changed the water every day, and in three days time every tube had a small body reproduced upon it. The only difference that I can discover in the structure of the young from the old heads, consists in the new ones wanting the small red *papillæ*, and in the absence of all colour in the animal."—Proceed. Zool. Soc. No. 41, p. 55.

to me not altogether unwarrantable to infer a like temporary existence and revival in those of the Sertulariadae from a reflection on the experiments of Mr Lister,—incomplete certainly, but which prove that under certain circumstances their polypes disappear by a process of internal absorption,* and under convenient circumstances would have been renovated, as I have witnessed in similar experiments. † Had these singular facts been known to Linnæus, how eagerly and effectively would he have impressed them into the support of his favourite theory! Like the flowers of the field the heads or “flores” of these polypidoms expand their petalloid arms, which after a time fall like blighted blossoms off a tree;—they do become “old in their youth,” and rendered hebetous and unfit for duty or ornament by age or accident, the common trunk throws them off, and supplies its wants by ever-young and vigorous growths. “Admiranda tibi levium spectacula rerum.” The phenomena are of those which justly challenge admiration and excuse a sober scepticism, so alien are they to all we are accustomed to observe in more familiar organisms; but besides that faithful observation renders the facts undeniable, a reflection on the history of the Hydra might almost have led us to anticipate such events in the life of these zoophytes. “Verily for mine owne part, the more I looke into Nature’s workes, the sooner am I induced to beleeve of her even those things that seem incredible.”

I arrange the British species of this order under the following families and genera:

Family I. HYDRAIDÆ.

Polypes viviparous, the young pullulating from the body of the parent.

1. HYDRA. Polypes naked, single, locomotive.

* Phil. Trans. 1834, p. 374, 376.

† On Saturday, May 28th 1837, a specimen of *Campanularia gelatinosa* was procured from the shore, and after having ascertained that the polypes were active and entire, it was placed in a saucer of sea-water. Here it remained undisturbed until Monday afternoon, when all the polypes had disappeared. Some cells were empty or nearly so, others were half-filled with the wasted body of the polype, which had lost, however, every vestige of the tentacula. The water had become putrid, and the specimen was therefore removed to another vessel with pure water, and again set aside. On examining it on the Thursday (June 1st) the cells were evidently filling again, although no tentacula were visibly protruded, but on the afternoon of Friday (June 2d) every cell had its polype complete, and displayed in the greatest perfection.

Family II. TUBULARIADÆ.

Polypes gemmiparous, the gemmules naked, pullulating from the bases of the tentacula.

* No Polypidom.

2. CORYNE. Polypes naked, the tentacula filiform.
3. HERMIA. Polypes tunicated, the tentacula with glandular tips.
** A distinct polypidom,
4. TUBULARIA. Polypes not retractile within cells: Polypidoms fistular, simple or branched.

Family III. SERTULARIADÆ.

Polypes gemmiparous, the gemmules enclosed in external ovarian persistent vesicles scattered on the polypidom.

* Polype-cells sessile.

5. THOA. Cells indistinct, tubular, the simple extremities of the interwoven branchlets.
6. SERTULARIA. Cells biserial, short, erect, the apertures everted.
7. THUIARIA. Cells biserial, imbedded, the apertures looking forward.
8. PLUMULARIA. Cells uniserial; the branchlets plumose or pectinate.
9. ANTENNULARIA. Cells uniserial; the branchlets whorled.
* Polype-cells on ringed stalks.
10. CAMPANULARIA. Cells campanulate.

I. HYDRAIDÆ.

I. HYDRA, Linnæus.

Character.—*Polypes locomotive, single, naked, gelatinous, sub-cylindrical, but very contractile, the mouth encircled with a single series of granulous filiform tentacula.*

1. H. VIRIDIS, grass-green; body cylindrical or insensibly narrowed downwards; tentacula 6—10, shorter than the body. (Fig. Vol. i. p. 236.)

Polypes verds, *Trembley*, Mem. 22, pl. 1. fig. 1; pl. 3, fig. 1—10.—
Fresh-water Polypus, *Trembley*, in Phil. Trans. Abridg. viii. 623. *Folhes*, in ibid. 676. pl. 17, and pl. 18, fig. 1—3.—*Hydra viridis*, *Lin.* Faun. Suec. 367, No. 1283, *Lin. Syst.* 1320. *Mull. Verm.* I. ii. 13. *Zool. Dan. prod.* 230, No. 2783. *Berk. Syn.* i. 221. *Ure's Rutherg.* 232. *Turt. Gmel.* iv. 691. *Turt. Br. Faun.* 218. *Lam. Anim. s. Vert.* ii. 60. *Stew. Elem.* ii. 452. pl. 12, fig. 4, 5. *Blumenbach's Man.* 275. pl. 1, fig. 10. *Bosc Vers* ii. 274. *Stark*, [Elem. ii. 443. *Woodward*, in Mag. Nat. Hist. iii. 349, fig. 89. *Roget*, *Bridgew. Treat.* i. 162, fig. 59, and 176—8, fig. 73—76. *Adams on the Microscope*, 399, pl. 21, fig. 5. *Carus*, *Comp. Anat.* tab. 1. fig. 1.—*H. viridissima*, *Pall*, *Elench.* 31.

—Third sort of Polype, *Baker*, Polyp. 19 c. fig.—Le Polype vert, *Cuv. Reg. Anim.* iii. 295.—L'Hydre verte, *Blainv. Actinol.* 494. pl. 85, fig. 1.

Hab. Ponds and still waters, common throughout England, and the south of Scotland. In almost all the parishes in the vicinity of Glasgow, *Ure*.

The polypes of this species differ from the following, “not only in colour, but likewise in their arms, which were much shorter in proportion to their bodies, capable of but little extension, and narrower at the root than the extremity, which is contrary to the other species. Their arms were so short, they could not clasp round a very small and slender worm, but seemed only to pinch it fast, till they could master and devour it, which they did with as much greediness as any. I imagined these polypes owed their green colour to some particular food, such as weeds, &c. and that they would lose it upon being kept to worms; but I find myself mistaken, for they retain their greenness after some months as well as ever, and are now grown of a moderate size, extending sometimes three quarters of an inch; their arms are also lengthened very much to what they were, and are of a lighter green than the body, their number eight, nine, or ten. The tail is very little slenderer than the body, but more spread at the end than the tails of other kinds.”—*Baker*.

Pallas says that the offspring are produced from every part of the body, while Blainville thinks he has remarked that they shoot always from the same place, “au point de jonction de la partie creuse et de celle qui ne l'est pas.” Blainville is candid enough, however, to inform us that Professor Van der Hoëven had made some observations adverse to his opinion; and our own are certainly in accordance with those of Pallas and of the Professor of Leyden.

Trembley is careful to tell us that he discovered this species in June 1740, nor can we smile at the particularity of the record when we remember that the discovery is the foundation of his immortal fame.* It was first observed in England in the spring of 1743 by a Mr Du Cane of Essex. It appears to be a hardy animal. I have kept it for more than twelvemonths in a small vial of water unchanged during the whole of that time, and it remained lively, and bred freely, feeding on the minute Entomostraca confined with it, and which, propagating much more abundantly, furnished a good supply of what was evidently a favourite food.

2. *H. VULGARIS*, orange-brown or sometimes oil-green; body cylindraceous; tentacula 7-12, as long or longer than the body.

* “Trembley (Abraham), de Genève, né en 1710, mort en 1784; *immortel* par la découverte de la reproduction du polype.” *Cuvier, Reg. Animal.* iii. 422.

Polypes de la seconde espèce, *Tremb.* Mem. pl. 1, fig. 2, 5; pl. 2. fig. 2; pl. 6. fig. 2 and 8; pl. 8. fig. 1—7; pl. 10. fig. 1—7; pl. 11, 12, 13. figs. omn. partly copied in *Adams*, Micros. 399, pl. 21. fig. 6.—*Hydra vulgaris*, *Pall.* Elench. 30. *Ellis* and *Soland.* Zooph. 9.—*H. grisea*, *Lin.* Syst. 1320. *Mull.* Zool. Dan. Prod. 230, No. 2784. Verm. i. ii. 14. *Ure's* Rutherg. 233. *Berk.* Syn. i. 222. *Turt.* Gmel. iv. 692. *Turt.* Brit. Faun. 218. *Stew.* Elem. ii. 452. *Lam.* Anim. s. Vert. ii. 60. *Bosc.* Vers ii. 275. *Stark.* Elem. ii. 443. *Templeton* in Mag. Nat. Hist. ix. 418.—*H. brunnea*, *Templeton*, loc. cit. 417. fig. 56.—First sort of Polype, *Baker*, Polyp. 17. c. fig.—*L'Hydre commune*, *Blainv.* Actinol. 495.

Hab. Weedy ponds and slowly running waters. Probably common in all parts of the kingdom.

On comparing the descriptions of the authors quoted above, I am led to conclude that this species is either subject to much variety, or that two species have been confounded together, and given rise to a discrepancy which seems otherwise irreconcilable. My own experience inclines me to the latter supposition, but since I have had no opportunities of making observations on specimens from different and distant localities, I deem it more prudent to indicate what appear to be two species as only varieties of the *vulgaris*, until the point can be settled by more leisured naturalists.

Var. a. aurantia, light reddish-brown or orange-coloured; tentacula not longer than the body. Plate X. Fig. 1.

Var. b. grisea, light olive-green; tentacula paler and longer than the body. Plate X. Fig. 2.

The first is by much the commoner, and does not exceed the *H. viridis* in size, which it resembles also in its habits and form. It is always of an orange, brown, or red colour, the intensity of the tint depending on the nature of the food, on the state of the creature's repletion, becoming even blood-red when fed upon the small crimson worms and larvæ which usually abound in its haunts.* The tentacula in all my specimens have never exceeded the length of the body, are usually seven or eight in number, and taper to the point insensibly. Every part of the body is generative of young, which may frequently be seen hanging from the parent at the same time in different stages of their growth. *Baker's* figure represents this variety very well.

The second is a larger animal and comparatively rare, less sensible to external impressions, and of a more gracile form. Its colour is a dilute olive-green with paler tentacula, which are considerably longer than the body, and hang like silken threads in the water, waving to and fro without assuming that regular circular disposition which they

* "I have found a bright red *Hydra* rather abundant on Putney Heath, near London. It does not much differ, except in colour, from the green one." *J. E. Gray* in lit. May 6, 1833. See *Trembley's* Mem. p. 47, and 128.

commonly do in the *H. viridis*. I have not observed more than one young at a time, pullulating from near the middle of the body, and after this has attained a certain growth, the polype has the appearance of being dichotomously divided.

Dr Fleming's *Hydra vulgaris*, Brit. Anim. 553, embraces this and the preceding, as well as the following species, which are considered the mere variations of one protean original;—

“Facies non omnibus una,

Nec diversa tamen:”—

but the conviction of their permanent distinctness has been forced upon me by a long continuous observation of individuals in a state of confinement. Had, however, personal observation been wanting, the same conclusion would have been willingly adopted on the paramount authorities of Trembley and Baker, who had very carefully studied these creatures; and Pallas speaks very decidedly to the same purport. “Species Hydræ a Linnæo * pro varietatibus habitas, a Ræselio primum bene determinatas adoptavi, cum de trium priorum constantia, propria me experientia certissimum reddiderit.”—*Elench.* 29.

3. *H. FUSCA*, brown or griseous; inferior half of the body suddenly attenuated; tentacula several times longer than the body.

Polypes à long bras, *Tremb.* Mem. pl. 1. fig. 3, 4, 6; pl. 2. fig. 1, 3, 4; pl. 3, fig. 11; pl. 5, fig. 1-4; pl. 6, fig. 3-7, 9, 10; pl. 8. fig. 8, 11; pl. 9. copied in *Adams*, Micros. 399, pl. 21, fig. 7, 8; pl. 23, A. B; pl. 24, A. B. fig. omnes. *Cuv.* Reg. Anim. iii. 295.—Long armed fresh-water Polype, *Ellis*, Corall. xvi. pl. 28. fig. C. (the tentacula shortened for the conveniency of introducing them within the size of the plate.)—Second sort of Polype, *Baker*, Polyp. 18 c. fig.—*Hydra oligactis*, *Pall.* *Elench.* 29.—*H. fusca*, *Lin.* Syst. 1320. *Ellis* and *Soland.* Zooph. 9. *Berk.* Syn. i, 221. *Turt.* Gmel. iv. 691. *Turt.* Brit. Faun. 218. *Stew.* Elem. ii. 452. *Lam.* Anim. s. Vert. ii. 60. *Bosc* Vers, ii. 275.—*L'H.* brune, *Blainv.* Actinol. 495.

Hab. Still waters in England, rare. In a pond at Hackney, *Mr. John Ellicot*. †

“The tails of these are long, slender and transparent, and when placed before the microscope, a long straight gut may plainly be distinguished passing from the body-part or stomach to an opening at the end thereof. These are rather lighter coloured than the former, (*H. vulgaris*,) and have seldom more than six or eight arms, but those capable of great extension.”—*Baker*.

Baker reckoned that his English exemplars were of a sort different from those he had received from *M. Trembley*, but the only apparent

* In the 10th edit. of *Syst. Nat.* p. 816, under the name of *Hydra Polypus*.

† Elected F. R. S. Oct. 26, 1738; and the author of several papers on subjects in Natural Philosophy, published in the *Phil. Trans.* between the years 1745 and 1750. He was a watch-maker, and died in 1772.

difference lies in the greater shortness of the tentacula of the former, and this is a character liable to considerable variation, and insufficient of itself for specific distinction. The species has been beautifully illustrated, in Trembley's "Mémoires," by the pencil and graver of the celebrated Lyonet, for it is an interesting fact that all the figures, and most of the plates, which adorn the admirable book just mentioned, were drawn and etched by the author of the "Traité anatomique de la chenille du saule,"* and are indeed among the very earliest specimens of his extraordinary attainments in these arts.

It may be worth while to call attention to the remarkable resemblance of the *Hydra fusca* to the *Cucullanus cirratus* of Muller, Zool. Dan. tab. 33, fig. 1-7, which is an intestinal worm!

4. *H. VERRUCOSA*, pale cinereous; body pedunculate, campaniform; tentacula longer than the body.

Hydra verrucosa, Templeton, in Mag. Nat. Hist. ix. 418, fig. 57.

Hab. Still waters. "In the pond at Cranmore (near Belfast), Sept. 1812," *J. Templeton, Esq.*

"Of a pale cinereous hue, with six verrucated tentacula, of moderate length, and nearly equal thickness."—"This species, when at rest, assumes more of a campanulate form than any other species of the genus, except *lutea* and the following. The warts are not uniformly diffused, as in *pallens*; nor do the tentacula diminish much in size towards the tips."—*Templeton*.

** *Marine species.*

5. *H.?* *LITTORALIS*, "white; head large; about 10 extremely short tentacula encircling the base." Robt. Jameson. †

Hydra lutea? Jameson, in Wern. Mem. i. 565.—*H. lutea*, Flem. Brit.

Anim. 554.—*H. corynaria*, Templeton, in Mag. Nat. Hist. ix. 419, fig. 58.

Hab. Sea shore, adhering to Fuci. Frith of Forth, Professor Jameson. "Found adhering to *Fucus vesiculosus*, at White House Point, Belfast Lough, Oct. 1810," *J. Templeton, Esq.*

The figure represents a branched animal with enlarged clavate heads encircled round the truncate apex, with tentacula rather shorter than the diameter.—To justify the change I have made in the name, it is only necessary to mention that nothing can be more certain than

* "Ouvrage qui est à la fois le chef-d'œuvre de l'anatomie et celui de la gravure."—*Cuvier*.

† The name affixed to the specific characters is that of the person who, so far as I have been able to ascertain the point, added the species to the British Fauna.—Mr Jameson is the present Regius Professor of Natural History in the University of Edinburgh.

that this species is not identical either with the *Hydra lutea* or *corynaria* of Bosc.

Obs. Leuwenhoek* discovered the *Hydra* in 1703, and the uncommon way its young are produced, and an anonymous correspondent of the Royal Society made the same discovery in England about the same time, but it excited no particular notice until Trembley made known its wonderful properties, about the year 1744. These were so contrary to all former experience, and so repugnant to every established notion of animal life, that the scientific world were amazed; and while the more cautious among naturalists set themselves to verify what it was difficult to believe, there were many who looked upon the alleged facts as impossible fancies. The discoveries of Trembley were, however, speedily confirmed; and we are now so familiar with the outlines of the history of the fresh-water polype, and its marvellous reproductive powers, that we can scarcely appreciate the vividness of the sensation felt when it was all novel and strange; when the leading men of our learned societies were daily experimenting on these poor worms, and transmitting them to one another from distant countries, by careful posts, and as most precious gifts; and when even ambassadors interested themselves in sending early intelligence of the engrossing theme to their respective courts.

The *Hydræ* are found in fresh and, perhaps, also in salt waters, but the former species only have been examined with care, and are the objects of the following remarks. They prefer slowly running or almost still water, and fasten to the leaves and stalks of submerged plants by their base, which seems to act as a sucker. The body is exceedingly contractile, and hence liable to many changes of form: when contracted it is like a tubercle, a minute top or button, and when extended it becomes a narrow cylinder, being ten or twelve times longer at one time than at another, the tentacula suffering changes in their length and diameter equal to those of the body. "It can lengthen out or shorten its arms, without extending or contracting its body; and can do the same by the body, without altering the length of its arms: both, however, are usually moved together, at the same time and in the same direction."—The whole creature is apparently homogeneous, composed of minute pellucid grains cohering by means of a transparent jelly, for even with a high magnifier no defined organization of vessels and fibres can be detected. On the point opposite the base, and in the centre of the tentacula, we observe an aperture

* "Antonius v. Leeuwenhoek, civis Delphensis, peritus vitrorum politor, curiosus, et ad paradoxas opiniones pronus." Haller, *Bib. Bot.* i. 583. He was born 1632; elected F. R. S. January 1680; and died in 1723.

or mouth which leads into a wider cavity excavated as it were in the midst of the jelly,* and from which a narrow canal is continued down to the sucker. When contracted, and also when fully extended, the body appears smooth and even, but “in its middle degree of extension,” the sides seem to be minutely crenulated, an effect probably of a wrinkling of the surface, although from this appearance Baker has concluded that the Hydra is annulose, or made up of a number of rings capable of being folded together or evolved, and hence, in some measure, its extraordinary ability of extending and contracting its parts.† That this view of the Hydra’s structure is erroneous, Trembley has proved;‡ and the explanation it afforded of the animal’s contractility was obviously unsatisfactory, for it was never pretended that such an anatomy could be detected in the tentacula, which, however, are equally or more contractile. These organs encircle the mouth and radiate in a star-like fashion, but they seem to originate a little under the lip, for the mouth is often protruded like a kind of small snout: they are cylindrical, linear or very slightly tapered, hollow and roughened, at short and regular intervals, with whorls of tubercles which, under the microscope, form a very beautiful and interesting object; and I have thought, when viewing them, that every little tubercle might be a cup or sucker similar to those which garnish the arms of the cuttle-fish. § Trembley has shewn us that this is a deception, and that there is really no exactness in the comparison.||

* Pallas denies this. “Ab alimento recepto *cavata*, inquam, haud enim Hydræ corpus naturaliter intestini instar cavum crediderim. Totum solidum et medullare, pro admoto alimento, ceræ instar, digitum admittentis, cavari concipio parenchyma et alimentis insinuatis sese circumfundere. Qui alias per longitudinem dissecta Hydra, illico qualibet portione deglutire, et cavo clauso alimenta condere posset? quod tamen observare rarum non est.” Elench. Zooph. 27, 28.—For a view of the Hydra’s stomach see Tremb. Mem. pl. 4, fig. 7, copied by Roget in his Bridgew. Treat. ii. 74. fig. 241.

† “The outward coat is white like the arms, and made up of minute *annuli* or ringlets, that double in the midst, and can, occasionally, be folded close together, in the manner of a paper lanthorn.”—Hist. of the Polype, 25.

‡ Mem. 27.

§ Pallas has the same suggestion. Elench. 26. See also Roget’s Bridgew. Treat. i. 182.—Baker says that “two or three pretty long hairs” issue from each of the papillæ or tubercles, p. 36.; and Trembley has figured a short hair issuing from some of them, Mem. 62, pl. 5, fig. 3. This appearance of hairs is, I presume, produced by the glutinous secretion from them being drawn out into fine lines and drying on the glass. The tentacula probably adhere to foreign bodies principally by means of a mucous excretion, and being as it were engrained into the microscopic interstices of the body to which they are applied.—Tremb. Mem. 46.

|| Mem. 108.

The tentacula are amazingly extensible, from a line or less to one or, as in *H. fusca*, to more than eight inches; and “another extraordinary circumstance is, that a polype can extend an arm in any part of its whole length, without doing so throughout, and can swell or lessen its diameter, either at the root, at the extremity, in the middle, or where it pleases: which occasions a great variety of appearances, making it sometimes terminate with a sharp point, and at other times blunt, knobbed, and thickest at the end, in the figure of a bobbin.” We naturally enquire how this wonderful extension is made,—by what power a part without muscularity is drawn out until it exceeds by twenty or even by forty times the original length? The dissections of Trembley have proved beyond any doubt that the body is a hollow cylinder or bowel, and that the tentacula are tubular and have a free communication with its cavity;* and in this structure, combined with the loose granular composition of the animal, we find an answer to the question. Water flows, let us say by suction, into the stomach through the oral aperture, whence it is forced by the *vis a tergo*, or drawn by capillary attraction, into the canals of the tentacula, and its current outwards is sufficient to push before it the soft yielding material of which they are composed, until at last the resistance of the living parts suffices to arrest the tiny flood, or the tube has become too fine in its bore for the admission of water attenuated to its smallest possible stream,—how inconceivable slender may indeed be imagined, but there is no thread fine enough to equal it, seeing that the tentacula of *Hydra fusca* in tension can be compared to nothing grosser than the scarce visible filament of the gossamer’s web.

The *Hydra*, though usually found attached, can nevertheless move from place to place, which it does either by gliding with imperceptible slowness on the base, or by stretching out the body and tentacula to the utmost, fixing the latter, and then contracting the body towards the point of fixture, loosening at the same time its hold with the base; and by reversing these actions it can retrograde. Its ordinary position seems to be pendant or nearly horizontal, hanging from some floating weed or leaf, or stretching from its sides. In a glass of water the creature will crawl up the sides of the vessel to the surface, and hang from it, sometimes with the base, and sometimes with the tentacula downwards; and again it will lay itself along horizontally.† Its locomotion is always very slow, and the disposi-

* Mem. 123—5; and 263.

† “The position in which they appear to take most delight, is that of remaining suspended from the surface of the water by means of the foot alone: and

tion of the zoophyte is evidently sedentary ; but the contractions and mutations of the body itself are sufficiently vivacious, while in seizing and mastering its prey it is surprisingly nimble ; seizing a worm, to use the comparison of Baker, “ with as much eagerness as a cat catches a mouse.” It is dull and does not expand freely in the dark, but enjoys light, and hence undoubtedly the reason why we generally find the Hydra near the surface and in shallow water.

The Hydræ are very voracious, feeding only on living animals,* but when necessary they can sustain a fast of many weeks without other loss than what a paler colour may indicate. Small larvæ, worms, and entomostracous insects seem to be the favourite food, and to entrap these they expand the tentacula to the utmost and spread them in every direction, moving them gently in the water to increase their chances, and when a worm, &c. touches any part of them it is immediately seized, carried to the mouth by these flexible and contractile organs, and forced into the stomach. “ ’Tis a fine entertainment,” says Baker, “ to behold the dexterity of a polype in the mastering its prey, and observe with what art it evades and overcomes the superior strength or agility thereof. Many times, by way of experiment, I have put a large worm to the very extremity of a single arm, which has instantly fastened on it with its little invisible clasps. Then it has afforded me inexpressible pleasure, to see the polype poising and balancing the worm, with no less seeming caution and judgment than a skilful angler shows when he perceives a heavy fish at the end of a single hair-line, and fears it should break away. Contracting the arm that holds it, by very slow degrees, he brings it within the reach of his other arms, which eagerly clasping round

this they effect in the following manner. When the flat surface of the foot is exposed for a short time to the air, above the surface of the water, it becomes dry, and in this state exerts a repulsive action on the liquid, so that when dragged below the level of the surface, by the weight of the body, it still remains uncovered, and occupies the bottom of a cup-shaped hollow in the fluid, thereby receiving a degree of buoyancy, sufficient to suspend it at the surface. The principle is the same as that by which a dry needle is supported on water, in the boat-like hollow which is formed by the cohesive force of the liquid, if care be taken to lay the needle down very gently on the surface. If, while the Hydra is floating in this manner, suspended by the extremity of the foot, a drop of water be made to fall upon that part, so as to wet it, this hydrostatic power will be destroyed, and the animal will immediately sink to the bottom.”—Roget, *Bridgw. Tr.* i. 179. This passage is nearly a literal translation from Trembley’s *Hist. des Polypes*, p. 37–8.

* In confinement, however, Trembley found that they might be fed on minced fish, beef, mutton, or veal.—*Mem.* 104.

it, and the danger of losing it being over, all the former caution and gentleness is laid aside, and it is pulled to the polype's mouth with a surprising violence." * Sometimes it happens that two polypes will seize upon the same worm, when a struggle for the prey ensues, in which the stronger gains of course the victory ; or each polype begins quietly to swallow his portion, and continues to gulp down his half until the mouths of the pair near and come at length into actual contact. The rest which now ensues appears to prove that they are sensible of their untoward position, from which they are frequently liberated by the opportune break of the worm, when each obtains his share, but should the prey prove too tough, woe ! to the unready ! The more resolute dilates the mouth to the requisite extent, and deliberately swallows his opponent, sometimes partially, so as, however, to compel the discharge of the bait, while at other times the entire polype is engulfed ! But a polype is no fitting food to a polype, and his capacity of endurance saves him from this living tomb, for after a time, when the worm is sucked out of him, the sufferer is disgorged with no other loss than his dinner. † This fact is the more remarkable when it is contrasted with the fate which awaits the worms on which they feed. No sooner are these laid hold upon than they evince every symptom of painful suffering, but *their violent contortions are momentary and a certain death suddenly follows their capture.* How this effect is produced is mere matter of conjecture. Worms, in ordinary circumstances, are most tenacious of life even under severe wounds, and hence one is inclined to suppose that there must be something eminently poisonous in the Hydra's grasp, as it is impossible to believe, with Baker, that this soft toothless creature can bite and inject a venom into the wound it gives. " I have sometimes," says Baker, " forced a worm from a polype the instant it has been bitten, (at the expence of breaking off the polype's arms,) and have always observed it to die very soon afterwards, without one single instance of recovery." ‡ To the Entomostraca, however, its touch is

* Hist. of the Polype, 65. Also Roget's Bridgw. Treat. ii. 76.

† Trembley, Mem. 112.

‡ Hist. of the Polype, 33—comp. with 67–8.—" That insignificant and inactive insect called the fresh water polypus, of all poisonous animals, seems to possess the most powerful and active venom. Small water-worms, which the polypus is only able to attack, are so tenacious of life, that they may be cut to pieces without their seeming to receive any material injury, or to suffer much pain from the incisions. But the poison of the polypus instantly extinguishes every principle of life and motion. What is singular, the mouth or lips of the polypus have no sooner touched this worm than it expires. No wound, however, is to be perceived in the dead animal. By experiments made with the

not equally fatal, for I have repeatedly seen Cyprides and Daphniae entangled in the tentacula and arrested for some considerable time, escape even from the very lips of the mouth, and swim about afterwards unharmed; perhaps their shell may protect them from the poisonous excretion.—The grosser parts of the food, after some hours' digestion, are again ejected by the mouth; but, as already mentioned, the stomach is furnished with what in one sense, may be called an intestine to which, according to Trembley and Baker, there is an outlet in the centre of the base, and the latter asserts that he has, “several times, seen the dung of the polype in little round pellets discharged at this outlet or anus.”*

But the Hydra is principally celebrated on account of its manner of propagation. It is of course like zoophytes in general, asexual; and every individual possesses the faculty of continuing and multiplying its race, principally, however, by the process of subdivision. During the summer season, a small tubercle rises on the surface, which lengthens and enlarges every hour, and in a day or two develops in irregular succession, or in successive pairs, † a series of tentacula, and becomes in all respects, excepting size, similar to its parent. It remains attached for some time, and grows and feeds, and contracts and expands after the fashion of this parent, until it is at length thrown off by a sort of sloughing or exfoliation. These buds sprout, in the common species, from every part of the surface of the body, but not from the tentacula; and very often two, three or four young may be seen depending at one time from the sides of the fruitful mother, in different stages of growth, every one playing its part independent of the others. They are evolved with rapidity in warm weather especially, and no sooner has one dropt off than another begins to germinate; “and what is most extraordinary, the young ones

best microscopes, it has been found, that the polypus is neither provided with teeth, nor any other instrument that could pierce the skin.” Smellie's *Phil. of Nat. History*, ii. 462.—The fact that fishes cannot be made to swallow Hydræ, seems to prove the presence of some irritating quality in the latter.—See Trembley, *Mem.* 137.

* *Lib. s. cit.* 27.—He adds,—“Much the greater and grosser part of what the polype eats, is most certainly thrown out again by the mouth, after lying a proper time to become digested in the stomach: and, for a good while, I imagined there was no other evacuation; but am now convinced, that the finer part, in small quantity, is carried downwards through the tail, and passed off that way. I believe, however, there is also another purpose to which this passage serves, and that is, to convey a mucus or slimy matter to the end of the tail, for its more ready adhesion to sticks, stalks, or other bodies.”

† Baker's *Hist.* 35.

themselves often breed others, and those others sometimes push out a third or fourth generation before the first fall off from the original parent."—Trembley found in one experiment that an individual of *H. grisea* produced forty-five young in two months; The average number per month in summer was twenty, but as each of these began to produce four or five days after its separation, the whole produce of a month was prodigious.*

"No sooner is a young one furnished with arms, than it seizes and devours worms with all possible eagerness; nor is it an unusual thing to behold the young one and the old one struggling for, and gorging different ends of the same worm together. Before the arms come out, and even sometime afterwards, a communication continues between the bodies of the old and young, as appears beyond dispute by the swelling of either when the other is fed.† But a little before the young one separates, when its tail-end begins to look white, transparent, and slender, the passage between them, I believe, is closed. And when the young one comes away, there remains not the least mark where it had been protruded."—"After a young polype once gets all its arms, it alters indeed in size, but neither appears to shift its skin, or undergo any of the changes most other insects do."‡

Instead of buds or little protuberances, the body sometimes pushes forth single tentacula scattered irregularly over it, and these tentacula can be metamorphosed into perfect polypes, the base swelling out to become the body, which, again soon shoots out additional tentacula to the requisite number! §

This is a mode of generation which the term viviparous does not correctly embrace, unless we give to that word a signification so extensive as to include all generations which are not oviparous: It is an example of equivocal, or what some foreign physiologists denominate, the generation by the individualisation of a tissue previously or already organized, ||—and seems to be the usual way of propaga-

* Mem. pour l'Hist. des Polypes, 174—5. Also Baker, lib. s. cit. 53—4.

† By some clever dissections, Trembley demonstrated the reality of this communication. Mem. 161—2.

‡ Baker lib. s. cit. 50. § Baker ut cit. 110—11 : 121—3.

|| La génération n'est pas pour cela spontanée : une *génération spontanée* doit être la production d'un être organisé de toutes pièces, lorsque des élémens inorganiques se réuniront pour produire un animal, une plante. Cette génération est impossible, et n'a jamais lieu. Une *génération équivoque* est celle où des tissus organisés préalablement par un être déjà pourvu de vie, *s'individualisent*, c'est-à-dire se séparent de la masse commune et participent encore, après cette séparation, de l'état dynamique de la masse, c'est-à-dire de sa vie, mais, à son propre profit. C'est ainsi qu'un tissu produit un Entozoaire. C'est de la vie continuée."—Ch. Morren in Ann. des Sc. Nat. an. 1836, Vol. vi. p. 90. *Part. Zool.*

tion among the Hydræ during the summer months. But in autumn the Hydra generates internal oviform gemmules which, extruded from the body, lie during the winter in a quiescent state, and are stimulated to evolution not until the return of spring and its genial weather. Few observations have been made on these apparent ova, so that their structure, their source, their manner of escape from the body, and their condition during winter are scarcely known, Trembley describes them as little spherical excrescences, of a white or yellow colour, attached to the body by a very short pedicle. He never saw more than three on the same polype. After sometime they became separate, and fell to the bottom of the glass of water in which the creatures were kept, where they came to nothing, excepting one only which was presumed to have evolved into a polype, for although his experiment renders this conclusion probable, it was still rather an inference than an actual observation, so much so, that Trembley continued to entertain doubts of their nature. Jussieu, it seems, conceived that each little excrescence was a vesicle filled with ova of microscopic minuteness, but there is no foundation for any such hypothesis.*

These are the modes in which the Hydra naturally multiplies its kind, but it can be increased, as already hinted, by artificial sections of the body, in the same manner that a perennial plant can be by slips and shoots. If the body is halved in any direction, each half in a short time grows up a perfect Hydra; if it is cut into four or eight, or even minced into forty pieces,† each continues alive and develops a new animal, which is itself capable of being multiplied in the same extraordinary manner. If the section is made lengthways, so as to divide the body into two or more slips connected merely by the tail, they are speedily resoldered, like some heroes of fairy tale, into one perfect whole; or if the pieces are kept asunder, each will become a polype, and thus we may have two or several polypes with only one tail between them; but if the sections be made in the contrary direction—from the tail towards the tentacula—you produce a monster with two or more bodies and one head. If the tentacula,—the organs by which they take their prey, and on which their existence might seem to depend,—are cut away, they are reproduced, and the

* Trembley, Mem. 196—7.

† “ J’ai ouvert sur ma main un Polype, je l’ai étendu, et j’ai coupé en tout sens la peau simple qu’il formoit, je l’ai réduit en petits morceaux, je l’ai en quelque manière haché. Ces petits morceaux de peau, tant ceux qui avoient des bras, que ceux qui n’en avoient point, sont devenus des Polypes parfaits.”—Trembley, Mem. 248.

lopt off parts remain not long without a new body : if only two or three tentacula are embraced in the section, the result is the same ; and a single tentaculum will serve for the evolution of a complete creature. * When a piece is cut out of the body the wound speedily heals, and, as if excited by the stimulus of the knife, young polypes sprout from the wound more abundantly, and in preference to unscarred parts ; when a polype is introduced by the tail into another's body, the two unite and form one individual ; and when a head is lopt off it may safely be ingrafted on the body of any other which may chance to want one. You may slit the animal up, and lay it out flat like a membrane, with impunity ; nay it may be turned inside out, so that the stomachal surface shall become the epidermous, and yet continue to live and enjoy itself. † And the creature seems even to suffer very little by these apparently cruel operations, for before the lapse of many minutes, the upper half of a cross section will expand its tentacula and catch prey as usual ; and the two portions of a longitudinal division will, after an hour or two, take food and retain it. “ A polype cut transversely, in three parts, requires four or five days in summer, and longer in cold weather, for the middle piece to produce a head and tail, and the tail part to get a body and head, which they both do in pretty much the same time. The head part always appears a perfect polype sooner than the rest.” “ And what is still more extraordinary, polypes produced in this manner grow much larger, and are far more prolific, in the way of their natural increase, than those that were never cut. It is very common, when a polype is divided transversely, to see a young one push out from one or other of the parts, and sometimes from both of them, in a very few hours after the operation has been performed : and, particularly from the tail part, two or three are frequently protruded in different places, and at different times, long before that part acquires a new head, and consequently whilst it can take in no fresh nourishment to supply them with : and yet the young ones proceeding from it, under these

* From the experiments of Trembley, (Mem. 235,) of a correspondent of Baker's and of Baker himself, it would seem that a tentaculum cannot produce a new body, unless a part of the head or body is removed with it (Hist. 193-4,) ; but other experimentalists are said to have succeeded when this was not done. For the particulars stated in the text, and others equally incredible, the reader may consult the works of Trembley and Baker, *passim*.

† Trembley had several by him “ that have remained turned in this manner ; their inside is become their outside, and their outside their inside : they eat, they grow, and they multiply, as if they had never been turned.”—Phil. Trans. Abridg. viii. 627 ; and his Mem. 253, &c.

disadvantages, thrive as fast, and seem as vigorous as those produced by perfect and uncut polytes.*

When such things were first announced—when to a little worm the attributes of angelic beings were assigned †—it is not wonderful that the vulgar disbelieved, albeit credulity may be their besetting sin, when even naturalists, familiar with all the miracles of the insect world, were amazed and wist not what to do. “Il faut”—exclaimed Reaumur—“il faut porter la foi humaine plus loin qu’il n’est permis à des hommes éclairés, pour le croire sur le premier témoignage de celui qui le raconte, et assure l’avoir vu. Peut-on se résoudre à croire qu’il y ait dans la nature des animaux qu’on multiplie en les hachant, pour ainsi dire, par morceaux ?” ‡ But this illustrious naturalist was himself the first to promulgate, and experimentally to verify the discoveries of Abraham Trembley, which have been fully confirmed by many subsequent inquirers, and are now made so familiar to us by their admission into elementary works and treatises on natural theology, that we read of them with little surprise and without incredulousness.

(*To be continued.*)

V.—*On a Confervoid State of Mucor clavatus, Lk.* By the Rev.
M. J. BERKELEY, M. A. F. L. S.

THOUGH great advance has of late years been made, not only in the study, but in the manner of studying cryptogamic plants, it is plain from the pertinacious adherence of many botanists to their old habits of looking rather to external and accidental, than to internal and essential characters, that there is much room for improvement. In consequence of this, mycology and other branches of cryptogamic botany are still overloaded with a mass of anomalous productions,

* Baker, lib. s. cit. 92, 93.

† “Vital in every part, not as frail Man
In entrails, heart or head, liver or veins,
Cannot but by annihilating die;
Nor in their liquid texture mortal wound
Receive, no more than can the fluid air:
All heart they live, all head, all eye, all ear,
— — — — and, as they please,
They limb themselves, and colour, shape or size
Assume, as likes them best.”

MILTON.

‡ Hist. des Insectes, vi. pref. 49.

which are, in fact, nothing else but unusual or undeveloped states of different species. Hence we find amongst Algæ certain states of various Fungi, Lichens, Mosses, and Ferns, while amongst Fungi we have the infant state of many species (Mycelia) arranged under distinct genera. Indeed in the new system of Fungi which is now in the course of publication, by Dr T. F. L. Nees von Esenbeck, we still find such a genus as *Himantia* retained, though it is almost impossible for practical botanists not to observe the actual developement of the productions of which it is formed into perfect Hymenomycetous Fungi. Again in a late number of a supplement to Bulliard, by M. Letellier, a new species of *Geoglossum* is formed out of a state of one of the Mycelia, denominated by authors *Ozonium auricomum*, a state, it is to be observed, noticed long ago by Withering and Sir J. E. Smith. Many other instances might be noted in which such productions are either again enumerated as autonomous fungi, or new forms described. It is with great justice that Fries complains, that although he has again and again called the special attention of botanists to this point, his labour at present seems to have been all but useless. He expresses, however, his determination of persevering, and his conviction that his views will at length be adopted.

No tribe has afforded more of such doubtful productions than the Mucedines, from many of the more common species being more or less perfectly developed with such ease and celerity in various situations and circumstances. The sporidia of many germinate in situations in which their true habit is never assumed, in liquids for instance; and such imperfect states have been generally considered as Algæ. The habit, indeed, of arranging these Mycelia or masked fungi amongst the algæ had obtained some years since, such irresistible influence, that, aided by a habit of theorizing, M. Carus, though absolutely witnessing the curious forms assumed by the same species under different degrees of moisture, considered the circumstance as proof of the possibility of plants essentially belonging to one order giving origin to plants of an order entirely distinct, under a different adjustment of the elements. (Act. Nov. Leop. 1823, t. 58.) Very lately a volume has been published, which at present I have only had an opportunity of casually inspecting in the Library of M. Desmazieres, on these confervoid forms of Mucedines, by Dr Biasoletto of Triest, in which they are considered as belonging to distinct genera of the order Algæ.

Having had the good fortune of witnessing the perfect developement.

ment of a very extraordinary production of this nature, which on a slight inspection, without carefully weighing its nature, had all the appearance of being a true Algæ, I take an early opportunity of communicating the fact which I have witnessed, as a multiplication of observations of this nature will alone induce cryptogamists generally to consider the matter in its true light.

On the 17th of March a quantity of raisin wine was made in the usual manner, with the exception that boiling water was used. The quantity, however, of water applied at once was not sufficient to communicate a high temperature to the mash. The weather which succeeded was so extremely cold that fermentation did not take place, and it was not convenient to place the tub in a proper temperature. In a few days the surface was spotted with white patches of mould, which when perfectly developed proved to be *Penicillium candidum*, Lk. at least the plant was extremely small, and the sporidia never acquired any colour. Meanwhile a few confervoid tufts floating just beneath the surface became visible. This was first observed on the 1st of April, and in a few days the whole surface was coated with a thick scum, of the same colour as the liquor, resembling a piece of cotton wadding immersed in it, or some of the more slender *Confervæ*, such as *C. sordida*, when the green tint has passed away. This production was examined at the time, and found to consist of an intricate mass of branched threads, the branches being often set on at a right angle. Towards the base they were generally more or less unequal, very irregular, without articulations, giving out here and there, scattered or tufted, more slender root-like branches. Towards the surface, the threads became articulated, but varying extremely in the length and forms of the divisions, some being nearly cylindrical, and in length exceeding the diameter many times, while others were very much swollen, and often almost globular. Occasionally there seemed an effort to form a sporangium. All were filled with a pale grumous nucleus, in which a few distinct granules were visible. Though resembling *Confervæ* in some points, I was convinced, from the irregularity in the manner of articulation, and from a certain indescribable habit, that the plant before me was a state of some mould. The scum being removed was accordingly saved, but it underwent no further development. As often, however, as the wine was cleared, the production was again developed, without affecting very sensibly the taste or quality of the wine. Fermentation not taking place, the tub was

at length placed in a room in which a fire was constantly kept up, the temperature being seldom below 60° of Fahrenheit, and the patches soon became smaller, but indicated signs of fructification. It was in a short time clear that the plant was a state of *Mucor clavatus*, Lk. which was further proved by the developement of that species upon the skins of the raisins, which had been thrown into a tub in which were some brewers' grains. It is curious that in this latter case there was scarcely any trace of a Mycelium.

The Mycelium of the *Penicillium* before fructification, though more or less submerged, had little in it remarkable, consisting of extremely fine branched, articulated, pellucid threads.

a. State of *Mucor clavatus*, in outline, highly magnified. *b.* A portion of the same to show the contents of the articulations. *c.* Perfect fertile threads, with sporangia and columella.



REVIEWS AND CRITICAL ANALYSIS.

Voyage Scientifique en Morée. Paris. Levrault.

WHEN it was determined to employ the combined arms of England and France in order to clear Greece of the remains of the barbaric race of Othman, the opportunity was not lost by the French government, and with the laudable zeal for science, which, amid the motley changes we have witnessed in these days, has never ceased to animate the various parties who have successively ruled at Paris, a sort of ambulant Institute, resembling on a smaller scale the celebrated body which accompanied the Egyptian expedition, was fitted out, with a view to explore the classic and almost unwrought soil their arms were called on to visit.

The result of the labours of this commission has been recently made public, and we shall proceed to analyse such parts of it as the nature of this publication permits. Although we must in candour say that we have risen from the examination of it with a considerable feeling of disappointment, and that when we consider the means at the disposal of the commission, the time devoted to it, and the power they possessed of perambulating a region of comparatively small extent, and perfectly accessible in every point; as well as the vast advantage of visiting a country which, as far as natural science is concerned, with the exception of the botany of Sibthorp, might be said to be unexplored, we felt entitled to expect that more might, and in fact ought to have been done;—nevertheless they have brought to light some very interesting facts, which we shall lay before our readers, following the course of the publication itself.

The work contains a sort of personal narrative of the parties engaged, a summary of the observations on mammalia, reptiles, insects, fishes, botany, geology, antiquities, statistics, and topography. There is a large volume filled with drawings and illustrations of various kinds, most of them well executed, and of great interest and value; but we certainly think that the many sheets occupied by landscape

views in lithography, although well executed, might have been advantageously bestowed on objects of higher value, leaving these subjects of amateur interest in the hands of private individuals, who would have been sure to avail themselves of the opportunity of publishing them. Nearly a year was devoted to the expedition, which sailed from Toulon in January 1829, and returned in December of the same year, previous to which it had been suddenly stopped in its career by the dreadful pestilence of malaria, or marsh intermittent fever, which in all ages has infected the shores of Greece, and the prevalence of which has been increased by the want of cultivation consequent on the invasion of the Mahometans. For this very serious result, we conceive some parties, either the government at home, or those in immediate command of the commission, must have been very highly to blame. Every one who has the slightest knowledge of the Mediterranean is aware, that after the summer solstice the marshy shores of nearly the whole range on both sides is subject to this fever, which increases in force with the advance of the season, and attains its maximum of virulence in the beginning of September, after which it is checked by the rains, which in general fall from the 10th to the 18th of that month, and induce a salutary and beneficial, as well as most agreeable, change in the temperature. Not only the general precautions founded on the knowledge of this unvarying course of nature were unnoticed, but the common and unerring warnings of danger, the presence of myriads of musquitos, which assailed them in the deltas and marshes of Western Greece, were equally disregarded, until they were roused to the sense of their situation by a simultaneous attack of nearly the whole party, which put an abrupt termination to their proceedings, and compelled them to disperse and seek for safety in a more healthy climate.

Now it is very clear, that, by the exercise of a little discretion and forethought, proper stations might have been selected, whence the observations could have been carried on according to the season with perfect safety, and, by changing place to the islands or to the elevated grounds during the worst period, examining the pestilential marshes at the proper time, better results would have been obtained, and the parties engaged saved from carrying, as we have no doubt some of them will, the remembrance of this improvident arrangement to premature graves.

The narrative, which occupies the first volume, is drawn up by M. Bory de St Vincent. In some parts the more remarkable animals they met with are mentioned, but in general it is entirely personal,

containing the admixture of slight and superficial notices of the pastoral and agricultural inhabitants of the country. We were not surprised to find their testimony respecting these people more favourable than might have been expected from the reputation the Greeks have acquired at Smyrna, Constantinople, and other trading places, where the most disadvantageous comparisons are generally made between them and their former barbarian masters. In other respects, the drawing up of this narrative gives no very favourable opinion either of the liberality or knowledge of the author, on certain subjects he has the bad taste to introduce or rather parade before his readers. He appears to be of that class of his countrymen who labour under what may be termed, "anglophobia," which became prevalent in the time of the empire, having succeeded to the "anglomanie" of the period prior to the revolution, and is so prevalent at present, notwithstanding the friendly terms we are on, that every candidate for public favour must make his profession of it, or be purified, according to the Spanish phrase, of any tendency to the older disease,—and we doubt not this seasoning of anglophobia one cause for this volume running to a second edition, as we understand it has, the merits of the book itself being very small. The writer gives very unequivocal proof of his being of the modern school. He deplores, in a way to leave no doubt of his sincerity, the national arms being employed in concert with those of England. Every rock seems to suggest visions of occupation, and of goblins in the shape of British sailors and marines taking permanent possession of them;—a strange commentary on the proceedings of his countrymen on the opposite coast of Africa!

In one instance he travels quite out of his way, in speaking of the Greek Priests, to introduce an observation on our manners, which, if it were founded on fact, would be totally misplaced in his work; but happening to be quite the reverse, it shews not only the animus which dictated the insertion of it, but the utter ignorance as well as low and vulgar prejudices of the author. These observations may appear to be unnecessary here, and foreign to the subject we are writing on; but they are by no means so. We are speaking of a public body, the elite of one of the leading members of the great republic of science, and it is not unimportant to notice the spirit in which these reports, which are in fact public property, are conducted. Independently of this there are other reasons. The same narrow and contracted views which have caused the introduction of these topics where they are quite uncalled for, infect various parts of the

body of the work itself. There is too visible a tendency to assume airs of exclusive intelligence, and reduce everything to the petty scale of the little circle or clique which were brought together. "Nous," "un de nous," &c. occur rather too often, whilst the works of others, which might have assisted them, are either unnoticed, or mentioned so slightly, that it would appear to be the result of force, rather than from that general republican feeling which ought to animate those who hold prominent situations in the scientific body. We regret any tendency to this failing the more, from seeing its effect on our own literary and scientific societies, the tendency in which this evil is so strong, and the difficulty so great, of avoiding the forming petty oligarchies, with their moment of splendour, followed by stagnation, twaddle and decay. It will be a real loss to the world, if this spirit (as it is beginning to be thought,) seize on the French; but to themselves it will be still heavier, for it will entail the certain falling from the "high estate" to which the great men who have lately departed had raised them. The lead once lost will not easily be regained. Of the littleness we complain of, one of the common forms is the fear of being "devance," and the carefully abstaining from any connection of the observations made by others in the corresponding zone of Europe, which, especially those on Italy and Dalmatia, might have been introduced in a work of this sort, where some general views of science might have been looked for, as well as the more isolated facts which came to their knowledge. As, however, this appears not to have entered into the speculation of MM. de la Commission, we shall proceed to analyse the information which they have presented to us.

MAMMALIA.—It would seem incredible that of the bats we should only have *V. murinus* and *pipistrellus* mentioned. In a country like Greece, which abounds in caverns and retreats suited to the genus, we looked for a very different result. The very treasuries of Atreus and Merigas, or the walls of Messene and the vaults of Megarpeia might have been ransacked, to extend the scanty list, in forming which we fear little attention has been paid.

Traces of moles were observed, especially in the elevated tablelands which form the centre of the Morea, but the species was not made out. It is most probably the *Aspalax* or *T. cœca* of Savi. They are said to disappear during summer,—no doubt retiring to the marshes or to the depths of the shady forests, where the soil is easier to work, and the food more abundant, than in the open grounds, which become indurated with the rays of the burning sun.

The wild-cat, *F. catus*? is extremely common, especially in the cen-

tral parts of the Morea, where they prey chiefly on partridges; but at some seasons they approach the isolated houses and seize the poultry. The species is said to resemble that of the centre of Europe, but in some degree to assimilate to one figured in the voyage of Belanger to the East Indies, and called *Felis rubiginosa*, which they say has spots on the breast and sides. We have carefully examined both the plates, which are quite unlike each other. The cat of Belanger is so badly represented that it is necessary to be told what animal it is meant to represent, and considerable doubts exist as to its being a genuine species, or more than the common cat of Madagascar.

The plate in the present work is much better, and is totally different from the other. From the looseness of the description, we are disposed to think that no very great attention has been paid to the subject, and that the true species of the Morea remains to be more accurately described. We have a strong suspicion that it may turn out to be identical with a cat seen by the writer of this notice, in the Sierra de Cuenca in Spain. This species, of which he has only seen the individual specimen on which the observation was made, differs totally from that of the north and centre of Europe. The fur was reddish, like some of the lynxes of the Alps, the back and head broadly striped, and the tail barred with black. The greatest peculiarity was in the ears, which were short and rounded, as if they had been clipped, and they scarcely stood above the fur. The head was round and the muzzle short, unlike the lynx and caracal, and the animal was possessed of very great strength.

The zones or parallel of these localities nearly correspond with each other, and it is very probable, when a more accurate account is given of the cat of the Peloponnesus, that it may turn out to be similar to that of Cuenca—respecting which we have written to Spain, and hope, when the country is in a more tranquil state, to have some further account.

The lynx is not uncommon, and it is protected by the prejudices of the people, who believe that it is the deadly foe of the wolf, and assists in defending their flocks! Most probably this popular error proceeds from their being seen engaged in conflict, to defend the prey they had taken, which the stronger and equally rapacious brute was desirous of appropriating to itself. We are left in ignorance of the species, from which it may be inferred that it is the common lynx of the centre and north of Europe. We should rather have expected to hear of the spotted variety, which we found to abound in the Sierra Morena, *Felis pardina*, or a variety of it? This, the most beautiful

of the European quadrupeds, we have not seen in any collection. A skin very nearly entire was sent by the writer to the British Museum, but, not having been properly cured before it came into his possession, was destroyed in setting up. There can be little doubt, that if it be not found in the Morea, it may be looked for in the larger islands of the southern Archipelago.

The wolf is very numerous, and were it not for the celebrated breed of Molossian dogs, which have lost none of their qualities, would render the keeping flocks of sheep extremely difficult.

The fox is very common in the Peloponnesus, as may be expected in a country of mountain fastnesses, and of forest and wooded ravines so well adapted to their habits. The species is not given, but they suppose it to be the same with that which inhabits the centre of Europe. We rather suppose, on the contrary, that this was not ascertained, owing to their being probably ignorant of the discovery of the Prince of Musignano, and that the Grecian fox is the *C. melanogaster*, or short-footed species, of that naturalist.

The most important discovery made amongst the Mammalia by the Commission was that of the jackal, *C. aureus*, which not only inhabits the Morea, but is extremely abundant there. On one occasion their yelpings at night put the little camp on the alert, and they stood to arms as if expecting an attack. We are told this quite gravely; and we cannot help contrasting the restless vigilance of our neighbours, bordering on timidity, which is a quality so valuable in war both by sea and land, with the habits of our own countrymen, in whom it is almost wholly wanting, often to the great prejudice of our arms; and when once composed, we engage that a party of John Bull's family would require a much stronger stimulus to rouse them from their slumbers.

We confess feeling rather a sense of humiliation, that, after the hordes of travellers we have sent annually, fit and unfit, to travel in Greece for the last twenty-five years, the curious fact of the existence of the animal should have been left to the discovery of these gentlemen in 1829.

We have a disquisition on the species, which it appears has engaged the attention of F. Cuvier, who has made out the following varieties: Caucasian, Nubian, Senegal, Algiers, and that of the Morea. As the distinctions of those of Algiers, Caucasus, and the Morea, appear to be founded wholly on the colour, or rather shades of colour and length of fur, we are not disposed to concur in them, as the influence of season, of age, or climate, will no doubt account for the appa-

rent differences, especially as the observations can only be made on a comparatively small number of individuals.

The case is different with the species of Nubia, which is probably identical with that of Senegal. The skin is spotted, and the ears are longer than in the northern race.

We are now favoured with a curious observation suggested by this peculiarity in the ears of the Nubian species. We are told that the elongation is common, not only to the quadrupeds which inhabit the vicinity of the Zahara, or great desert, but to man also, and that the Bedouins, who belong to it, have the conch of the ear singularly long, differing from that in other races. We confess we were a little startled at the intelligence. Our first idea was, whether, if the being born about the Zahara imparted such a peculiarity, the sojourning some time in the vicinity might not be followed by some elongation of the same part. Not finding, however, that this was the case, and knowing that the Moorish Spaniards, whose ancestors came from the region in question, have remarkably small ears, unless, indeed, that proceeded from their being removed from the locality, our thoughts then turned very naturally to our old acquaintance Pan, and the Fauns with their auricular appendages. According to this theory, instead of being natives of Mount Taygetus and Arcadia, their pedigree ought rather to be Numidian or Mauritanian. We wish the Commission had discussed the subject in the part of their work which is dedicated to the ancient animals of the Peloponnesus; and we strongly recommend the consideration of it to that portion of the Parisian savans, who devote many sittings to the affinities of the genus homo with some of the quadrumana. It might afford an interesting variety to these lectures, of which the auditory begin very naturally to complain.

This fact, if established, might be of considerable use in assisting the reform now carrying on so resolutely in the Ottoman dominions. It is known to those who have been in the East, or have attended to their peculiar method of conducting a government, that the common mode of announcing a victory, before the introduction of gazettes and bulletins, which are now coming into use, was by the arrival of Tartars or couriers with sacks full of the ears of the vanquished, which were pickled in salt. The heads, which ought to have been sent, being too heavy for transport, this lighter substitute was found. Now it has happened not unfrequently, that, in a scarcity of the article,—or from the battle being of the nature of those in Spain, where it is difficult to say which party is the conqueror, or rather who has lost the least, excepting in ammunition and shoe-leather,—that a habit has prevailed

of filling the bags at the expense of the rayas or infidel inhabitants, especially the Jews of the towns in the line of march, who were called on to make up the deficiency. In case of operations being carried on in any of the parts in which this conformation existed, it would have afforded an excellent means, by keeping the measurements of the ears of the respective tribes, to check the accounts and statements of the pachas, and be the means of preventing innocent and guilty being placed in the same situation, as was too often the case.

The Commission are too generous to deprive the author of this speculation of the merit justly his due. It is stated to proceed from "un de nos consuls generaux." However lightly we may be inclined to treat this lucubration of the worthy consul, we cannot but applaud the zeal which has induced him to attend to such subjects, and we wish him success in his future communications. We only wish we had similar instances to report from our consular and diplomatic bodies, who are, with some exceptions, singularly deficient in imparting information on such subjects.

One more observation on the jackal of the Morea. Are we to consider them of the early inhabitants, prior to the first civilization, and contemporary of the lions and other larger feræ, which we have historical testimony to bear out the belief, that they did really inhabit the Peloponnesus? or may they not have followed the train of the Asiatic herds, who at various times have crossed the Bosphorus or the Hellespont under Xerxes and others? Leaving out the possibility of their crossing by the bridge of that monarch, it is by no means a rash supposition, that the abundant provender to be obtained by following such bodies of men would impel animals to make an unusual exertion, in order to keep in a train so advantageous, and the swimming the Hellespont is quite within the power of such a quadruped as the jackal. We have seen the shoals of sharks, one of which was accustomed to follow each Guinea or slave-ship to the West Indies from the coast of Africa, at the time that trade was permitted, impelled by a similar motive. It is possible this may be the origin of the present breed of jackals; but we should rather incline to the belief that they were aboriginal, and co-existent with the Næmæan lion and the Erymanthian boar, both which races have disappeared, and that, by retreating to the fastnesses of Taygetus, or of Pindus and Parnassus, they lived in seclusion during the period of civilization, and escaped the extermination in which the larger feræ were involved,—advancing again by natural progression, as the Turks

reduced the country to a state more congenial to their habits, and fitted to encourage their propagation.

BIRDS.—The catalogue of birds is extremely scanty, consisting of only 66 species, without any pretension to novelty. We should be inclined to say MM. de la Commission, What have you been about? In fact, it would seem incredible that such a list should be the production of so much time and labour. We could be almost tempted to furnish a supplementary list of those we know *must* be there, or which, from some cause or other, have been overlooked. Our countryman, Mr Strickland has, we believe, at least found one new *Sylvia*, and has done more than the Grecian Institute.

A good plate is given of the *Falco tinnunculoides*, which, until very recently, was, and still is, extremely rare in collections. (We believe the first seen in this country were those brought from Spain by the writer of this notice.) They claim the merit, we believe due, of giving the first good representation of the most beautiful of the smaller eagles, as the *Falco Bonelli*, when in full plumage, is unrivalled amongst the larger of the genus of the European *Falconidæ*.

We have long been aware of this bird being common in Greece, from the circumstance of first seeing a number of them blown off by a gale from the Acroceraunian mountains several years since, during the war, when they were captured at sea. The writer of the ornithological report asserts that it is unknown in the west of Europe! Yet they inform us in another place, that one of the party had been at Seville, where they swarm, as they do in all the cities of the south of Spain, and are seen as far north as Toledo. We do not despair, if our Hibernian brethren, who are at last in the field, and will look vigilantly out, of adding this and other interesting birds to the British fauna.

A very moderate flight to a bird accustomed, as this is, to remain the whole day on the wing, would waft them from the western coasts of the Peninsula to the nearest part of Ireland. We particularly recommend the attention of the writer of the notice on the Irish birds in the late number of this Journal to the subject, and especially to those which are mentioned as breeding about the steeples of churches.

We wish steps were taken to naturalize these beautiful birds, which we have no doubt would easily live in the south of England. They are quite harmless, live on beetles and other insects, occasionally take a mouse or mole, and would be highly ornamental in such situations as Exeter or Salisbury cathedrals. They can easily be procured

at Seville by means of the keeper of the Giralda, who has access to their nests.

The *Strix bubo* and *Vultur fulvus* were met with, but we are not informed whether the former be of the common species of the north, or of a supposed variety which is assigned to the zone of these observations.

If the list of birds be scanty, to make amends we have a new arrangement of the *Passeres*, and a fresh coinage of names with which M. Geoffroy has favoured his friends and the public.

The partridge of the Morea is said to be the *P. rufa*, contrary to our belief that it is the *P. Græca* or *Bartavelle*. Probably both species may occur, and it is pretty certain that the *P. petrosa* will be found to be the prevailing species in some of the southern islands.

The beautiful *Poule Sultane*, or purple water hen of Latham, *Porphyrio hyacinthus*, was found in the marshes near Navarino, the plains of Helos, and other localities. It is probably more numerous than it is supposed to be, if the habits resemble those of the species in Sardinia, where they frequent the most infected parts of the marshes, which are almost inaccessible during the heats of summer.

We strongly recommend to our friends of the new society in St James's Park to take steps for the introduction of this most lovely bird. We were informed by the late Professor Bonelli, that they are abundantly kept in the yards of houses at Catania in Sicily, as they were in the time of the Romans. They live easily in a domestic state, and would only require protection from the winter's cold in this country. Independently of their beauty of plumage, which resembles the finest tints of the tropical birds, their habits of using the long prehensile toes to lift their food gives them a peculiarly elegant appearance.

REPTILES.—The *Testudo emarginata* abounds in the Morea, as does the *T. Græca*, which is common in Sicily, Calabria, &c.

The *Testudo Europa* (Gray,) which inhabits the marshes of the south of Europe, was found abundantly at the mouth of the Eurotas.

A new species is given under the name of *C. Hellenica*. It was found in the ditches which drain the plain of Nisi, in the heart of Messenia. It appears to differ from its congener, by the form being less elliptical, the sides more rectilinear and elongated. Some were observed to be even less than rectilinear, and to be slightly concave on the sides. There are also some minor points of difference.

Emys Caspica (Gmelin) is common in the shallow streams of the Morea, and in those of the Isle of Tenos.

We have thus a respectable addition to our scanty knowledge of these reptiles. There is little doubt that the aquatic species could very easily be naturalised in our streams and artificial waters of the south and west of England, where there is depth to enable them to secure themselves against the winter's cold. They are perfectly innocuous in every respect, and as the steam-boats which now traverse the Mediterranean in all directions give great facility for their transport, they would form an interesting appendage to them. We cannot speak from personal knowledge as to their fitness for the table, never having tasted them, but we have heard that one of the terrestrial species, probably *T. Græca*, formed a favourite item in the Lent fare of the luxurious inhabitants of the wealthier convents in the south of Italy, before their suppression at the time of the French invasion. Our informant complained only of their highly stimulating and nutritious properties, which ought to have made the worthy monks cautious in the use of them.

Amongst the Saurians, a new lizard, under the name of *L. Peloponnesiæa*, is introduced. It is nearly allied to *Lacerta muralis*, the green lizard of the south of Europe, but the palatal teeth are wanting, and the lateral parts of the head behind the eyes are said to differ, the scales being nearly equal and polygonal, without the large central scale, as in the neighbouring species. It was found in the Morea and in the islands with *L. muralis*, but is less common.

We should scarcely, after the description which is given, expect to find the animal represented as almost wholly bright green, but so the artist has turned it out. It is so managed that the very spots or blotches meant to represent "noirâtres," look like deeper tints of the same colour. This inattention is inexcusable, otherwise the plates, especially that of *S. muralis*, are beautiful.

Another new saurian is given as *Algyroides Moreoticus*, being of a genus established by MM. Dumeril and Bibron to distinguish it from *Algyras*, owing to some slight difference discovered in the scales. It is a small but very beautiful species.

The *Stenodactylus guttatus* of Cuvier, (*Agame ponctuée* of the great work on Egypt, and hitherto not observed out of that country,) was found in some part of Greece, but the locality is not given, which we would much rather had been the case. Its congener, the *S. vermiculatus*, which is common in the south of Europe, was found at Modon, Argoś, &c.

The Ablepharis, Kitaibelli of Cocteau, a congener, which had only been seen in Hungary, was also observed. The form is longer and more taper than that of the adjoining species.

The Pseudopus Pallasii, the Scheltopusik of the south of Russia, was found to be common in the Peloponnesus. This curious genus, of which we owe the discovery to Pallas, and probably has not been seen by many of our readers, is a serpent with a long finny membrane on each side upon the under part of the body, which makes it a connecting link between the lizard and snakes. The first which was seen was basking in the vernal sun after emerging from its winter retreat, and was demolished instantly by our naturalists with the but of their guns; and they were surprised on examination to find it had no fangs, and was consequently not venomous, reminding us of the youthful zeal with which we used to attack the poor *Anguis fragilis* or slow-worm, when it unfortunately came in our way.

Many were subsequently taken, and were more mildly dealt with, being kept alive about the houses in a half domestic state, to which their mild and inoffensive manners enabled them to accommodate themselves. Their powers of digestion must be considerable, for we find the principal diet offered to them was hard boiled eggs, reminding us again of the practice of our younger days, as if animals in a domestic state should be given the food most unlike that of their natural habits. On one occasion, however, a pseudopus met with a nest of young unfledged birds, which it soon demolished, and we have no doubt fully enjoyed. The plate is good, the colour being more russet and less green than that of the Prince Musignano, probably owing to some difference in age or sex, or from the animal being more recently killed than that figured in the *Iconographia Romana*.

Another species is given as new under the name of *P. Durvillii*. It is much smaller, and is striped and varied in colour. We cannot help thinking it possible that it may be the young of the preceding species.

An *Anguis* or slow-worm, on which the name of *A. punctuatissimus* has been conferred, seems to possess unequivocal claims to novelty, the muzzle being narrower, the arrangement of the cephalic plates and the disposition of colour differing from the common *A. fragilis*. The upper part of the body is "café au lait;" underneath it is grey, and the whole dotted with very small black specks, forming longitudinal lines round the body.

SERPENTS.—A small yellow reptile, the *Typhlops flavescens* of

these writers, was met with in the islands of the Archipelago. In form it would appear to resemble Anguis, but it is placed amongst the true serpents.

The *Erix jaculus*, Daudin, the *Erix* of the Delta in the great work on Egypt, a small harmless species, was found in the islands of Saxos and Tenos.

The *Coluber siculus* of Cuvier, which was named after specimens brought from Sicily by Bibron, is common in the Morea, and a species so nearly resembling it as probably to be identical, but which is called *Coluber bilineatus*, is also figured. Both these, if they be two species, are very nearly allied to *C. natrix*. The beautiful *C. leopardinus* is also given, but the plate is not equal to that of the Prince Musignano, who, they complain, preceded them owing to the delay of the engravers.

The *Coluber cucullatus* of the great work on Egypt, which was not known to exist in Europe, is given as found in Greece, but unfortunately we have no locality assigned to it.

The common and indeed only viper, according to these gentlemen, is the *C. ammodytes* or snouted species. It is very common, and the activity of its poison produces frequent accidents. The length is not great, the largest only measuring from 15 to 18 inches in length, but they are said to be very thick, a proportion which has not been observed by the draftsman.

The *Bufo palmarum*, so called from its habit of seeking shelter under the palmetes, is nearly of the same dimensions as the *B. aqua* of America. The largest known of the genus has hitherto only been found in Sicily and in the Morea. Some individuals measured from the nose to the extremity of the hind feet 40 centimetres, nearly half a yard. The colour is dark yellow brown, and the appearance extremely disgusting.

A good plate is given of the *B. viridis*, a beautiful species, if the idea of beauty can be attached to a frog. It was found in the ditches of the fortress of Modon.

The extent to which this notice has been carried prevents our noticing the sections of Fish, Insects, and Botany, &c. which we reserve for a future occasion.

BIBLIOGRAPHICAL NOTICES.

A History of British Birds. By WILLIAM YARRELL, F. L. S., Secretary to the Zoological Society. Illustrated by a Wood-cut of each Species, and numerous Vignettes. London, Van Voorst, 1837. 8vo. Nos. I. II.

WE merely announce the appearance of these numbers as the commencement of another department of a valuable series of works devoted to the Natural History of the British islands, and bringing down our information to the latest date. When the work has reached its completion, we shall endeavour fully to review its contents. The present numbers are published nearly in the same beautiful style of workmanship with their author's *Fishes* and Mr Bell's *Quadrupeds*. The descriptions are concise and faithful, and contain all that is at present known of the birds. The execution of the wood-cutting is in general beautiful; but we do not like the drawing of many of the birds. Some of the figures are stiff and not artist-like; as examples we may mention those of the *Neophron* and white-tailed eagle, and as a contrast we would refer to the finely wrought figure of the jerr-falcon.

The Birds of Australia and the adjacent Islands. By JOHN GOULD, F. L. S. Part I. Folio. 1837.

Icones Avium, or Figures and Descriptions of New and interesting Birds from various parts of the Globe. By JOHN GOULD, F. L. S. Forming a Supplement to his former works. Part I. Folio. 1837.

The two works of which we have now given the titles have been sent to us by their indefatigable author. If carried through in their present manner, they will be invaluable to the ornithologist; and from the materials which Mr Gould can call to his assistance, and the talents as an artist possessed by his lady, we could not wish the subjects to have been placed under a better charge. The birds of Europe being now completed, ample time can be devoted to these additional undertakings.

The first work contains figures and concise descriptions of ten birds from Australia,—*Malurus Lambertii* and *elegans*, the latter a closely allied but distinct species; *Calodera maculata*; *Amadina ruficauda*; *Nanodes undulatus*; *Nymphicus Novæ-Hollandiæ*; *Nestor productus*; *Hemipodius melanogaster*; *Leptorhynchus pectoralis*, a curious bird intermediate in form between *Himantopus* and the

avosets, and *Phalacrocorax punctatus*, a cormorant of gray and white plumage, and orange-coloured legs and feet.

The "Icones" contain *Eurylaimus Dalhousiæ*, of which Mr Gould has formed a subgenus, *Crossodera*. Mr Swainson, in his Synopsis of Genera, given in Lardner's Cyclopædia, has also thought this necessary, and has named the former *Psarismus*, from its "supposed" resemblance to a Psaris. We are not sure which of these names has the right of priority, but we are sure that the bird in question has little resemblance to Psaris, and the bill appears to us to be as much developed in form as in the other green or gray tinted species from continental and alpine India.—*Todus multicolor*, described by Gould in the proceedings of the Zoological Society, and now we believe figured for the first time. We saw this species, in 1825, in M. Temminck's collection at Amsterdam.—*Ianthocincla phænicea*, a beautiful and brightly-coloured species from alpine India.—*Calliope pectoralis*.—*Microura squamata*,—both from Himalaya.—*Paradoxornis flavirostris*—See Mag. of Zool. and Bot. i. p. 64.—*Pteroglossus Gouldii*, a species from the Brazils, and named by M. Natterer in honour of our author.—*Numida vulturina*, Hardw. a very fine species from Western Africa.—*Ortyx plumifera*, one of the most beautiful species yet described. The head is adorned with two narrow feathers nearly three inches in length, forming a graceful bending crest. The other plumage is richly blended shades of gray, brown, and chestnut; and the bird is besides remarkable in shewing the character and markings of plumage which we perceive on the flanks of the red-legged partridges. Three specimens were procured in California by the late David Douglas.—*Cursorius rufus*, from the Indian islands, intermediate between *C. Asiaticus* and *Temminckii*.

Supplement to the Flora Metropolitana, or Botanical Rambles within thirty miles of London. By DANIEL COOPER, A. L. S. 12mo. 1837. Highley, London.

A little work of 36 pages, giving localities which were omitted (or at the time of its publication undiscovered) from Mr Cooper's former volume, noticed at p. 281, Vol. i. of this Magazine. The greater portion of the pages is, however, occupied by a full index to the whole work, containing the English and scientific names, and indicating by contractions "the time of flowering, and colour of the flowers of the phænogamous plants." And, in conclusion, a short table is given of the elevations of the principal localities round London, above the level of the Thames, at Trinity high-water-mark.

Similar tables would be very desirable were they appended to the more extended Floras which we have of various districts both in England and Scotland, and also, according to Mr C. Watson's plan, to note the ranges of elevation between which the plants are seen to occur.—The greatest height within the limits of Mr Cooper's Flora is Leith-Hill, 993 feet. The lowest is Kensington Palace, 66 feet, 1 inch.

PERIODICALS—*British.*

Loudon's Magazine of Natural History. New Series. July and August 1837. (Continued from page 276.)

I. *Zoology.*

On Nomenclature by Zetetes, p. 421.—EYTON upon the Theory of Hybridity, p. 357.—TEMPLETON'S List of the Irish Vertebrate animals, p. 403.—Dr MOORE on the Web-footed Birds of Devonshire, p. 360.—Observations on Woodcocks and Fieldfares breeding in Scotland, by GEORGE FAIRHOLME, p. 337, with remarks on the same subject, by Mr E. BLYTH, p. 439.—On the structure of the Fossil Saurians, from the German of HERMANN VON MEGER, p. 341.—Report of a Notice, by M. Rang, respecting the Inhabitant of the Argonaut, by MM. DUMERIL and De BLAINVILLE, p. 393.—Some observations on Mr Stutchbury's proposed new genus of univalve shells *Cypræcassis*, by G. B. SOWERBY, p. 366 and p. 431. Could not Mr Stutchbury's views of a genus in Malacology be controverted without the infusion of acrimony which embitters this paper? In his "additional remarks," Mr Sowerby declares that he is not actuated by any personal feeling against his opponent,—so that he seems to have had no reason whatever for having stated his objections in the first instance in an irritating and insulting manner, for assuredly there is no expression in the original paper of Mr Stutchbury, which could provoke such a bilious discharge. We do indeed very heartily wish that our metropolitan brethren would cultivate a greater "sweetness of speech," for their animosities and mutual recriminations afford no sport to us, and do not tend to edifying.—On the *Mastradæ*, by J. E. GRAY, p. 370.—Among the short communications we find, Notice of the South African Museum: Additions to the Zoological Society: the Fossil remains of Apes: on the Habits of the Viper: on the swimming of snakes: on the alleged affinity between the Pigeons and Poultry: Eagle's nest in Loch Skene: Ventriloquism in Birds.

II. *Botany.*

The communications under this head are limited to a few short notices. 1. On *Lamium intermedium*, and 2. *Fedia carinata*, by Mr LEIGHTON: 3. On *Alyssum calycinum*, and 4. *Leucojum vernum* by Mr. BROWN. It would appear not improbable, from a note of Mr Brown's in p. 447, that the *Betula intermedia* is a native on the Clova hills, where it has been mistaken for *B. alba*. The point is deserving the attention of our Scottish friends.

Companion to the Botanical Magazine. By Sir W. J. HOOKER, Professor of Botany in the University of Glasgow. (Continued from p. 276. Vol. ii.)

THIS Number (the 24th of the work) completes the second volume; and as we have received our August and September numbers of the Magazine, but without its worthy "Companion," we feel somewhat uneasy, and sincerely trust that it has not altogether ceased, for want of encouragement and support.

The contents of the number are, Notes upon some genera and species of South American Orchideæ, by JOHN LINDLEY, Ph. D. F. R. S. —Chrysothoe, a new genus of Chamælaucieæ, by the same author.—Floræ Insularum Novæ Zelandiæ precursor; or a specimen of the Botany of the Islands of New Zealand, by ALLAN CUNNINGHAM, continued from last number, contains the Hepaticæ, Lycopodiaceæ, the Felices veræ, and a portion of the Plantæ vasculares. Two figures of *Loxoma Cunninghamii*, a new species belonging to the Polypodiaceæ, are given; the one, illustrating the fructification, is beautifully executed by F. BAUER.—Botanical information contains a list of the species figured in the two last parts of the "Icones Plantarum."—Some remarks by Dr WRIGHT, copied from the Madras Journal of Literature and Science, relative to the descriptions of Dr Graham, from Colonel Walker's specimens. Dr Wright leaves the matter of the identity of the plants still uncertain, but is of opinion that Dr Graham's plants have been introduced to the Island of Ceylon, and are not indigenous.

PERIODICALS—*Foreign.*

Annales des Sciences Naturelles. Zoologie, MM. AUDOUIN et MILNE-EDWARDS. *Botanique*, MM. AD. BRONGNIART et GUILLEMIN. Crochard and Co. Paris, Janvier 1837.

I. *Zoology.*

Recherches sur quelques Entozoaires et larves parasites des insectes Orthoptères et Hyménoptères, par LEON DUFOUR.—Professor

VROLIK sur les dents incisives et le nombre des côtes du *Rhinoceros Africain*.—*Observations préliminaires sur l'existence d'Infusoires fossiles et sur leur profusion dans la nature*, par M. EHRENBERG.—*Etudes pour servir à l'histoire naturelle des Myriapodes*, par M. P. GERVAIS. He has ascertained that the eyes of the *Juli*, *Lithobii*, and *Scolopendræ* increase in number with the growth of the individual.—*Synopsis des genres et des espèces d'animaux fossiles découverts dans les couches supérieures des dépôts tertiaires des montagnes Sivalek de l'Himalaya*, par MM. CAUTLEY et FALCONER.—BAKER sur le *Chameau fossile du Sub-Himalaya*. This and the preceding are translations from the *Journal of the Asiatic Society*.—*Note sur les organes respiratoires des Capricornes*, par M. PICTET.

II. Botany.

Notice historique sur Ant.-Laur. de Jussieu, par M. AD. BRONGNIART. (See a translation of this paper in our present Number.)—*Note historique sur ce que l'on a écrit en France de 1806 à 1816 sur les mots conducteurs et cordons pistillaires*, par M. A. de SAINT-HILAIRE.—*Note sur le genre Stephanotis, de la famille des Asclépiadées*, par M. AD. BRONGNIART.—*Description du nouveau genre Archimedeia, par feu la P. Leandro do Sacramento, précédée d'une notice sur ce botaniste*, par M. AUG. de SAINT-HILAIRE.—*Note sur le genre Polycnemum et sur une nouvelle tribu de la famille des Paronychiées*, par A. MOQUIN-TANDON.—*Essai sur la disposition des feuilles curvisériées*, par MM. BRAVAIS.

Magazin de Zoologie, Journal destiné à établir une correspondance entre les Zoologistes de tous les pays, et à leur faciliter les Moyens de publier les espèces nouvelles ou peu connues qu'ils possèdent. Par F. E. GUERIN-MENEVILLE. 8vo. Paris, 1836. Sixième année.

THIS periodical has now been continued for six years, the last or sixth volume having been completed with the year 1836. The entire work is devoted to every branch of zoology, but the subjects are arranged in classes, which can be subscribed for separately, according to the taste and pursuits of individuals. The plan of the work appears, from the prospectus and volume before us, to be restricted to descriptions of what may be considered new species, the information and figures being sometimes taken from contemporary works, and to monographs and memoirs of particular families or genera. No reviews or notices of new works, and no general information regarding the progress of zoology, are given.

Among the Mammalia described, we have a description and figure of the beautiful Colobus Guereza, taken from the "Neue Wirbelthiere" of Rüppel.—A notice of some of the animals brought home by "La Corvette La Favorite," and a short memoir, "Sur le genre *Papthagomys* et quelques autres Rongeurs qui l'avoisinent," accompanied by a figure of *P. ater*, and a good plate of the dentition of *Oryctomys*, Blain.

The ornithological department commences with descriptions of some of the birds discovered by the expedition of "La Favorite," by MM. Fortune Eydoux and Paul Gervais. A figure of Gould's *Pteroglossus ulocomus* is given. The specimen was procured at Para, and is said to be the only one in the Parisian collections. An Ibis is presented under the title of *I. Lamellicollis*, sent from New Holland, and so named by M. Lafresnaye, but this is the New Holland Ibis of Dr Latham, the *I. spinicollis* of Jameson, New Ed. Phil. Journal; and the *I. Lathamii*, Gray, Proceed. Zool. Society of London.—The same gentleman figures and describes a shrike as new, and lately sent from the Cape of Good Hope, by M. Verreaux, under the title of *I. melanoleucus*.—How he has hit on the same title we know not, but a plate and description will be found executed and published six or seven years since in Illustrations of Ornithology by Sir W. Jardine and P. J. Selby, from specimens sent to Europe by Dr Smith. A curious bird from Madagascar, of which a new genus is made, (*Falculia*,) is figured and fully described. The form is considered to be intermediate between the hoopoes and *Promerops* of Temminck, and the colouring is peculiar, the head, neck, and under parts pure white, the remaining plumage deep bluish-black. A short memoir by M. Lafresnaye on the species of the genus *Orthotomus* of Horsfield.—Remarks by the same person on the genus *Certhi-landa*, Sw. with observations on two South American species, which are considered to be new, and a beautiful *Micropagon* from South Africa, or rather from the interior of the country, said to have been brought from the country of the "Masilikats." M. Lafresnaye has named it *M. sulphuratus*.

MOLLUSCA. Plate 71 represents *Drepanostoma nautiliformis*, the type of a subgenus of *Helix* distinguished by a peculiarity in the shape of the aperture which the name (from *δρεπανον*, a scythe, and *στομα*, a mouth,) is meant to express. The species is a native of the province of Como in Italy, living in families under stones and decaying leaves in shady woods.—The *Rostellaria occidentalis* of Beck forms the subject of Pl. 72. It belongs to the same section as our British species; and is a native of the North Ame-

rican coast, and, it would appear, of the Greenland shores also.—*Marginella Cleryi*, figured in Pl. 73, is allied to *M. Adansonii*, from which, however, it is well distinguished: it inhabits the coast of Senegal.—*Helix Poeyi*, from the interior of the island of Cuba, occupies Pl. 74, but the shell only is given.—This is followed by Webb and Vanbeneden's notice *sur les mollusques du genre PARMACELLA, et description d'une nouvelle espèce de ce genre*,—a valuable paper which we have already noticed, Vol. i. p. 492. Two plates, one zoological and one anatomical, are devoted to its illustration.—*Note sur deux espèces nouvelles d'Aplysies, par MM. VANBENEDEN et WEBB*. These fine species were procured from the shores near Nice. Their characters are:

1. A *BRUGNATELLII*, colore aurantiaco: alis parum elongatis; tentaculis posterioribus colore privatis, ore membranis duabus accessoriis lateralibus munito. Testa ovata, tenuissima, fragili, pellicida, striis concentricis eleganter notata. Rostro dextrum inclinatum et in uncinam parvulam abeunte.—Long. 35 millim. larg. de la coq. 12 millim.

2. A *WEBBII*, corpore limaciformi, virescente, maculis nigris flavisque ornato; alis palii parvis et partes testæ medias minime vestientibus; siphone fere nullo. Marginibus pedis antè dilatis; ore membranis accessoriis munito. Testa ovata elongata compressa, striis linearibus sculpta incisura ad dextram sinuata, rostroque bidentato.—Long. 25 millim. larg. de la coq. 15 millim.

CRUSTACEA.—The contributions to this class belong to its lower forms, and the species are all described by Guérin. The *Pterelas* is a new genus of the Isopodes, Fam. Cymothodes, nearly allied to *Æga*. The species is named *Pt. Webbii*, from the naturalist who procured it on the coast of Portugal.—*Description de quelques genres nouveaux de Crustacés appartenant à la famille des Hypérines*. The genera are *Primno*, nearly allied to *Phronima*, a native of the South American seas; *Hieraconyx*, which will stand in the system near to the *Themisto*; and *Pronoe*, near to *Typhis*. The paper contains besides descriptions of a new species of *Phronima*, viz. *Ph. atlantica*; and of the *Oxycephalus oceanicus*, a very curious animal from the shores of Chili.—The *Phlias serratus* delineated in pl. 19, forms a new genus of Amphipodes, affined to *Amphitoe* and *Gammarus*. M. Gaudichaud found this pretty little species on his passage from the Maldivé islands to Port Jackson.—Pl. 14 represents a new oniscidous insect named *Deto echinata*, brought from the east by Olivier. It resembles in form our common *Oniscus asellus*.

ARACHNIDA.—*Observations sur les aranéides du genre Hersilia, et description de deux espèces nouvelles appartenant à ce genre par M. H. LUCAS.*—This is followed by a monograph of the genus *Pachyloscelis* by the same naturalist; who in pl. 15 describes a new species of *Attus* from the neighbourhood of Paris, named *A. venator*.

INSECTA.—Plates 139 and 140 represent *Scarabæus Anubis*, a fine species allied to *Scar. Typhon* and *Goliath* from Brazil.—*Monographe du genre Pamborus, par M. H. GORY*, with figures of all the ascertained species.—*Notice sur les metamorphoses des coleopteres du genre Telephorus, par E. BLANCHARD*; and this lady contributes also a notice of the larva of *Staphylinus olens* in pl. 165.—*Meloe collegialis* is described and figured by AUDOUIN in pl. 169, a species with considerable marks of affinity to the *M. excavatus* of Leach.—*Carabus basilicus* from Porto-Rico, a very fine insect, occupies pl. 170, erroneously numbered 169 in the letter-press; and the genus *Bryaxis* is fully illustrated in pl. 171.

RADIATA.—The only paper in this class is entitled *Recherches sur la cause ordinaire de la phosphorescence marine, et description du Noctiluca miliaris, par M. SURIRAY*, already noticed in our Vol. i. p. 491.*

* First part of a monograph on the *Trachydérides*, by M. Dupon Jeune, seems well and carefully done. Figures are given of the species, and 42 on 24 plates are now published. We shall recur to this memoir on its completion.

INTELLIGENCE.

ZOOLOGICAL.

Patella parva, Da Costa.—This shell, on the authority of Maton and Racket, has been considered synonymous with the *P. virginea* of Muller by all our recent writers. Dr Fleming threw out a hint that it may have been confounded on our shores with the *P. tessulata* of Muller, but he took no pains to ascertain the fact. My attention was first called to the point by the statement of Audouin and Milne-Edwards that the animal of the “Patelles roses” found in the English channel differed entirely in the structure of its branchiæ from the true Patellæ, and formed a new genus of pectinibranchous mollusca allied to the Turbines. (Hist. Nat. du Litt. de la France, i. p. 144.) Mr J. E. Gray informed me that these “Patelles roses” were the same as the *P. virginea* of our shores, but on examining these, I soon satisfied myself that those found on the coast of Berwickshire at least were formed like the Patella, the cloak of the animal being ciliated all round with a fringe of short equal filaments. The accuracy of this observation I have recently had occasion to confirm in company with my friend Mr J. Alder. It follows, therefore, that the shell usually called *Patella virginea* by British conchologists, is not that so named by Muller, but is probably his *P. tessulata*, in which the margin of the cloak is ciliated.

Is the *Patella pulchella* of Forbes in Loudon’s Mag. Nat. Hist. Vol. viii. p. 591, fig. 61, a Patella or a Lottia?—G. J.

Zoology of Africa.—Our readers are by this time aware that Dr Andrew Smith has lately returned from an expedition undertaken to explore the interior of Southern Africa, and that he has brought to this country the whole of his collections in Natural History, which are now publicly exhibited in London. In the published catalogue of part of this collection there are the names of 62 mammalia, and 339 birds: there is besides an extensive series of drawings, MSS., &c. with other materials fully to illustrate the districts traversed; and in furtherance of his plan Dr Smith is about to commence printing a work to be entitled, “The Zoology of Southern Africa,” embellished with highly finished plates, executed from the original drawings. On the authority of an individual on whose judgment we can rely, we are able to say that the materials are most valuable,

and the drawings full of character and interest. The Government has granted L. 1500 to assist in defraying the expenses of the publication. "In consequence of this," says the editor of the Magazine of Natural History, "an arrangement is being made with the intended publishers (Smith and Elder, Cornhill,) by which the public will obtain the work at one-fourth or fifth of the actual cost price, the Government grant defraying the whole expense of engraving the plates."

BOTANICAL.

BOTANICAL SOCIETY OF EDINBURGH, May 11, 1837.—Professor Graham in the chair. The following members were elected:—*Resident*, Mrs Michael Percival, Mr Thomas Dickson, Mr James Hamilton, Mr James Nairne, Dr Silas Palmer, Mr George Trusted. *Non-Resident*, Mr J. S. Bowerbank, London; Mr Alfred White, London.

Specimens from Dr Salter were presented. Donation to library, "Pugillus Plantarum Indiæ Orientalis, composuit G. A. Walker-Arnott,"—from the Author.

Dr Balfour read some extracts from a letter from Mr Gardner, at present in Brazil, received along with the first invoice of Plants sent home by that gentleman.

Dr Balfour then read a communication on Botanical Prosody, in which he endeavoured to show that botanists in general did not pay sufficient attention to the proper pronunciation of the terms which they used. Whilst he allowed that in some cases the quantities of botanical names were arbitrary, he proved that in others these could be easily ascertained by a reference to classical authors; and in illustration of this, he adduced a number of instances, quoting the authority for a different pronunciation from that usually given to them.

A paper by Dr Walker-Arnott was read, containing observations on the British *Cichoraceæ*, with an arrangement of these according to the system adopted by Lessing in his "Synopsis Generum Compositarum." Dr Arnott expressed his belief that all our Floras would ere long follow Lessing's arrangement of the *Compositæ*, and adopt his generic characters, and for this reason strongly recommended the study of his Synopsis, along with the fifth volume of De Candolle's *Prodromus*, in order to obtain a competent knowledge of this difficult tribe, and the value of the different parts in generic characters. Various species of *Apargia*, *Leontodon*, *Hieracium*, and *Crepis* were especially noticed, and many interesting observations

were made upon these. In particular, it was shown that *Hieracium molle* being in all respects a *Crepis*, ought to be removed to that genus.

Mr James M'Nab exhibited a remarkable monstrosity of Spruce Fir from near Kettle in Fife; also *Petasites hybrida* from a station in the same neighbourhood, where it is apparently wild,—both found by Dr Howison.

June 8th.—Professor Graham in the chair. The following members were elected:—*Resident*, Mr Henry Barham Mitchell Harris, Mr Alexander Seton. *Non-Resident*, Mr John Ball, Christ's College, Cambridge.

Dr Graham presented from Lady Dalhousie a beautiful collection of Lycopodiums and Ferns, being the remainder of her Ladyship's East Indian Herbarium.

Dr Douglas MacLagan exhibited specimens of a root called *Hiarry*, received by him from Mr Watt, surgeon, Demerara, which is used by the natives of British Guiana for intoxicating fish. The botanical information regarding the plant was chiefly obtained from a slight sketch sent along with the roots; for no light had been thrown on the subject by consulting botanical works. The flowers are papilionaceous, light-purple, five or six on a lax raceme, the pod about the size of the common Laburnum, smooth, containing eight or nine seeds. The root, though dried, was found to retain the property of poisoning fishes; and a watery extract was ascertained by various experiments to produce on fishes nearly the same effect as Turkey Opium, and to be superior in activity to the extracts of Belladonna, Hyoscyamus, and Conium. A chemical examination of the root showed, that besides a large quantity of gum and colouring matter, it contained a resin of a light-yellow colour and peculiar smell, and an acid differing in quality from any known acid,—but regarding the state of combination of which in the plant, no precise information had been obtained. One-fourth of a grain of this acid, obviously not in a state of purity, poisoned a minnow in half an hour. The effects of the *Hiarry* upon minnows, and comparative experiments with opium, were shown in presence of the Society, in which Dr Balfour, who read the paper in the absence of Dr MacLagan, was kindly assisted by Professor Christison.

Dr Graham exhibited specimens in flower of *Carex Buxbaumii* and *Lophospermum scandens*. He then stated, in reference to several species of *Bletia* lately obtained at the Botanic Garden, from Jamaica, through the kindness of the Rev. Mr Campbell, that an examination of these had satisfied him that the specific names in

this genus had been multiplied without due attention to nature. In particular, he believed that *Blelia florida*, *B. verecunda*, *B. Shepherdii*, and he feared even *B. patula*, must be considered mere modifications of the same species. Specimens upon which this opinion was formed were exhibited. Dr Graham also exhibited a specimen in flower of *Philodendron crassinervium*. This plant had been introduced into the Botanical Garden, from Brazil, by Captain Graham sixteen years ago; but though it had several times developed flower buds, the spatha had never till this season fully expanded, probably owing to the command of heat having been heretofore inadequate. —W. H. CAMPBELL, *Sec.*

Glass eroded by a Lichen.—“Several pieces of glass were lately brought to me by a glazier in this city, taken from the old windows of an ancient church in the vicinity; some of these had the appearance of being worm-eaten. Struck with the singularity of this, I immediately commenced an investigation of the circumstance, that I might ascertain by what agency this corrosion had been induced. Upon making a minute examination, I found it was caused by the instrumentality of a cryptogamic plant, I believe of the lichen species. The first indication of the plant was a greenish pulverulent mould on the surface of the glass; in this substance some light-coloured brown dots appear; these enlarge, and form cup-like substances of a slightly violet tinge; these plants increase, and become fully developed. The glass is gradually acted upon, being first a little roughened and indented; afterwards small cavities, some even penetrating a considerable distance into the substance of the glass, are formed.

“Not having read or heard of any plant having hitherto been discovered capable of decomposing and growing on and in the substance of glass, I thought it right to make a public communication of the fact through the medium of the pages of your valuable periodical, leaving it to other and abler naturalists and philosophers to disclose the kind of agency, whether chemical or galvanical, by which this singular decomposition of glass is effected.

“The glaziers of this city inform me, that glass similarly acted upon may be met with in the cathedral and old church windows.”
THOMAS HICKES, Gloucester, April 25, 1837, in *Med. Gazette* for May 6.

Musci Angusiani, or Dried Specimens of the Mosses of Angus or Forfarshire.—This is the title of a work projected by Mr William Gardiner, Jun. of Dundee, of which a prospectus has been

sent us. "The work will be comprised in about *seven* or *eight* 12mo fasciculi—price 3s. 6d. each—forming *two* neat pocket volumes. On the left hand page of each leaf, one, two, or more specimens of a species will be carefully gummed, with the *scientific* and *English name*, reference to the page of the *British Flora* where the species is described, *locality*, and *time when found*,—all accurately written underneath. With the concluding fasciculus will be given, along with title-pages for both volumes, a printed table of the contents of each, arranged according to Sir W. J. Hooker's *British Flora*, and including a synopsis of the generic and specific characters. A blank will be left at the top of each page for numbering the species, and by means of the tables the specimens can be numbered and arranged with the greatest ease, while the numbers not being attached to them when published, will allow of any subscriber adopting whatever mode of arrangement he chooses, as well as of the author adding species that may be found during the publication of the work."

Northumberland Flora.—At the July meeting of the "Berwickshire Naturalist's Club," the members, in the course of their walk, discovered the *Asplenium septentrionale* growing in great profusion, on Kyloe crags, near Haggerston. The *Hieracium molle* was gathered in Kyloe dean; and the *Blyssmus rufus* abundantly in a salt marsh at the mouth of the Low below Beal. The two former plants are not included in Mr Winch's "Flora of Northumberland and Durham;" and for the latter, two localities only are given, both in the south of Durham. Dr Francis Douglas exhibited a specimen of *Cladium mariscus*, which he has discovered native in Learmouth Bogs, Northumberland, where, however, it is not plentiful, but a very interesting addition to the botany of the district. If to these we add Dr Johnston's discovery of *Cerastium atrovirens*, we have sufficient evidence that the zeal in the investigation of indigenous botany for which the northern botanists of England have been long noted, is not grown lukewarm.

Cerastium pedunculatum.—The explanation of the plate illustrative of this species having been omitted in its proper place, is here supplied. Plate VI., C. pedunculatum, var. β . 4-partitum. *a*, calyx with capsule of do. *b*, petal of the same. C. Fig. 1, calyx of Cer. tetrandrum: 2, a sepal much magnified so as to show the herbaceous point bordered by a pellucid membrane. D. Fig. 1, calyx of Cer. semidecandrum: 2, a sepal of the same much magnified so as to show the diaphanous margin and apex.

MISCELLANEOUS.

Seventh Meeting of the British Association for the Advancement of Science.

THE Meeting of the British Association was arranged by previous agreement to be held this year at Liverpool, the general meetings to commence on Monday, 11th September. In the preceding week the preliminary arrangements were made by the Council and General Committee, while the town and corporation of Liverpool opened its institutions, and prepared accommodation on the most liberal scale for the various assemblies which were contemplated. The private institutions in the town, and the principal manufacturing establishments were also opened during the week of meeting; excellent and commodious rooms were allotted for the business and debates of each of the sections; and altogether, the proceedings of this year have been most important and satisfactory. Our particular department being connected with one section, we shall only now notice the proceedings in Zoology and Botany, but previously will offer one or two remarks on the manner in which some parts of the general business has been conducted.

The British Association has always had our warmest wishes for its success, and when circumstances permitted us to attend its meetings, we departed at their conclusion impressed with a feeling of deep regret that they had terminated, and that the friendly and scientific intercourse had so soon been broken off; we thought that it was an association which bid fair to extend the march of science, and would give an additional thirst for the acquirement of knowledge to many, who would not have been directed to any of its branches, simply because, what they had in reality to learn required to be pointed out; and where the direction of the subjects treated of, and the occasional lectures given, as at the present meeting with reference to the local application of science, the most important results might be expected. We are sure then, that, having expressed our opinion thus of the utility and importance of this great national assemblage, we shall not be thought as invidiously finding fault with any portion of its management, but that we wish to give the warning of a sincere well-wisher to a body which we would most anxiously cherish. At the same time, making the fullest allowance for occurrences which must take place to a certain extent, where the members are so numerous and the arrangements so multitudinous, there are one or two occurrences which we feel it would not be our duty to pass over in complete silence, particularly as we have seen that none of our periodicals have

ventured to notice them, but have drawn their reports only in the spirit of commendation.

Our first fault is with the manner in which the tickets of admission were distributed ; far too much bustle and confusion prevailed in the rooms devoted for this purpose, and from half an hour to three quarters were spent before an individual could make his way through the crowd, and gain the presence of the Secretary ; and by the irregularity of the manner in which those issued to the General Committee were marked, several gentlemen were subjected to the inconvenience of being refused admittance to meetings where *they* only had a right to be present. We know that Mr Taylor did his utmost in the rooms to prevent this, but, as the forms to be gone through had been previously arranged, it became no easy matter to keep things in order. The points which we think should be attended to at another meeting, and which we are sure our friends in Newcastle will amend, are the assistance of one or two additional clerks,—to dispense with so much signing and counter-signing, which prevailed at Liverpool before the ticket could be finally given,—and to make some separation between the tickets which are given to life members, and those which are only taken out on the occasion.

On Friday, which nearly terminated the debating meetings of the various sections, it was arranged that the President of each should deliver at the amphitheatre in the evening, a comprehensive report of the whole proceedings during the week,—an arrangement at once both useful and important, as laying before the public the manner in which the sections had been employed, and allowing it to judge of the importance of the subjects which had thus occupied them. These gentlemen or their delegates (for we regret to say that one or two were confined by indisposition,) certainly appeared when called on by the President, to deliver their reports ; but, with the exception of Dr Faraday and Professor Henslow, we looked in vain for any thing in accordance with the task which had been entrusted to them. The gentlemen whom we have mentioned devoted their twenty-five minutes * to the reading of plain intelligible statements of the transactions of the week, giving a concise analysis of the most important papers, or offering remarks upon them, couched in simple and appropriate, yet eloquent and classical language. The exhibitions of the others were rambling discourses,—a lecture on the stethoscope, and a rant on the benefits which the Association would confer on a commercial community,—all totally foreign to the expected purpose ; and

* From the time which the first specimen occupied, Lord Burlington allotted to each the space of twenty-five minutes.

where we saw that the dignity of well informed men was somewhat lost sight of in an attempt to make an impression on an audience, which they supposed were not all capable of following the drier or deeper points of science, which would necessarily require to have been treated of.

There is still another little failing of correctness of arrangement which we must notice,—fully convinced that, if such matters of little moment in themselves remain unchecked, they would in time inflict a wound which would often become irksome, and eventually refuse to be soothed by mild or ordinary treatment. On the platform erected for the evening meetings, and on which the General Committee or foreigners only have a right be present, a table has of necessity to be devoted for the accommodation of the President and the gentlemen officially connected with the meeting; around this we observed the scions of some noble houses regularly to take their seats, to the exclusion of some of the Presidents of the sections, and other officers who *might* have been called on in the course of business. We would always wish rank to assume its station, and rank with science combined has our highest homage; but it must be recollected that in these meetings the attainments of the individuals are the test of their distinction; and the office-bearers in the sections being elected as the most fitting persons to fill these honourable stations, their places should have been reserved during the short period they had been thus honoured by their fellow members. Let us entreat the Association to beware how they thus act again. Let the selection be made as rigorously as possible, but when it has been made, let the chosen officers be treated as such; at the same time, let rank and title have its highest and fullest influence. Hitherto we think the Association has acted most wisely. In the election of its Presidents, it has, in the first place, run through a list of names high famed for scientific acquirements; and latterly it has entered on a few whose names are alike noble for their rank, and for the manner in which the different branches of science have been prosecuted or patronized by them; and admiring the way in which this has hitherto been conducted, we have been the more particularly induced to make the preceding observations, feeling that if the least inroad is permitted either of this undue deference to men of high degree, or of the slightest taint of party or political bias, we must bid farewell to all our delight in these meetings, and to our anticipations of the great and extended utility which we at present think the BRITISH ASSOCIATION may afford to individuals of every profession.

Section D.—ZOOLOGY AND BOTANY.

President,—W. Sharpe Macleay, F. L. S.*Vice-Presidents*,—Dr Richardson, Professor Graham, Professor Lindley.*Secretaries*,—C. C. Babington, W. Swainson, Rev. L. Jenyns.*Members of Committee*,—Thomas Hincks; N. A. Vigors; Rev. F. W. Hope; Pat. Neill; Professor J. S. Henslow; Professor T. S. Traill; Earl of Derby; Rev. W. Hincks; John Curtis; P. B. Duncan; J. E. Gray; Charles S. Parker; Rev. J. Yates; J. E. Bowman; T. Eyton; J. P. Selby; C. Horsfall; R. Ball; S. W. Dillwyn; J. N. Walker; A. H. Haliday; J. T. Mackay; Captain James Ross; Sir W. Jardine; R. Harrison; Mr Tinney; H. Sandbach; J. Salisbury; Mr Green; Dr Duncan; F. Archer; G. Cook.*Monday, September 11th.*

The chair being taken about eleven o'clock, the business of this section was commenced by Dr Traill, (Professor of Medical Jurisprudence, Edinburgh,) exhibiting specimens of the *Argas persicus*, the poisonous bug of the Mianneh of Persia, and making some short verbal remarks regarding it. The bite was said to create a fever similar to that of typhus, and it was considered fatal to sleep in some of the villages near which it abounded. Mr Macleay considered that the specimens exhibited were not true insects, but belonged to the family of the Arachnoideæ, and that among them there were two genera, *Argas* and *Ixodes*. He also did not consider the bite so fatal as stated by Dr Traill, but thought the inflammation might be produced by the serrated rostrum remaining in the puncture; and remarked that, in the Island of Cuba, there existed another poisonous insect belonging to a similar family, which attacks the horses, producing great pain and irritation, but he added, that the horses thus attacked were always considered to be those in best health and condition. Dr Traill persisted in his opinion.

Mr Gray exhibited drawings of a new water lily, sent from British Guiana by Dr Schomburgh. He remarked, that this splendid plant would form a new genus, with characters intermediate between *Nymphaea* and *Euryale*, and proposed to name it *Victoria regina*. It was found growing in the river Berbice. The flowers are sweet-scented, the outer petals white, but changing to pink as they expand, and when fully opened showing a flower of from 15 to 18 inches in dia-

meter. The leaf is of an oblong ovate form, from 5 to 6 feet in length, the under side with elevated spinous ribs, as in *Euryale*, and of a rich crimson colour. The edges turn up, and form an erect fringe five inches high, making a frame or border around the leaf, and contrasting finely with the green colour of the upper surface. We have to regret, that neither seeds nor roots were brought home. The drawings are proposed to be engraved and published by the Geographical Society. (See our Plate XII.)

Mr Gray communicated the result of *Mr Children's* repetition of the experiments made by *Mr Cross*, for the reproduction of insects from an infusion of silica. Every attention was given that these experiments should be made exactly in the same manner with those performed by *Mr Cross*, but *Mr Children* did not succeed in procuring the insects from the infusion. *Mr Stuchbury* of Bristol had made the experiments with the same result, so also had *Mr Golding Bird*; and these gentlemen seemed to be of opinion, that the acarus produced by *Mr Cross*, being a recent species, and one well known as most abundant in all situations, had come from eggs present in the distilled water employed in the experiments, and called into existence by the galvanic influence. The question was, however, left open for future investigation and experiment. *Mr Macleay* compared the production of the insects by *Mr Cross* under the galvanic influence to the effect of a high temperature upon the germination of seeds; and compared their vitality to some of the lower animals, which could be revived either after a long series of years, or when apparent life had been completely suspended. Instances were noticed of the germination of grains which had been found in the pyramids, after having lain there upwards of 2000 years, and of the resuscitation of the animals of the genus *Vibrio*, after having been completely dried. *Dr Graham* mentioned instances of eggs of insects having preserved their vitality for a long period, and under high temperature, in which *Mr Gray* agreed, and stated, that the eggs of *Acarus lapicida* have been kept for two years in a dried state, still retaining their vitality; and that he had placed larvæ of one of the musca for three days in prussic acid, which, when removed, produced in due time the perfect insect. The above remarks brought on a discussion, whether circulation and respiration were completely suspended during torpidity. *Mr Macleay* considered that it was so in lower animals, and gave as instances of it the species of *Gordius* and *Filaria*, which could be entirely dried and again revived. *Mr Gray* concurred in these opinions, while *Dr Graham* seemed in favour of these functions being only partially suspended.

Rev. T. W. Hope read a letter from Sir Thomas Phillips on the best method of destroying insects which infest books and MSS. Sir Thomas found the wood of his library attacked by *Anobium striatum*, particularly where beech had been introduced, and appeared to think that this insect was much attracted by the paste employed in binding. He recommended as preservatives against their attacks spirits of turpentine and a solution of corrosive sublimate, and also that the latter substance should be mixed with the paste. In some instances he found the produce of a single impregnated female sufficient to destroy a book. Much unimportant discussion followed the reading of this letter, regarding the best manner of preventing the Coleoptera and their larvæ from destroying objects of natural history. Turpentine and spirit of tar were recommended; but Mr Gray stated, that the only method pursued in the collections of the British Museum was an abundant supply of camphor, with attention to keeping the rooms dry, warm, and well ventilated. Mr Macleay stated that it was *acari* only which fed on the paste employed in binding books, while it was the larvæ of the Coleoptera only which pierced the boards and leaves. He also recommended dryness and ventilation.

Mr J. Ball read a notice of *Erica Mackaiana*, Babington, from Cunnemara, and exhibited living specimens; adducing arguments in favour of its being distinct from *E. tetralix*. Mr Mackay made remarks on its distribution, and stated, that another addition to the British flora had been discovered in the *Erica carnea*, found wild within eight miles of the town of Galway.

Tuesday, 12th September.

Mr Macleay read a communication from Captain Ducane of Southampton, on some marine animals. In laying this communication before the section, he stated, in explanation of the objects of the paper, that, while Mr Thompson had observed that the *craw fish* underwent metamorphoses from the young to the perfect state, Rathke of Berlin maintained the reverse, which would be a remarkable fact if proved, to find that a change took place in long-tailed crustacea, while none had been observed in the Brachyurine division. He felt inclined to support Mr Thompson's opinion, considering that gentleman an accurate naturalist, and he could scarcely think that one who had observed the remarkable fact of the cirrhipeds being locomotive and free in their young state, would now be mistaken. The letter about to be read confirmed his views, and showed an instance of an individual, who had not previously attended to natural history, observing and proving the curious transformations which are puzzling our

professed naturalists. Captain Ducane, Mayor of Southampton, had his attention lately directed to marine animals. He found specimens of what, at the time, he considered the common prawn (*Palemon serratus*) in the ditches of a fen where the tide occasionally entered, and the water was brackish. These were loaded with eggs, and when put into fresh salt water, it was soon afterwards filled with small diaphanous creatures, very different in form from the parent animals. He was not, however, able to keep them more than three days alive—the parent only five or six. Drawings of this animal and the young were shown to Mr Macleay, who discovered at once that it was not a *Palemon*, but a species of some allied genus, perhaps *Crangon*, and on comparing Captain Ducane's drawings with the figure of Mr Thompson, copied from Slabber's work, found them very similar, and almost identical; and this fact he considered went very far to prove the confirmation of that gentleman's observations.

Dr Richardson hinted at the possibility of these young animals being parasitical in the eggs of the *Crangon*, but Mr Macleay considered it impossible that every egg should contain a parasite. Mr Hope remarked that *Zoe* had been found parasite on *Beroe*, while Mr Macleay stated, that he had found the Decapod crustacea parasitical in the Gulf stream, but could not perceive the smallest ground for believing that the young alluded to in Captain Ducane's letter could be animals of this description.

Mr Haliday exhibited engravings (from the *Suites des Buffon*) of *Argas persicus* and *ixodes*, in illustration of the subject brought forward yesterday by *Dr Traill*. Mr Macleay remarked, that the term *bite*, which was employed yesterday when describing the wound inflicted by this animal was improper, being produced by the insertion into the skin of a serrated rostrum, which produced great inflammation. He also remarked that the history of this genus was remarkably curious. In Cuba oxen were sometimes covered with them, and when they had sucked their fill, the serrated rostrum breaks off, and the creature makes its way to the nearest stone, under which it may then be found. When brought home, thousands of eggs would be found issuing from the broken rostrum. He, however, did not pretend to say that the eggs were not impregnated by the usual canal, but that he had never seen them produced in any other way than from the opening formed by the abrasure of these parts, which, when the animal became so full, seemed to serve the common purpose of an intestinal and generative opening. These eggs produced a hexapod larva, the young form of the great division *Arachnoideæ*, of which the *Acari* are the types.

Mr Babington read a notice of a botanical excursion to Jersey and Guernsey, made during the month of August last. (This paper will appear in our next Number.) *Professor Lindley* stated, that Prof. Augusta, a Spanish botanist, had investigated the flora of the Channel islands, and had made out a list of the plants, so far as he knew them to exist, which was deposited in the libraries of some of the institutions there, and would be serviceable to botanists that might again wish to examine the islands. Mr Forbes bore witness to the similarity of the botany of Jersey to the adjacent coast of France, and stated that *Lamium album* was not found in the Isle of Man.

Mr Allis read a paper on the Sclerotic bones of birds and animals, and exhibited preparations of the bones from the collection of the York Philosophical Society. He commenced by stating, that the opinions expressed by several eminent comparative anatomists were at variance with what he had observed, and cited those of Blumenbach, Carus, Cuvier, Yarrell and Buckland, pointing out in what manner they differed from his own observations; and adduced as an example of the very great variation in the statements of these men, the Eagle-owl, said by Cuvier to contain a series of twenty bones, while Mr Alice could only find fifteen. The greatest number found in any bird he had yet examined was seventeen, the smallest eleven; and he thought, that, from the different form and structure which he had been able to observe, any particular order might be at once distinguished.

Mr Reid communicated a paper on the chemical composition of vegetable fibre,—alluding to the great difficulty which Prof. Henslow had expressed in separating the cellular tissue from membrane, which he now considered comparatively easily accomplished, and that its composition could be therefore correctly ascertained. Prof. Henslow considered that Mr Reid had not yet succeeded in separating the two materials, and that he had not performed the experiments with sufficient care; in which Prof. Lindley concurred, stating that the hollow cells emerge into the petals as well as the stamens, and that Prof. Henslow's meaning had been evidently mistaken.

The Rev. F. W. Hope read some observations on the genus *Filaria*, confining his observations principally to those species which infest insects, and exhibited a specimen of *Steropus ethiops*, with the parasitic *Filaria* protruding. He considered that the first attack was made in the larva state, and that in this respect they, to a certain degree, resembled the Ichneumons, and might, among Coleopterous insects, assume their part, and be a wise provision for controlling the exuberance of species. All the insects hitherto recorded as in-

fested with these parasites, live in moist places, some of them are entirely aquatic. One species he discovered in a species of Phryganea, though he had not succeeded in detecting it in their larvæ; among the Lepidoptera he had not discovered any. A list of forty species of insects, which were infested with Filaria, was laid before the meeting. Rudolphi considered all the species to be identical; but in this assertion Mr Hope could not agree, having detected several among the Coleoptera, while that in the Phryganea were distinct from all; and he considered that each species, or at least each genus, possessed a species peculiar to it. Several distinct forms even seemed to exist, while the distinction between Gordius and Filaria had not yet been sufficiently marked, and he would now propose, that *Filaria* should be restricted to the form exhibited by the common Guinea worm (*F. Medinensis*), and concluded by recommending attention to the species which infested the animals composing our own Fauna.

Mr Duncan asked if Mr Hope had paid sufficient attention to the different species to say that they were distinct in each? Mr Hope said he had, and that he considered they would afford the means of distinguishing the closely allied animals, and that those infesting the higher orders were distinct from the insect parasites. Mr Macleay considered the paper a most valuable one, and thought that each insect contained its peculiar species. He could add to the list on the table, and possessed a spider which contained a Filaria. In an article in the *Bibliothèque Universelle*, a Filaria is recorded from a specimen of *Gryllus*. The tenacity of life was also alluded to: that belonging to the *Gryllus* had remained dried up for several weeks, and when placed in water again revived. Mr Hope concurred in these observations, and stated that he believed the specimen on the table was yet alive, having made various contortions since the insect had been set up.

Mr Bowman read a paper by Mr Gardener on the internal structure of the palm tribe. Mr Gardener is now in the Brazils, making observations on the botany of the country, of which that now communicated was among the first received. It contained some curious observations regarding the manner in which the woody part was produced, assimilating its formation to a certain extent with that of the Coniferæ. Mr Bowman offered to be the medium of communication between Mr Gardener and the Association.

Mr Niven communicated the results of some interesting experiments in reference to vegetable physiology. The experiments were made chiefly upon the *Ulmus campestris*, or common English elm,

with the view of ascertaining the direction of the sap, and the supposed peculiar principles which allowed it to develop leaves or roots. Mr Niven considered, that there were two constant principles, the one upwards, which he terms the leaf principle, the other downwards, or that producing the roots, and he stated that he thought these could not be controverted. In confirmation he produced a specimen of the elm ringed round about to the depth of one or two layers in the wood. The under surface of the cut part produced young shoots with leaves, while on the upper part of the excision abundance of roots were springing out. Various modifications of the same experiments were detailed. Drawings in illustration of them were exhibited; showing at the same time, that the tree or branch would be supported, and would live for a considerable time, at least when subjected to a very deep incision or insulation of the parts; different trees, however, having various powers of prolonging their existence, or of producing additional wood and bark under the above-mentioned circumstances. Professor Lindley observed, that the experiments were all consonant with the present generally received opinions, but considered roots to be only the wood part sent down by the buds.

Mr Gray made some observations on one or two species of Mammalia preserved in the collection of the Royal Institution. The first was a species of *otter* from Demerara. It is intermediate in form between the common otter or *Lutra*, and the *Enhydra*, is remarkable for the great development of the webs of the hinder feet, has the tail partially broadened, or fringed with a lateral membrane, and the muzzle is entirely hairy, with nothing bare excepting the edge of the nostrils. Mr Gray considered this animal as being the fourth type of the otters. The next animal was *Thalacinus cynocephalus*, exhibited on account of the very young state of the specimen, which would scarcely exceed four inches in height, and remarked that the teeth now resembled in their formation those of the young seals. Two specimens of Philantombo were shewn, a species of antelope from western Africa, called as above by the natives of Sierra Leone, and which Major H. Smith had described from a young and small specimen in the British Museum under the name of *Ant. philantombo*; and lastly, a perfect specimen of the *Felis gracilis* of Dr Horsfield.

Mr Lindley made some additional observations on *Victoria regina*, which was exhibited yesterday.

Wednesday, 13th September.

The paper brought forward by Dr Traill at last meeting was first

read. It was a case communicated by Dr Williamson, of a young woman, about 21 years of age living in a cellar, who, after much pain and violent paroxysms, voided a large gray slug, after which the annoying symptoms gradually subsided. Mr Jenyns considered the specimen in question, now before the section, to be the *Limax variegatus*, which inhabits cellars; and the Rev. Mr Hope, Mr Curtis, Mr Macleay, and Professor Henslow, mentioned some cases of insects and their larvæ having been passed from the intestines.

Dr Richardson read a communication from Dr Bellingham on the frequent occurrence of *Tricocephalus dispar* in the human intestines. The author considered that it had been erroneously described by former observers, and stated, that it was found in the intestines of almost every one. Some discussion took place on the subject, in which Dr Richardson, Mr Curtis, Mr Selby, and Mr Macleay took part.

Prof. Lindley communicated a paper from Mr Ward on the cultivation of plants without ventilation. These experiments originated from Mr Ward's unsuccessful attempts to rear plants in a confined and smoky situation in London. They were made in small bottles and glass cases of various sizes, and houses of twenty-five feet in length. They went to prove the possibility of growing plants under these circumstances, and would be one of the greatest discoveries made in the manner of transporting living plants from distant countries under a varied temperature. Many cases had been already received in this county, and the Messrs Loddiges bore testimony to the success which had already attended the plan. On one occasion, plants were shipped at New Holland at a temperature of 80°; in passing Cape Horn the temperature fell to 20°; at Rio it rose to 100°; afterwards to 120°; and on arriving in England it again fell to 40°; but when taken out they were in perfect condition, notwithstanding the various changes of temperature they had undergone. This method of growing some plants of no great size in our rooms, and of noticing their various modes of growth, might be applied to many purposes of experiment.

Mr Yates read the report from the Committee in Liverpool for growing plants on Mr Ward's plan. The green-house which had been erected on the above construction was stocked with eighty species of plants, and, so far as time had yet been afforded, they appeared to be thriving and fulfilling every expectation. The report gave rise to some interesting discussion on the power possessed by plants to exist in vessels excluding the external air, and also on the practicability of introducing small animals, or at least those of the lower classes, along with the plants. Dr Graham considered, that with

plants no necessity for circulation of air existed, but the vessel must be placed in such a situation as to receive the influence of the sun, for the purpose of causing the leaves to reproduce the atmospheric air. He had found that several of the Cacti thrive better in the moist atmosphere of a closed glass, than in the dry state in which they are generally kept, and that he had grown species in his own room in this manner for the last two years, some of which had not received water for eighteen months. The plants which the Doctor found to thrive best under this treatment were the Lycopodii, the Grasses, which thrive remarkably, Begoniæ and Cacti. Orchideous plants did not thrive under these circumstances; and seed had never been seen to be produced or ripened by any of the plants. Animals he considered could not exist, for the reason that they had no power to reproduce the atmospheric air; and the quantity which they would consume would be so disproportionate to that produced by the plants, as to be either insufficient for their maintenance, or would require vessels much too large for the purpose of convenient experiment. Professor Lindley bore testimony to the importance of this discovery, and to the perfect manner in which some plants had been transported. The *Arucaria* had been brought home and transplanted with the greatest success. He concurred generally with the opinions expressed by Dr Graham.

Mr Bickersteth exhibited the milk from the *Masaranduba tree*, the cow-tree of Humboldt (*Galactodendron utile*.) Dr Traill remarked that there were two kinds of cow-tree; that he had analysed the juice of the *Galactodendron* or cow-tree of the Caraccas, which consists principally of wax and resin; but that the juice of the cow-tree of Demerara (botanical name unknown) contains chiefly caoutchouc.

Mr Pooly brought before the meeting an instance which occurred to himself, of three swallows being found on one of the German lakes completely imbedded and frozen up in ice, one of which when uncovered revived and lived for a short time. He inferred from this that the old theory of these birds going under water during winter was tenable. This notice excited considerable interest, and was remarked on by Mr Allis, Mr Hutton, and Mr Selby, and after much cross-questioning, it was generally concluded that the fact did not bear on the question of hibernation, but that the swallows in question might have been those of a very late brood, and being benumbed when in search of food, had been frozen or surrounded with snow, a very short time previous to their discovery.

Mr Gould exhibited drawings of some new Trogons for the continuation of his monograph, and some figures for two new works

which he had in preparation. (See Bibliographical Notices, p. 357.) At the same time he made some observations on the habits of the Trogonidæ, which elicited from various members their opinions of their proper station in the system, which most of the ornithologists present considered to be among the Fissirostres. Mr Macleay made some interesting observations on the *T. temnurus* (forming the genus *Temnurus* of Swain.) which is remarkably abundant in the island of Cuba. This species feeds principally on caterpillars which it seizes on the bark and branches of trees; and it was thought that this manner of feeding indicated the propriety of the views held by Mr Swainson, that it exhibited the scansorial type of the genus. The berry-eating species of the Trogons have been found principally, if not entirely, among the Caluri.

Mr Sandbatch exhibited specimens of an undescribed *Prionites* and a *Parus* from the collection of the Royal Institution: for the Motmot he proposed the specific name of "*superciliaris*," from a stripe of ultramarine feathers which stretch over each eye. It is one of the most beautiful of a limited genus, and appeared to be intermediate in the form of the bill between the *Pr. platyrhynchus*, Jard. and Selby, and the ordinary forms, the bill very much depressed, and very finely serrated.

Mr E. Forbes read a notice of several new forms of British animals and plants, making observations on two Mollusca, one allied to *Doris pinnatifida*, the other to the genus *Montagua* of Dr Fleming. He exhibited also *Asterias rubens* of Johnston. The plants mentioned were a new *Polygala*, which was described in the report of the Botanical Society of Edinburgh, and a new *Euphrasia*, distinguished from *E. officinalis*, by being hairy throughout, and having its fruit placed in an alternate and opposite manner, so as to form four vertical lines, and to give a square appearance to the spike.

Friday, 15th September.

Mr R. Mallet read a communication on the power of aged trees, under certain circumstances, to reproduce themselves from the centre of the trunk. The trees which have been observed to become most generally hollow are the oak, elm, chestnut, beech, cherry, and yew; numerous sketches of remarkable instances of this operation of time and the seasons were exhibited. The meeting did not seem to agree generally with Mr Mallet in his opinions. Professor Henslow and Mr Duncan made observations on the subject.

Mr Smith of Jordan Hill exhibited two new shells dredged from Rothesay Bay, and which had been named *Fusus Boothii*, and *F. umbilicatus*. He also produced fourteen species of fossil shells,

found among recent shells at a higher level than the present high water, and which are not known to exist in a recent state.

Mr Macleay exhibited portions of the pier of Southampton, which had been forwarded to him by Captain Ducane, and which were completely destroyed by the operations of the *Limnoria terebrans*. Mr Macleay stated that this pier had been erected only a few years since, at an expense of between L. 8000 and L. 10,000, and that its state of decay was now such that it would require to be rebuilt, and would cost nearly a similar sum. Mr Francis suggested, that if the wood had been cayennised, it would have resisted the effects of this destructive insect, and detailed many experiments, by which, under other circumstances, its efficacy had been proved. Mr Francis was requested to bring before next meeting the result of a series of experiments which were now in progress, and also to direct his attention to the power of this preparation in resisting the attacks of insects.

Mr J. E. Gray exhibited some new land shells from the Museum of the Royal Institution, and remarked on their peculiarities. One of more than usual interest was a new species of *Anodon*, found near Broughton in Craven Yorkshire, and named *A. Roisii*.

The Rev. J. Meade read a paper on the solid materials found in the ashes of plants and animals. This paper went chiefly to prove that the earthy, saline, and metallic ingredients contained in plants, were the maintaining substances of vegetable life.

Mr J. Taylor exhibited a specimen of *Goliathus magnus* from the collection of the Institution; also the jaws of a large shark, and specimen of the oil obtained from its liver. Mr Macleay made some interesting remarks on the history and affinities of *Goliathus*, but was prevented entering so deeply into the subject as he could have wished from the time of the section being nearly run. The same reason prevented the reading of several other valuable papers which had been entered in the list, particularly one on the affinities of birds by Mr Vigers, in which he proposed to illustrate the subject, and explain some of his views, which the opponents of the circular arrangement had either misconstrued or not understood.

In the Committee of this section, which was not publicly open, the following grants were made from the funds of the association for the purpose of performing experiments. A grant of L. 50 was proposed by Professor Henslow, to be placed at the disposal of the committee in Liverpool, appointed for the purpose of ascertaining the results of experiments made for growing plants in apartments

or cases where the external air was excluded. A greenhouse had been already erected, and the experiments were commenced under the superintendence of Mr Yates. Professor Henslow also proposed that a sum of L. 25 should be placed at the disposal of a committee, for the purpose of ascertaining the best liquors for preserving specimens of animal and vegetable substances. The experiments to be performed at Cambridge under the superintendence of Professor Henslow, Dr Clark Professor of Anatomy, &c. and progress to be reported next meeting.

Some subjects were also recommended as worthy of particular attention, and different individuals and committees were named who agreed to furnish reports, so far as possible, by the next meeting of the Association.—Mr Gray and Mr Bald undertook the examination of the manner in which molluscous animals bore into rocks.—Mr Children engaged to continue his observations into the “Chemistry of Entomology, and the Geographical distribution of insects.”—Mr Vigors proposed that a committee should be appointed to prepare a Fauna of Ireland, and should be requested to report progress at next meeting. The gentlemen named were Captain Portloch, Mr R. Bald, Mr William Thompson, Mr Vigors, Mr Halliday, and Dr Coulter, with power to add to the number,—Mr Vigors to act as Secretary.—The Rev. T. W. Hope agreed to prepare a report upon the fossil insects of Great Britain and Ireland. Sir William Jardine was requested to draw up a paper upon the species of the Genus *Salmo* found in Scotland, giving their specific characters, and noticing the changes which took place in their progress from their young state to maturity. Mr Gould undertook to lay before the next meeting a monograph of the Caprimulgidæ, describing the known species, and entering so far as possible into their habits and affinities.

It was agreed that the next meeting of the *British Association* should take place at Newcastle, in the month of August, the particular day of meeting to be fixed by the Local Committee. The Duke of Northumberland was proposed, and has accepted the presidency.

British Museum.—The new buildings of the British Museum are proceeding, though rather slowly to completion. We are happy to have a good report to make of the part intended to be occupied by the zoological department, for which the accommodation, we understand from good authority, will exceed that of any museum in Europe. The principal gallery is to be that now occupied by the minerals and or-

nithology, with one which is unfinished. The light is from the top, as is well known, but, by an unfortunate oversight in the construction, is much less perfect than it might be. They have completely succeeded in a noble room on the opposite side, which is called the Egyptian Room, and is a model for every purpose of construction. We very much wish before the collections are placed, the authorities would examine into the practicability of altering the lights of the gallery in question. It is a mere question of expense, and we certainly think, in a national building, that ought not to be the first consideration, but that of having it complete and perfect as possible. Nothing can be more admirable than the light in the Egyptian Room, and we regret that in an adjoining wing, which is to be occupied by the minerals, lateral lights have been introduced, which, besides the loss of space they entail, we fear will be found quite insufficient for the purpose. An observation has been made in constructing the cabinets worthy of notice. Most persons observe in the mineralogical gallery the glare and reflected lights on the glass windows of the cabinets, owing to the mode of the light falling on them. The corrective to this is found to be, the laying them horizontally or flat, instead of sloping in the usual manner.

On the whole, although these buildings may be open to criticism, we are thankful, considering the mode of laying out the public money in other places, that we shall be comparatively well situated, and we only wish Parliament would hasten the time of their completion by larger grants.—S. C.

OBITUARY.

February 11th 1837, at Winchester, in his 97th year, JOHN LATHAM, M. D. F. R., A., and L. SS. Member of the Royal College of Surgeons, and of several foreign learned societies. He was the son of Mr John Latham, a surgeon and apothecary at Eltham, in Kent, where he was born on the 27th June 1740. He was brought up to his father's profession, and pursued it for many years at Dartford, whence he removed, in 1796, to Romsey in Hampshire.—Dr L. was elected a Fellow of the Society of Antiquaries on the 15th of December 1774; and of the Royal Society on the 25th May 1775. In 1788, he was one of the original members or founders of the Linnæan Society, all of whom he survived. The degree of M. D. was unsolicited conferred on him by a foreign university (we believe Vienna) in 1795.—At the age of 80 he retired with his second wife to the house of his son-in-law, W. N. Wickham, Esq. at Winchester, where he remained till his death. In his 82d year this in-

defatigable man began publishing his "General History of Birds," which was completed in 10 vols. 4to. In 1835, he for the first time began to feel the failure of his sight. Infirmities gradually increased on him; but he was still an active and cheerful man, taking his daily walk alone, and scorning the assistance of an arm. Four days before his death he exhibited unusual vivacity; this was followed by a failure of understanding, and he fell into a deep sleep, in which he expired without a pang. Though chiefly known, and most successful as a naturalist, Dr L. was also much attached to antiquities. In a letter to Mr Denne, written in 1797, he remarked, "In respect to natural history and antiquities, I compare myself to Garrick, between Tragedy and Comedy; and, though not so great a man, I cannot help, like him, squinting towards that which pleases me best."—*Extracted from the Gentleman's Magazine for July 1837.*

Dr Latham's works in natural history were confined to Ornithology, in which they were for long the universal text-books, and they are still held in considerable estimation. Cuvier says—"Il a surtout enrichi l'Ornithologie de belles espèces nouvelles; mais ses ouvrages sans critique veulent être lus avec précaution."

On the 6th July 1837, Dr JAMES WOODFORDE, of Castle Carey, Somerset.—Dr W. completed his medical studies at the University of Edinburgh, where he graduated M. D. in 1825. The year previous he published "*a Catalogue of the Indigenous Phenogamic Plants growing in the neighbourhood of Edinburgh,*"—the result of much industry, and a useful companion in botanical excursions. Can we suppose that in the motto prefixed to this work Dr W. had the anticipation of his own brief career?

" Brevi cadentia hæcce
Brevem docentne vitam ?"

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MAGAZINE

OF

ZOOLOGY AND BOTANY.

ORIGINAL COMMUNICATIONS.

I.—*The Fauna of Twizell.* By P. J. SELBY, Esq. (Continued from
Vol. i. p. 424.)

FROM the circumscribed extent, as well as the natural features of the district described, the list of birds is necessarily very limited in species belonging to the Grallatorial and Natatorial orders, but contains a fair ordinary average of Insectorial as well as Rapacious and Gallinaceous birds. In front stands the great sea eagle, (*H. albicilla*), as I have twice had the gratification of seeing this noble bird wing its way across the district on its route from the coast to the interior. Scarcely a winter indeed passes without one or more individuals being seen in some part of the county; and during one season three of these birds almost daily frequented Chillingham Park, the seat of the Earl of Tankerville, where they were observed to prey upon the fallen deer. These visitors, it may be observed, are generally immature birds; but as no eyrie at present exists, either in Northumberland or in the south of Scotland, they are probably the offspring of some of those pairs which are yet to be seen in the northern districts and islands of Scotland, and which, in defiance of the assiduity and daring of the shepherd and Highland fox-hunter, continue at times to rear their young in some precipitous and inaccessible rock, or else upon the islets of its little frequented lochs. These, when able to provide for themselves, are driven from the place of their nativity by their parents, who allow of no compeer within their peculiar beat, and in their search of a domain of their own pay us these passing visits. The peregrine

falcon is still occasionally seen, but its appearance is now rarer than it used to be a few years ago. This may be attributed to the destruction of two or three eyries in the adjacent districts, one of which was placed in the remains of the tower at Dunstanborough Castle, and another in a craggy precipice upon a moor, about three miles to the south-west of Twizell. Eyries, however, of this falcon still exist in some of the precipitous gullies of the Cheviot range, and in the lofty rocks of the magnificent promontory of St Abbs Head. The merlin breeds, but sparingly upon the neighbouring moors; and for three or four successive seasons a pair had their nest within a stone's throw of our little district. The increase of sheep stock, and extended cultivation, is annually tending to diminish the numbers of this, as well as many other birds which formerly used to abound.

The kestrel, as well as the sparrow-hawk, annually breeds with us, the former in a crag in the Dean, or else in the old nest of a carrion crow; the latter is always its own architect, though it does not excel in the art, as the nest is a large flat fabric, loosely constructed of twigs and sticks, with a very trifling central depression. The sparrow-hawk has frequently as many as six young ones, and the hawcock they make at this time among the smaller birds and young game is almost beyond belief. I recollect inspecting a nest in which lay the recent remains of a lapwing, a blackbird, a thrush, and two green-linnets, some half devoured, and others nearly whole, but all neatly and cleanly plucked. The common as well as the rough-legged buzzard are only occasional visitants, and the first is perhaps of even rarer occurrence than the latter, but neither species has been seen for the last two years. The honey-buzzard (*Per. apivorus*,) certainly one of the rarest of our *Falconidæ*, figures in the list; as a fine specimen of the adult male is now in my possession, taken within the precincts of the district in September 1835, by means of a trap baited with wasp's comb, a nest of which insect it had previously been observed to have scratched out from the root of a tree. Within the last five or six years several honey-buzzards have visited Northumberland and Durham. Of those that have been secured, three or four which I have seen are in what is now considered the immature plumage of the male, in which state the greater part of the head and neck is white, the breast and belly with dark-brown lanceolate streaks.* In those

* For a more detailed account of the honey-buzzard in this state, our readers are referred to the first number of the "Illustrations of Ornithology," New Series, and the Transactions of the Berwickshire Naturalists' Club.

that I have dissected nothing but the remains of wasps in various stages were detected. The moor-harrier is rapidly declining in numbers, many of the marshes in which they used to breed having been drained and reclaimed. Some few years ago I recollect it as one of the most abundant species in this neighbourhood ; now an individual is rarely to be seen. Of the owls, the long-eared (*Otus vulgaris*) is the most plentiful, and is met with in all the plantations where the fir, particularly of the spruce kind, abounds. They breed early, and have generally eggs by the middle of March. An old nest, either of the magpie or carrion crow, is the situation invariably selected as the place of deposit. The young continue to be fed by their parents long after they have quitted the nest ; and their querulous cry, which commences immediately after sunset, is heard throughout the greatest part of the summer. The tawny owl is now rarely seen. I may here mention, that a very small owl, probably *Nyctipetes nudipes* or *Tengmalmi*, Swain. was seen near the stables at Twizell by a person well acquainted with birds, and who could scarcely mistake an owl of such small dimensions for any of the common species, particularly as he was within a very short distance, and had an opportunity of examining it before it flew from its perch. The cinereous shrike, (*Lan. excubitor*,) is the only species, I believe, that has yet been detected north of the Tyne. At Twizell I have killed two or three individuals, and have seen various other specimens from the adjoining districts. Its time of appearance is between the months of November and March. Two specimens, both adults, of the pied flycatcher (*Mus. luctuosa*) have been killed within our confines, and another was seen but allowed to escape. They all appeared in May ; but no instance of its breeding either here, or within the county, has yet come to my knowledge. Of the various thrushes, it may be remarked, that the mistel, (*Mer. viscivora*,) has of late years been rapidly on the increase in the north of England and Scotland. I well remember when it was considered a very rare bird. Now it is met with in all directions and at all seasons, as it has not been observed to migrate even during the severe winter months. This, however, the common thrush usually does to a certain extent, as it regularly moves from the interior to the sea coast towards the middle of November, and there continues till January is pretty far advanced. The ring-ouzel (*Mer. torquata*) pays us a passing visit on commencing its autumnal migration, but rarely remains more than a few days, during which it is generally seen in the neighbourhood of the mountain-ash trees, whose berries are a favourite repast of this as of all the other

thrushes. Fieldfares frequently remain here till May is far advanced, a fact which long surprised me, as most of the species which remain with us have ere then reared a full fledged brood. Mr Hewitson, however, in his beautiful work on British Oology, satisfactorily accounts for so late an appearance, as he informs us from actual observation that they do not commence nidification in Norway, one of their breeding-stations, before the end of May; and further, that they differ from all their congeners in the remarkable fact of breeding, like the rook, in large societies. The dipper (*Cin. aquaticus*), that lively attendant on our mountain streams, and whose sweet and early carol enlivens the solitary situations it frequents, breeds annually in Twizell Dean. The situation selected is the face of a rock or craggy steep overhanging the water, and frequently in a spot where it might be expected to be always saturated with wet from the dripping of the rock above, yet so compact and well framed is the dome of the nest, that it shoots off like a penthouse all superabundant moisture, and the eggs and young remain dry and warm in their mossy and leaf-lined receptacle. When the nest contains young, it is easily detected by their loud chirping as often as the old birds fly past or approach the nest with food. On quitting the nest, after feeding the young, the old birds frequently drop into the water, dive, and rise at some distance, when they take wing. I have before stated my opinion, that the dipper does not walk at the bottom of the water when submerged,—a power confidently attributed to it by various writers,—but uses the same exertion in this act as other diving birds. This opinion is confirmed by repeated observations, extending through a course of many years, during which I have watched its habits with particular attention, and oft when the bird has been close to me, though unaware of my near propinquity. The young, even before they leave the nest of their own accord, if disturbed and made to quit it, dive instinctively the moment they touch the water, but their progress beneath the surface, which I have frequently seen extended to six or eight yards, is always by the peculiar motion of the wings, made use of by other diving birds, and never by walking at the bottom,—a feat they ought to perform in common with their parents if given to them, like the usual mode of diving, as a natural or instinctive habit. I may also state that their internal anatomy presents nothing peculiar, or that could give one reason to suppose that they were likely to possess so extraordinary a power. Of the genus *Salicaria*, the sedge warbler (*Sal. phragmitis*) is still frequent upon the margins of the brooks and moist bushy situations; but the grasshopper

warbler (*Sal. locustella*,) which, during the early growth of many of the plantations, then abounding in whin, broom, and other undergrowth, might be heard in various directions, pouring forth its sibilous note, now that they have attained a considerable growth, is rarely heard, and then only in the brushwood adjoining the moor and other open ground. The white throat (*Cur. cinerea*) is plentiful; but no example of the lesser species (*Cur. garrula*) has yet been detected. Of the greater pettychaps (*Cur. hortensis*) the number is limited; but its congener, the black-cap (*Cur. atricapilla*) is abundant. Of the *Sylvia* or willow wrens, the hippolais of Lath. &c. the rufa of Temminck, is, comparatively speaking, a rare bird, and seldom more than three or four pairs annually visit the district, which are always confined to peculiar spots or localities. The *S. sibilatrix* or wood wren is plentiful in the woods of older growth, particularly where beech and oak abound. The *S. trochilus* is, however, the most abundant of all our summer visitors. This species and the black-cap arrive about the same time, and the period, from the observations of many years, is between the 14th and 18th of April; Mr Hewitson's work renders it almost unnecessary to add, that the nest of *S. sibilatrix* is easily distinguished from that of *S. trochilus*, by having a lining of hair instead of feathers. The diminutive but active little gold-crest (*R. auricapillus*) is very plentiful, and may be seen at all seasons in the plantations, delighting especially in the thick masses of the spruce and silver firs, among which it finds a constant supply of food, as well as a favourite site for its nest, which, as a semipendulous structure, yields in neatness and elegance of fabrication to none with which I am acquainted. In addition to our constant residents, we receive a great accession of strangers about the end of October and beginning of November from the colder regions of Norway, Sweden, &c. The pied wagtail (*Mot. alba*) migrates in autumn, but returns at an early period of the year, as I have frequently noticed it on the roof of the house during the last week of February, when the weather was mild. The majority of the grey species (*Mot. boarula*) also leave us during winter, a few individuals only remaining, which are occasionally seen in warm situations near spring heads and other water courses that remain open even during severe frosts. This species prefers the ledge of a rock upon the banks of our limpid rivulets for the site of its nest. It breeds very early, and the first brood has generally quitted the nest before the middle of May. The yellow wagtail is never seen in this district, though far from uncommon upon the dry hilly grounds a few miles to the westward. The *Anthus arboreus*,

tree pipit, breeds annually upon the lawn, and though its song does not possess great compass or variety, its mode of delivering it as it descends, with motionless expanded wing and outspread tail, from the elevated station it has previously attained by a flight as peculiar, makes it a general favourite. Its arrival does not take place till the last few days in April or the first of May. That lovely bird the wax-wing (*Bombycilla garrula*) has been twice or thrice seen within the district. It is uncertain in its appearance, and sometimes many years elapse without a visit. During the winters of 1835 and 1836 it was generally spread over the kingdom, and I saw many specimens taken in the neighbourhood. I may here mention, that a living individual was given to Dr Johnston of Berwick, who kept it caged for several months. It soon became tame and familiarized to its situation, and recognized those who fed and attended it. It was frequently allowed to come out of the cage and fly about the room, and at last made its escape, from the door of the cage having inadvertently been left open opposite to an open window. It was fed at first upon haws and holly berries, and when these failed, seemed to thrive upon dried fruits, such as raisins, currants, figs, &c.

The bunting (*Emb. miliaria*) visits the district in small flocks during the winter, but few breed with us, as it affects a more open and perhaps a less cultivated country, and I have observed it to be more abundant where meadows and pasture prevail. Flocks of snow-flakes (*Plect. nivalis*) occasionally frequent the stubbles during the winter months; none, however, have appeared this last winter although it has been long and severe, nor have I noticed them in the adjoining districts. The lesser redpole (*Linaria minor*) breeds in all the deans and copses wherever the birch abounds. Small flocks are now and then seen during the winter, but the great body seems to migrate further south. In April they return in flocks, and for some time frequent the Wych elms, whose seed, which at that time is beginning to ripen, they greedily devour. They do not nidificate before May, or till they can procure in sufficient plenty the downy pappus of the willow, with which soft substance they chiefly line their nests. I have observed the siskin, (*Car. spinus*) to be much more plentiful in mild than in severe winters; it is therefore probable that when the latter prevail they migrate to a lower or warmer latitude. They are generally seen upon the birch and alder trees, extracting the seed from the catkins, which they effect in a quick and adroit manner. When feeding, this bird assumes, like the lesser redpole, a variety of interesting attitudes, in order to reach the catkins. Its feet possess the true perching or insessorial form, and

it is never seen upon the ground. The bullfinch (*Pyrr. vulgaris*,) beautiful and ornamental as it is to the plantations, is the only species whose numbers I wish to see diminished, being a true *gemmivorous* bird, and when abundant, frequently making sad havock in the orchard and garden, as soon as the buds begin to swell in spring. It attacks the plum trees, gooseberries, medlars, certain varieties of the apple and the thorn, and I have known two individuals in the course of a couple of days denude a large plum tree of almost every bud. Last spring two or three attacked a large medlar upon the lawn, which they found so much to their taste that they never quitted it till they had stripped it bare, and this they effected in a few days. I may remark, that in the stomachs of a very great number opened at various times, nothing but the triturated remains of the embryo leaves and flowers could be detected. In winter they affect the young plantations and birch woods, and I have observed that they often feed upon the embryo shoots of the Scotch fir, as well as the buds of the larch. The crossbill (*Lox. curvirostra*) is well known as an occasional visitant. During the winter and spring of 1836, they were particularly abundant throughout the island, and whether from the ample supplies of food, or something peculiar in the season, they remained in the north to a period much later than I had ever before known them. On their former visits they have generally quitted us before Christmas, and this I considered to be in accordance with Temminck's statement as to the period of their breeding, for he remarks in his Manual, *niche en hiver*, but on their last visit they were seen in considerable numbers during March and April, and I continued to take specimens up to the 2d of May, on which day a male and female, evidently paired, were procured. On dissecting the female, eggs as large as a pea were found in the ovaries, the male also for the first time was heard to utter his love note, a fine clear whistle (very unlike their usual call,) while perched on the tree with his mate. Another pair was seen as late as the 16th of May. From these facts, it appears that the species do not always breed at the time mentioned by Temminck. Its nest hitherto has not been detected in Britain, but it seems probable that on such occasions as we have mentioned it may nidificate in the extensive pine woods of Scotland.

Of the Corvidæ, the raven (*C. corax*) is now only seen occasionally, but in former days it bred in Twizell Dean, where the Corbies' Crag still points out the situation of the nest. The carrion crow (*C. corone*,) though persecuted to the death as the great destroyer of the eggs and young of game, is yet too plentiful. From the obser-

vations and experiments I have made, this wary bird appears to rely much more on its acute vision than its sense of smell, to detect approaching danger and avoid surprise, and I am certainly not among those who believe in its nice discrimination of the fatal effects of gunpowder, the scent of which it is supposed to perceive at many gunshots distance. The beautiful and active jay is rare, and it is only now and then that its harsh and grating scream is heard in the plantations. The great spotted woodpecker (*P. major*) is the only species I have hitherto observed, and most of the instances have been in autumn, during the period of the equatorial migration. The common creeper (*Certhia familiaris*) is seen in all the plantations. A pair of these interesting birds bred for some years in a hole in the wooden back of a summer-house, where the female, when sitting, almost allowed herself to be handled without quitting her charge.

Of the fissirostral tribe, the kingfisher is a rare visitant, and it is only at distant intervals that it enriches the margin of the burn with its brilliant plumage. The chimney swallow (*Hir. rustica*) is the only species that breeds with us in any number, for though the martlet (*Hir. urbica*) used formerly to infest the corners of almost every window, and had besides a long row of nests under the eaves of the stables, they have for some years past entirely deserted the place, and it is only in autumn, when congregating previous to migration, that they are seen. I attribute this desertion in part to the growth and great extent of the plantations, for the natural situation or habitat of the species appears to be a naked open country; thus they are found breeding in vast numbers in many of the rocky cliffs upon the sea coast, and under the eaves of houses upon extensive moors; and in Sutherland we found the face of the marble cliffs near Inch-an-Damff, thickly beset with their clay built receptacles. The night-jar (*Cap. Europæus*), though never numerous, is far from being rare; several pairs breed annually within our precincts. Its peculiar humming note, the invitation of the male, is seldom heard before the latter end of May or beginning of June. This late arrival of the species is in beautiful accordance with the appearance of those hosts of insects, which furnish it an abundant supply of food, viz. the nocturnal Lepidoptera, and some of the large night-flying Coleoptera. When perched, the night-jar always sits lengthways upon the branch, with its head low, and from its assimilating colours, is with difficulty detected in that situation.

The ring pigeon or cushat (*Colum. palumbus*) is the only species we can boast of, but of it the number is very great, and seems annual-

ly increasing, which may be attributed to the shelter and security it finds in the plantations as nurseries for its young.

Among the Grallatores may be noticed the green sandpiper, (*Totanus ochropus*) a bird of rare occurrence in all parts of the kingdom. Its congener (*T. hypoleucos*) breeds upon the margins of the rivulet, and from its lively manners and elegant flight, proves an interesting addition to the Fauna. The golden Plover (*Charadrius pluvialis*) visits the fallows during autumn and winter in large flocks; in spring they disperse and retire to breed upon the adjoining moors, at which time they assume the livery of the *C. apricarius* of authors, the white of the under parts giving place to a deep black. To obtain the eggs, the birds must be watched at a distance, as the female, upon the approach of any intruder, at the warning note of the male, immediately skulks off from the nest, and only shows herself, when she has got to a considerable distance from it. The dottrel (*Ch. morinellus*) we see only during its migration northwards in May, and then but occasionally, as the great resting point of the flocks which pass by this route, is further to the north, in the neighbourhood of Berwick. The wild goose sometimes in spring alights upon our new sown fields, but the usual feeding grounds of the species are all at a considerable distance, and these they have been known to haunt from time immemorial. The wild duck (*Anas boschas*) frequently breeds with us, but the old duck conducts her young as soon as hatched with all possible dispatch further down the rivulet, from whence they can have access to marshes and other ground appropriated to their habits of concealment. The common gull (*Larus canus*) is seen in the pastures, and plowed fields during the autumn and winter months, whenever the ground is free from snow and frost. It leaves us in April, retiring further north in order to breed, and it is succeeded by the lesser black-backed gull (*Larus fuscus*), which resorts to the Farn Islands in great numbers, for the purpose of reproduction.

Of the reptiles, the blind or slow worm (*Anguis fragilis*) is far from uncommon in the dry and stony parts of the Deans; the adder (*Pelias berus* of Buonap. *Vipera communis* of Jenyns,) abounds in all the Deans, and other dry and warm exposures. I have been unable to detect more than one species, though a great difference of colour is observable among them, but this I find varies according to the age of the epidermis, season of the year, sex, &c. The common lizard (*Lacerta agilis*) is the only species I have yet had an opportunity of examining, but I think we may possibly possess the

L. stirpium, as I have at various times observed individuals of a larger size than the average one of *L. agilis*.

List of birds, &c. found and observed upon Twizell :

AVES.

FALCONIDÆ.

- Haliæetus albicilla*, Sav.
Falco peregrinus, Gmel.
 ——— *æsalon*, Gmel.
 ——— *tinnunculus*, Linn.
Accipiter fringillarius, Ray.
Buteo vulgaris, Bechst.
 ——— *lagopus*, Flem.
Pernis apivorus, Cuv.
Circus rufus, Briss.
 ——— *cyaneus*, Flem.

STRIGIDÆ.

- Otus vulgaris*, Flem.
 ——— *brachyotos*, Flem.
Strix flammea, Linn.
Ulula stridula, Selb.
N. Tengmalmi?

INSESSORES.

Dentirostres.

- Lanius excubitor*, Linn.
Muscicapa grisola, Linn.
 ——— *luctuosa*, Temm.
Merula viscivora, Selb.
 ——— *pilaris*, Selb.
 ——— *musica*, Selb.
 ——— *iliaca*, Selb.
 ——— *vulgaris*, Selb.
Merula torquata, Selb.
Cinclus aquaticus, Bechst.
Salicaria locustella, Selb.
 ——— *phragmitis*, Selb.
Curruca atricapilla, Bechst.
 ——— *hortensis*, Bechst.
 ——— *cinerea*, Bechst.
Saxicola œnanthe, Bechst.
 ——— *rubetra*, Bechst.
 ——— *rubicola*, Bechst.
Erithaca rubecula, Swains.
Phœnicura ruticilla, Swains.
Sylvia sibilatrix, Bechst.
 ——— *trochilus*, Lath.
 ——— *rufa*, Temm.

Regulus auricapillus, Selb.

- Parus major*, Linn.
 ——— *cæruleus*, Linn.
 ——— *palustris*, Linn.
 ——— *ater*, Linn.
 ——— *caudatus*, Linn.

Accentor modularis, Cuv.
Motacilla alba, Linn.

- *boarula*, Linn.
Anthus pratensis, Bechst.
 ——— *arboreus*, Bechst.

Bombycilla garrula, Buonap.

Conirostres.

- Alauda arvensis*, Linn.
Emberiza miliaria, Linn.
 ——— *schœniclus*, Linn.
 ——— *citrinella*, Linn.
Plectrophanes nivalis, Meyer.
Fringilla cœlebs, Linn.
 ——— *montifringilla*, Linn.
Passer domestica, Ray.
Linaria cannabina, Sw.
 ——— *minor*, Ray.
 ——— *chloris*, Swain.
Carduelis spinus, Steph.
 ——— *elegans*, Steph.
Pyrrhula vulgaris, Temm.
Loxia curvirostra, Linn.
Sturnus vulgaris, Linn.
Corvus corax, Linn.
 ——— *corone*, Linn.
 ——— *cornix*, Linn.
 ——— *frugilegus*, Linn.
 ——— *monedula*, Linn.
Pica melanoleuca, Vieill.
Garrulus glandarius, Flem.

SCANSORES.

- Picus major*, Linn.
Certhia familiaris, Linn.
Troglodytes Europæus, Selb.
Cuculus canorus, Linn.

FISSIROSTRES.

Alcedo ispida, Linn.

Hirundo rustica, Linn.
 ——— urbica, Linn.
 ——— riparia, Linn.
 Cypselus apus, Flem.
 Caprimulgus Europæus, Linn.

RASORES.

Columba palumbus, Linn.
 Phasianus colchicus, Linn. and
 torquatus, Temm.
 Tetrao tetrix, Linn.
 Lagopus Scoticus, Selb.
 Perdix cinerea, Briss.

GRALLATORES.

Ardea cinerea, Lath.
 Numenius arquata, Lath.
 Totanus ochropus, Temm.
 ——— hypoleucos, Temm.
 Scolopax rusticola, Linn.

SAURIA.

Lacertidæ.

Lacerta agilis, Flem.

OPHIDIA.

Anguidæ.

Anguis fragilis, Linn.

Serpentidæ.

Pelias berus, Buonap. Vipera
 communis, Jenyns.

OSSEI.

Acanthopterygii.

Gasterosteus aculeatus, Linn.

Malacopterygii.

Abdominales.

Cyprinidæ.

Scolopax gallinago, Linn.

——— gallinula, Linn.

Rallus aquaticus, Linn.

Crex pratensis, Bechst.

——— porzana, Selb.

Gallinula chloropus, Lath.

Vanellus cristatus, Meyer.

Charadrius pluvialis, Linn.

——— morinellus, Linn.

NATATORES.

Anser segetum, and ferus, Flem.

Anas boschas, Linn.

——— crecca, Linn.

Clangula vulgaris, Flem.

Podiceps minor, Lath.

Larus canus, Linn.

——— ridibundus, Linn.

——— fuscus, Linn.

REPTILIA.

AMPHIBIA.

Caducibranchia.

Ranidæ.

Rana temporaria, Linn.

Bufo vulgaris, Flem.

Salamandridæ.

Triton palustris, Flem.

——— aquaticus, Flem.

PISCES.

Leuciscus phoxinus, Yarr.

Cobitus barbatula, Linn.

Salmonidæ.

Salmo fario, Linn.

——— eriox, Linn.

——— trutta, Linn.

II.—*A Notice, with the results, of a Botanical Expedition to Guernsey and Jersey, in July and August 1837.* By CHARLES C. BABINGTON, M. A. F. L. S., &c. (Read before the British Association at Liverpool.)

It having been hinted to me, that a short notice of the results of my botanical examination of the islands of Guernsey and Jersey might be interesting to this Section, I have drawn up (since my arrival in Liverpool) the following slight and imperfect outline of them. Although the native plants of the Channel Islands have, for about two hundred years, been nominally included in the British Floras, yet the

islands appear to have been totally neglected by British botanists. I am not aware that there has ever been any published account of their Flora; nor do I know of more than three botanists, since the time of Ray, who have communicated to the public any information concerning them from personal observation. I refer to the papers of Mr Woods in the Companion to the Botanical Magazine, Mr Christy in the Magazine of Natural History, and Mr Trevelyan in the Supplement to English Botany. Mr Woods has recorded the plentiful occurrence of several of our rarer English plants, and has added to the list the five following, viz. *Allium sphaerocephalum*, *Bromus maximus*, *Festuca sabulicola*, *Brassica cheiranthus*, and *Scirpus tenuiflorus*. Mr Christy notices only one additional species, namely, *Allium sphaerocephalum*; but that having been also recorded by Mr Woods, (whose paper appeared at about the same time), it does not add to the total number of discoveries. Mr Trevelyan, I believe, gathered only one new plant, viz. *Armeria plantaginea*, but he rediscovered *Echium violaceum*, which probably had not been noticed since the time of Ray, and also *Centaurea Isnardi* and *Lagurus ovatus*. There now remains only one recorded species of those which have not been found in Britain, viz. *Juncus capitatus*, discovered by Hudson, and I believe found recently by Mr Woods.

After these preliminary observations, I will now proceed to communicate to the Section the results of my own visit to the islands during the present summer. Although my success has far exceeded my expectations, yet, as I was only able to devote four weeks to Jersey, three to Guernsey, and a single day to the little island of Herm, I have no doubt that much more remains to be done. Indeed there is not a single plant recorded for either of the islands of Alderney or Sark, both of which I was prevented from visiting by bad weather.

In Jersey I noticed about 500 species of plants, and was so fortunate as to obtain from Mr Saunders, a nurseryman there, an additional list of 200 species which had been gathered by himself, making a total number for that island of about 700 native species. In Guernsey I myself gathered about 420, and in Herm 196 species, or 725 for the three islands. No cryptogamic plants are included in these numbers except ferns.

In addition to observing numerous specimens of all those mentioned before, I was so fortunate as to find six plants, which have not as yet been recorded in our lists, viz. *Hypericum linearifolium*, *Neottia aestivalis*, *Sinapis incana* and *Mercurialis ambigua* in

Jersey; and *Arthrolobium ebracteatum* and *Atriplex rosea* in Guernsey.

It may perhaps give some slight idea of the Flora of these islands, if I now mention a few of the more common and rarer plants in them, and compare the lists with those of England.

The following are rare in England, but common in Guernsey or Jersey.

Asplenium lanceolatum.	Herniaria glabra, (the	nia (in both the isl-
Trichonema columnæ.	plant of Suffolk not	ands.)
Bromus diandrus.	Cornwall.)	Orobanche cœrulea and
Cynosurus echinatus.	Matthiola sinuata.	Lotus angustissimus (in
Cyperus longus.	Euphorbia peplis.	Jersey only.)
Iris fetidissimus.	Exacum filiforme.	Lotus hispidus, and Poly-
Erodium moschatum.	Scilla autumnalis, and	gonum maritimum (in
Helianthemum guttatum.	Scrophularia scorodo-	Guernsey and Herm.)

I will now notice a few common English plants which are rare in those Islands.

Bunium flexuosum.	Lamium album.	Ranunculus ficaria.
Cardamine pratensis.	Primula veris.	Mercurialis perennis.
————— hirsuta.	Lysimachia nummularia.	Saxifraga tridactylites.

I may also mention a few common English plants which have not been noticed in the Channel Islands.

Anemone nemorosa.	Hypericum hirsutum.	Habenaria chlorantha.
Bromus asper.	Listera ovata.	Helianthemum vulgare.
Campanula, (no species	Betula alba.	Juncus glaucus.
of the genus.)	Caltha palustris.	Ononis antiquorum.

I am sorry that it has not been in my power, to make a similar comparison of my list, with the Flora of the north of France;* as I am convinced that a far greater similarity would have been shown to exist between the plants of the Channel Islands, and those of that country, than appears between them and the native Flora of Britain. Would it not be far better to separate the Channel Islands from the countries included in the British Flora, since, although British by political connection, they are not so by geographical position? I suspect that their almost total neglect has been chiefly caused by their inclusion in our lists,—the French not considering them as part of their district, and the English thinking them too small or too distant from our coasts to be worthy of examination.

* In the discussion which followed the reading of this paper, Mr Forbes remarked, that the botany of Jersey was very similar to that of the adjacent coast of France.—Eds.

III.—*The Natural History of the British Entomostraca.* No. IV.

By WILLIAM BAIRD, Surgeon H. C. S. &c. (Continued from p. 144.)

IN my papers in Vol. i. p. 514, and Vol. ii. p. 138, of this Magazine, I gave a history of the genera *Cypris* and *Cythere*, with a list of all the species hitherto met with in this country. The next two genera I shall notice are *Daphnia* and *Lynceus*, which vie with any yet noticed, in variety and interest of details. In Latreille's arrangement, they form the third group of his section *Lophyropa*, the *Cladocera*. In M. Edward's work they will form the first order of his legion *Branchiopodes*, the *Cladoceres*. Straus unites the *Polyphepus*, *Daphnia*, and *Lynceus* into one family, and calls it *Daphnides*.

Order, BRANCHIOPODA.—Section, LOPHYROPA.

Group, CLADOCERA.—Genus I. DAPHNIA. II. LYNCEUS.

1st Genus, DAPHNIA.

Bibliographical History.—Very great confusion exists amongst the various authors who have noticed this genus, as regards the species, and many are the errors in *synonymy* which they have committed. Indeed in this genus, as well as in the genus *Cypris*, very little dependence can be placed either on the descriptions or figures of many of the earlier authors. Swammerdam is the first author, we know, that has taken notice of the *Daphniæ*, though he mentions that they had been observed before his time by Goedart, and named by him "pous aquatiques." No mention is made by this author of any insect resembling the *Daphnia*, in his work on the *Metamorphosis of Insects*, which is the only work of his I have seen, and which Swammerdam quotes from liberally, in treating of the changes which insects undergo; and Straus says also, that he has never been able to procure the work of Goedart, in which the notice of this insect occurs. In his "*Historia Insectorum Generalis*," printed at Utrecht in 1669, Swammerdam gives a pretty full description of a species of *Daphnia*, which is evidently, from the indifferent figure accompanying it, the *Daphnia pulex*. He calls it *Pulex arboreus* or *arborescens*, the first part of which name has been retained, and applied to this species by most authors who have written since his time. His description is not very correct in some points, for he says the beak is slender and pointed, and that it is by this sharp beak

the animal draws up its food as it were by suction, like other aquatic insects. He describes, however, the motions of the insect very well, and mentions them as being frequently quite red, or of the colour of blood. This memoir of Swammerdam is republished in his "Biblia Naturæ," where the same figures are also given.* Merrett, in his "Pinax rerum Britannicarum," &c. London, 1677, mentions these insects, or at least is said to intend them by the following short description,—“Vermes minimi rubri, aquam stagnalem colore sanguineo inficientes, unde vulgus dira portendit.” Francisco Redi, in his "Osservazioni utorno agli animali viventi che si trovano negli animali viventi," Firenze, 1684, gives three figures of a species which Muller quotes as the *Pulex* (his *pennata*), but which are so very bad that it is difficult to make them out. He calls them by the vague name of "*Animaletti aquatici*." In his "Opera" published at Napoli, 1687, he gives the same figures as in the former work, and mentions them as "Tre animaletti aquatici, che vivorno nelle acqua stagnanti, e ne' pozzi, osservati col microscopia." Bradley, in his "Philosophical Account of the Works of Nature," London 1739, gives a long description of a "wonderful insect, which had but one eye," found in the river Thames, with "a head somewhat like that of a bird," and legs "like the claws of an eagle;" the antennæ are described as "two branches, resembling the dugs of animals," and which he says "we might suppose were designed for suckling their young"! "for this insect," he adds, "is viviparous, which is contrary to other insects before-mentioned; for we did not only observe the young ones alive in the belly of the mother, but likewise saw several of them excluded from her body." The figure which he gives is equally good as his description, both of them shewing the force of imagination, for it is evident this "wonderful insect" is nothing more than the *Daphnia pulex*. Trembley, in his "Memoires pour servir à l'Histoire d'un genre de Polypes d'eau douce," 1744, takes notice of, and figures a species of *Daphnia* under the name of "Puceron branchu," which seems to be the favourite food of the polypes, as they devour them in great numbers. It is the *Daphnia pulex*, and his observations on this subject, and figures also, are quoted and copied by Adams in his "Micrographia Illustrata," published in London 1746. Linnæus in his "Systema Natura," 1744, describes the same species shortly under the name of *Monoculus pulex arborescens*, and in his "Fauna Suecica," 1746, and "Entomologia Faunæ Suecicæ,"

* Vide Leyden edition, 1737. Tome i. p. 86; Tome ii. tab. 31. fig. 1—3.

1789, he again describes it under the name of *Monoc. pulex*. Baker in his "Employment for the Microscope," 1753, describes and figures a species which is evidently the *D. pulex*. He maintains that it has two eyes, and severely handles poor Bradley for saying it has only one; though that is about the most correct part of that author's description! He quotes Swammerdam's memoir, and retains his name for it as expressive of its appearance and motion. Joblot, in his "Observations d'Histoire Naturelle, faites avec le Microscope," 1754, describes a species under the name of "Pou aquatique," which Muller quotes as his *D. sima*, but which Straus says is not so, but is his *D. macrocopus*. The figures which Joblot gives are very indifferent, and it is not very easy to say what species they are meant to represent. Schœffer in his Memoir "Die grünen Arm-polypen die geschwanzten und ungeschwanzten zackiger Wasserflöhe," 1755, describes at great length two or three species, under the name of "Geschwanzten zackiger wasserfloh" and "Ungeschwanzten zackiger wasserfloh,"—or "water flea with a tail," and "water flea without a tail;" and this memoir is the first in which an attempt is made to distinguish different species,—the various authors whom I have quoted above having all, with perhaps the exception of Joblot, described only one and the same. He figures two species, the *D. pulex* and *sima*, and gives a sketch only of the head of a third, which being provided with a tail, has been quoted by Muller and Straus as the *D. longispina*, but which is only a variety of the *pulex*. This memoir contains a great deal of very interesting information with regard to these insects, and having been partly translated into French by Jurine at the end of his work on the *Monoculi*, I shall be able to avail myself of many of its details. In his "Icones Insectorum circa Ratisboniam indigenorum," 1766, the same author figures the *D. pulex*, under the name of "*Branchipus conchiformis primus*," and in his "*Elementa Entomologica*," published same year, I believe, he again figures it under the name of "*Branchipus conchiformis*." Poda, in his "*Insecta Musæi Græcensis*," 1761, describes shortly the same species under Linnæus's name *Mon. pulex*, and Ledermuller, in his "*Mikroskopischen Gemüths und Augen-ergotzung*," 1763, gives an indifferent figure of a species which is easily recognizable as the same. Geoffroy, in his "*Histoire abrégée des Insectes*," 1764, gives a good many details of this genus generally, and describes a species under the name of "*Perroquet d'eau*," which Muller quotes as his *quadrangula*, but which Straus quotes, and I think more correctly, as the *D. pulex*; and Goeze, in the "*Naturforscher*,"

1775, describes the same species under the name which Swammerdam had given it, the "*Pulex arborescens*." Sulzer, in his "*Abgekürzte geschichte der insecten*," 1776, gives a very indifferent figure of what he calls *Mon. pulex*, but which is evidently the *D. vetula*. Muller, in his paper on the "*Cypris*," in the "*Philosophical Transactions for 1771*," has enumerated several species of this genus also as occurring in Norway and Denmark, but under the general name of *Monoculus*. In 1776, however, he established the genus *Daphne* in his "*Zoologiæ Danicæ Prodromus*," and describes eight species, only three of which had ever been noticed before his time. In his "*Entomostraca*," 1785, he adds one more species, gives figures of all the nine, and a lengthened description of each. He changes the generic name from *Daphne* to *Daphnia*, which latter has been adopted by all succeeding authors, and changes the specific names of two species, though without good reasons for so doing. De Geer, in the 7th volume of his "*Memoires pour servir à l'Histoire des Insectes*," 1778, gives a good many details concerning this genus, pointing out two or three errors into which Swammerdam had fallen, and giving very accurate descriptions of some portions of their anatomy. He describes at length, and figures very prettily, and with considerable faithfulness, four different species, two of which previous to this had only been noticed by Muller in his "*Zool. Dan. Prodromus*." Blumenbach, in his "*Handbuch der Naturgeschichte*," 1779, mentions one species of this genus, the *Mon. pulex*; and Eichhorn, in his "*Beytrage zur Naturgeschichte der Kleinsten Wasserthiere*," 1781, gives a tolerable figure of the same species. Gmelin, in his edition of Linnæus's "*Systema Naturæ*," 1788, gives all the nine species of Muller, and adds to them the *Mon. pediculus*, which Muller had formed into a genus by itself, the *Polyphemus*. Manuel, in the "*Encyclopedie Methodique*," 1792, gives all Muller's species, merely quoting his descriptions and copying his figures. Fabricius, in his "*Entomologia Systematica*," 1793, changes Muller's names in one or two instances, but merely gives his nine species. Donovan, in his "*Natural History of British Insects*," 1802, gives but an indifferent figure of a species taken when in its young state, and which appears to be the *D. vetula*. He calls it "*Monoculus Conchaceus*," and makes a few remarks upon its habits and manners, giving a frightful picture of its ferocity and cowardice! By numerous filaments which it darts forth, he says, it causes such motion in the water as to attract unresistingly the insects in the water to its mouth. "Thus it exists," he concludes, "a life of rapine and destruction, enjoyed at the expence of the lives of thousands; and as the objects of

its ravenous disposition are defenceless, so are they the sport of their conqueror ; the few moments of intermission its craving appetite grants them, is occupied equally in the spoil, first pressing them to death, and then tossing them undevoured into the fluid. But should a more powerful insect oppose him, he immediately contracts his parts, and nothing more than the external covering is open to his antagonist's violence, and he will sooner die ignobly than offer the least opposition." * Latreille, in his " Hist. gener. et partic. des Crust. et Insectes," 1802, gives all Muller's species, retaining his names ; and they are given in the same manner by Bosc in his " Hist. Nat. des Crustac. edit. de Buffon par Deterville," 1802 ; both authors giving a number of general details with regard to the genus. Ramdohr in 1805, published a detailed account of the anatomy of two species, the *D. sima* and *longispina* of Muller, in his " Beytrage zur Naturgeschichte einigen deutschen Monoculus-arten." Previous to his time, Schœffer, De Geer, and Muller, were the only authors who had attempted any particular anatomical details, and this memoir of Ramdohr added much to what they had already done. Lamarck, in his " Hist. Nat. des Animaux sans vertébrés," 1818, gives two species from Muller ; and Samouelle, in his " Hist. of British Insects," 1819, gives one. In " Rees' Cyclopædia," 1819, we have all Muller's species ; while Leach, in his article " Crustaceology," in the " Edinburgh Encyclopædia," 1820, only gives the *D. pulex*. From the time when Muller's " Entomostraca" appeared, up to this period, no additions to the species had been made—and, with the exception of Ramdohr's memoir already mentioned, no original matter had been published concerning the genus—though, as I have already observed in my former papers, this work of Ramdohr's seems to have attracted no notice from any of the authors who succeeded him. In 1820, Jurine's splendid work on the " Monocles qui se trouvent aux environs de Genève," made its appearance after the death of the talented and lamented author, in which we have a variety of extremely interesting information, not only with regard to their anatomy, but to their habits and manners. About the same period, an elaborate and most excellent paper on the genus was read before the Academy in Paris, by M. Straus, and published in the " Memoires du Museum d'Hist. Nat." 1821. To these two authors we owe the greater part of our knowledge with regard to these curious insects ; their labours and experiments having brought to light much information with regard to their economy, which had escaped

* Vol. i. p. 15.

all the previous writers. Jurine describes six species which had not been described by Muller, and Straus describes three, though some of them seem to be only varieties. Desmarest, in his work "Consid. Generales sur les Crustacés," 1825, enumerates fourteen species which had been described by the authors who had written before his time, and which have been found in France—but adds no new ones. Gruithuisen has published a very interesting memoir upon the *D. sima* (Muller) in the 14th vol. of the "Nova acta Physico-Medica Academia Cæsariæ Naturæ Curiosorum," part 1st, 1815, in which he describes at some length the circulation of the blood as observed by him in this insect. He describes two hearts, the arterial heart and the venous heart, and gives a figure much magnified of the blood in motion.* His figure of the insect itself, however, (Fig. 1-2,) is either not very correct, or it is a species different from the *Sima* of Muller.

Habits and Manners.—These insects are only to be found in fresh water, generally in ponds and ditches, where there is much of the lemna or duck-weed floating on the surface. In such places they are often to be found in myriads, and almost the whole year round; and as they sometimes, and in some species, assume a reddish colour, they have been said to have tinged the water with the hue of blood. Swammerdam asserts this to be the case, and says that he has seen them in such numbers at Vincennes, as actually to give the water of a horse pond the colour of blood; and he quotes a friend of his in Holland, a Dr Schluyt, who had observed the same occur in one of the canals near his house. This has been repeated by Derham, in his Physico-Theology,† and by others upon Swammerdam's authority; but no writer since Swammerdam's time has observed it himself. They are very prolific, having a great many layings, and some of the larger species having been observed to have as many as forty or fifty eggs and upwards in their matrix at once. According to Jurine, in June the young ones begin to have eggs about ten days after birth, and it is probable they continue to produce all the summer through at frequent intervals. The males are very few in number compared with the females, and are only to be met with at certain seasons. From this circumstance Schœffer and others have considered them as Hermaphrodites; and Sulzer, (as quoted by Straus,) though he oppugns this, gives a more singular opinion still, being of opinion that a copulation might take place with the young before they see the light of day! These au-

* Tab. xxiv. Fig. 6.

† P. 364—(Note a.) Glasgow, 11th edit. 1745.

thors had never seen the males, nor ever witnessed the act of copulation. Muller and others, however, detected the male, and witnessed the act; and it is ascertained that one single copulation is sufficient not only to fecundate the mother for her life, but all her female descendants for several successive generations. This was observed by Schœffer, who followed them up to the fourth, by Straus to the fifth, and Jurine to the sixth,—the latter observing, that he thinks it probable it might extend in some species to the fifteenth generation. Extraordinary as this may appear, I have further found that the young produced from the ephippia are also fecundated by this one copulation, and have progeny; and that their young again also produce eggs, without the intervention of the male. I have followed up the successive generations as far as the fourth in the *Daphniæ* born in the usual manner; and as far as the third in those born from ephippial eggs, and have found from repeated experiments that those *Daphniæ* which had ephippia became loaded with eggs soon after they had thrown off their ephippia, and had progeny again without the intervention of males; and that the young so born from those *Daphniæ*, which had thrown off the ephippia, and become pregnant, were also independent of the access of the male, and became mothers in the same manner as the young of other *Daphniæ*. November 29, Isolated a *D. pulex*, with an ephippium. 30th, Ephippium thrown off. December 4, *Daphnia* has eggs. 8th, young ones born. 9th, has eggs again. 16th, young ones born. 20th, has eggs again. 24th, young born. 25th, has eggs again. January 6, young born. Mother has eggs again. 14th, young born. Mother again has eggs. 22d, young born. February 1, has eggs again. 8th, young born. On the 8th of December, isolated one of the young born from the subject of last series of observations, on the 30th November. 21st, has eggs. 28th, young born. 29th, has again eggs. January 9, young born. Mother has eggs again. 24th, young born. 25th, has eggs again. February 1, young born. Mother has eggs again. 9th, young born. 27th, has eggs again. March 8th, young born. In both these experiments the young were always removed from the vessel in which the mother was kept, as soon as born. On the 2d of November I placed several ephippia in a glass of clear water. On the 10th, two young *Daphniæ* were born. Isolated one of them. December 12, this *Daphnia* has given birth to several young, and has eggs again. 18th, has again given birth to several young. 19th, has eggs again. 24th, young born. 25th, has again eggs. January 6, young born. 25th, after two several moultings without producing eggs, has again become

pregnant. February 1, young born. On the 5th December, isolated a young *Daphnia* born from an ephippium. January 18, it has given birth to young. 19th, isolated two of these, both females. February 8, both of these have given birth to young. Isolated two of them. I was at this period obliged, from circumstances, to suspend my observations; but the above experiment is sufficient to prove the fact, that the young born from an ephippial egg produce young, which in their turn become mothers without the intervention of the male.

According to Jurine, who has watched the act with great care, the following is the manner in which copulation is effected:—When the male attacks the female for this purpose, he springs upon her back, and gradually descends till he reach the inferior edge of her shell, and finds himself in a position where the open edges of the shells are opposed to each other. He then introduces the “harpons” and “filets” of his first pair of feet into the interior of her shell, and with them embraces her feet. Thus fixed, he then curves up his tail so as to touch the female, who at first is much agitated, but after a little time pushes out her tail also. They touch each other, and then the *Daphniæ* immediately separate, the male at the time of touching having been agitated with convulsive motions. The eggs are first to be seen in the shape of small round pellucid globules, which mark the situation of the ovaries placed along the sides of the intestine. These soon lose their transparency, become enlarged and continuous, and form a dark mass on the outer edge of the intestine, partly globular and partly elongated. The insect now changes its skin, and shortly after the eggs quit the ovary by the communication to be hereafter mentioned, and take their place in a spherical form in the open space on the back of the insect, where they remain till the time of expulsion quite free and unattached. At first they are quite round, and appear to consist internally of little globules like air globules. The shape then alters a little, becoming oval, and the globules augment in number, but as yet no trace of any part of the body is recognizable. A little afterwards we see a black spot in the centre, which is the eye, and which is the first organ visible. The other organs then begin to shew themselves, but it is not till near the end of the fourth day, or the ninetieth hour after laying, according to Straus, that motion is perceptible. At the end of the fifth day, according to the same author, they are launched into open day. They are from the first exactly like the parent insect, undergoing no metamorphosis, but merely differing in the less complete development of parts. In the *D. pulex*, the

young are ushered forth into the world, with the tail curved up within the shell; and very shortly after birth, (Straus says *previous* to birth, but Schœffer says a few moments *after*, which agrees with my own observation,) this tail may be seen to spring forth with a sudden jerk and assume its natural position. The setæ of the *rami* also may be seen to spring out in the same sudden manner, having been apparently folded up along the stem. The suddenness of this motion is attempted to be accounted for by Straus, from the instantaneous flow of blood into these organs, but it is evident that this rapid evolution of these parts is in a great measure owing to the insect frequently stopping in its career through the water, bending up its body within the shell, and pushing it quickly out again beyond its edges, while the *rami* are bent downwards, so as to enter the interior of the shell, where they are embraced by the feet of the insect, and quickly drawn through them so as to catch the ends of the setæ and raise them up. The motions of the insect during this process are exactly like those of the common house fly, when it stops to clean its wings and feet. In a very short time after birth, the insect is exactly like the parent, and gradually increases in size, till the shell becomes too small to hold it, when it throws it off, and comes forth with a new and a larger one. This process of moulting is a very curious one, and all important for the life of the animal. The intervals between each vary according to the season of the year, being shorter in summer than in cold weather. Schœffer says, in the young it takes place every two days, which agrees very nearly with Jurine's experiments performed in the month of June. In winter the intervals are somewhat greater. In the month of December I found them thus: December 8th, young one born. 12th, moulted first time. 14th, moulted second time. 17th, moulted third time. 21st, moulted fourth time, and has eggs. 29th, moulted fifth time. January 9th, moulted sixth time. 19th, moulted seventh time. In a young *D. pulex* born from an ephippial egg, the intervals were as follows: December 5th, young one born. 13th, moulted first time. 17th, moulted second time. 24th, moulted third time. January 3d, moulted fourth time, and has eggs. 11th, moulted fifth time. 18th, moulted sixth time. Each time it moults the insect increases in size, the moulting being evidently, as in the *Cyprides*, necessary for the gradual growth of the animal. The process does not seem to stop, however, when the insect has acquired its full growth, but, as far as I have been able to judge, continues during its whole life, even long after it has gained its full size. As in the case of the *Cyprides*, the shell of the *Daphinæ* soon be-

comes overgrown with moss or parasitic infusoria, and thus the insect's motions become much impeded, and at last entirely destroyed ; the moulting, therefore, seems to be necessary in the full grown insect for the preservation of its life, for weak or sickly individuals may be seen frequently so overgrown with moss, &c., that motion and life are both soon arrested, the insect apparently not having strength enough to throw off its exuvia. At the 4th moulting,* the young insect has eggs, which are deposited in the open space on the back, almost immediately after the old shell has been cast off. The time that the eggs remain there varies according to the season of the year. In summer, according to Jurine, three days ; according to Straus, from four to six. In winter I have found the interval between the eggs, being deposited in the open space, and the young ones being born, to be eight days, as may be seen in the experiments detailed above. Moulting takes place every time after the young are born ; and generally within a very short period of time after the change has taken place, eggs are again deposited. Occasionally, however, this does not take place, and then the insect remains without eggs for a space of time equal to that of carrying the eggs, when she moults again, and then has eggs. Straus says, that the young of the same laying are generally speaking all of one sex, the two sexes being seldom to be found together in the same birth. He also says, that the *Daphniæ* cease to produce at the approach of winter or to change their skin, and that they die before the commencement of frost. This does not accord with my experience, having found them in considerable numbers producing young and moulting as late as the month of December, after both frost and snow had taken place. Indeed I have found them as late in the season as February, though not in great numbers, but about that time they seem to disappear, and perhaps in a severe winter earlier, young ones only being to be met with in the spring. At particular seasons the *Daphniæ* may be found with a dark opaque substance on the back of the shell. This is what Muller has called the *Ephippium*, from the resemblance the substance has to a *saddle*. He was the first to take notice of this curious appearance ; but though he describes it very well, and has given an accurate representation of it, he does not give any opinion upon the cause or use of the formation. Jurine next notices it, describes it well, traces its gradual formation from matter contained in the

* Straus says after the third ; Jurine says generally between third and fourth. I have always found it to be after the fourth.

ovary, and gives it as his opinion that it is a disease these insects are subject to, the effect of which is to arrest their future fecundity. Straus, however, has been more fortunate in his observations upon this very curious formation, and has found it to be a substance containing two eggs, destined, he says, for the future generations of the insect in the spring, these eggs resisting the cold of the winter, which proves fatal to the perfect insect. Straus says, that they are generally to be met with in the months of July and August. Jurine mentions them as occurring as early as May; and I have found them in abundance upon the insect as late as the end of the month of November. Jurine says, that after the third moulting has taken place, we may see a green matter in the ovaries, which differs both in colour and appearance from that of the eggs. After the fourth moulting this green matter passes from the ovaries into the matrix or open space on the back, and spreading forms the ephippium. At first it is of a grayish colour, and some hours after becomes of a black hue. When examined by the microscope it appears of a dense texture, composed of a sort of net-work of hexagonal cells. In the centre of this opaque mass we see two round or rather ovular bodies, placed one before the other, called ampullæ by Straus, who says that they are capsules opening like a bivalve shell. In each of these ovular bodies is contained an ovum covered with a horny shell, by which means they are protected from the cold of the winter, and enabled to resist the severity of the winter which kills the parent. At the next or fifth moulting, the *Daphnia* abandons the ephippium, which floats on the surface of the water, and remains containing the two eggs inclosed till next spring, when the young are hatched by the returning warmth of the season. "These two species of eggs," says Straus, "produced by the same animal, offer a very singular example in the history of animals, and show with what wisdom nature provides for the preservation of her smallest creatures." Straus says, he has frequently hatched the young from these ova by suddenly bringing them into a warm temperature. In the months of November and December, I ascertained the truth of Straus's statement, and witnessed the young hatched from these ephippial eggs by keeping them in my room. November 2d, I took several ephippia which I found floating on the surface of a saucer full of water containing *D. pulex*, numbers of which had ephippia attached to them, and placed them by themselves in a wine glass of clear water. 10th November, two young ones born. 16th, one more. 29th, two more born. 21st, one more. 23d, two more. November 29th, took se-

veral ephippia from the same saucer, and isolated them in the same manner. December 5th, three young ones born. 6th, two more. 8th, two more. 10th, two more. 16th, one more.

On the 19th November I isolated a *Daphnia* with the ephippium attached. 21st, it has thrown off ephippium. December 5th, one young one born from the ephippial eggs. I have repeatedly performed the same experiment, and have always found the same results. The young from these ephippial ova do not differ from those born naturally, unless that perhaps they are a little longer in coming to maturity. In a young *Daphnia pulex* born naturally on the 8th December, it moulted the first time on the 12th, or four days after birth; fourth time and had eggs, on the 21st, or thirteen days after birth; whilst in a young one of the same species born from an ephippial egg on the 5th of December, the first moulting was not till the 13th, or seven days after birth, and the fourth when she first had eggs, not till the 3d of January, or twenty-nine days after birth. The periods between each moulting are also longer than in the others. It has been asserted, as I have mentioned above, by Jurine, that these ephippia are the consequences of a disease these insects are subject to, and that they have the effect of arresting their future fecundity. From the experiments which I have detailed above, and which I have mentioned as having been also made previously by Straus, it is evident that they are not a disease, and that instead they are ova of a particular nature destined to outlive the severity of the winter, and to perpetuate the species which would otherwise perish altogether. From some experiments which I instituted upon this subject, I also found that Jurine is wrong in asserting them as arresting the future fecundity of the insects. On the 29th of December, I isolated two of *Daphnia pulex* with their ephippia attached. On the 30th, both had thrown off their ephippia, and both had moulted. Upon close examination I found that on the shell where the ephippia were situated, there was left a mark corresponding to its figure, and a scar or deeper mark like a cicatrix where the ampullæ containing the ova were situated. In the ovaries were to be seen the transparent globules or first appearance of the ova. On the 4th December, both had eggs lodged in their matrix; and on the 8th the first family were born. Watched the farther progress of one of these *Daphniæ*. On the 16th December she had given birth to a second family, but did not moult till the 20th, when she again had eggs in her matrix; and on the 24th gave birth to a third family. On the 6th January has given birth to a fourth family. January 14th, has given birth a to fifth family. January 22d, has given

birth to a sixth family. One or two other experiments, with the same results, prove satisfactorily that that assertion of Jurine's is incorrect.

The motion of most of the species of this genus is chiefly by short bounds through the water, the most important organ producing the motion being the rami, or arms, as Swammerdam calls them. Such is the motion or manner of swimming in the *pulex* and *vetula*, &c. but in the *cornuta* it is different, the motion in that species being continued, or produced by incessant motion of the rami, and not by short bounds at a time. In my paper on the Cyclops, (Vol. i. p. 319,) I have mentioned Jurine's experiments upon the faculty these insects were said to possess of returning to life after being dried. Schœffer has instituted some experiments upon this subject with regard to the *Daphniæ* also, and his results are, that after having exposed the insect with eggs in the matrix, for a considerable time to a dry atmosphere, and then replacing it in water, the eggs did not lose their vitality, but were after a time hatched as usual. Sulzer, as quoted by Straus, says that the parents return to life also; but in the experiments reported by Straus, he never found either mother or eggs recover their vitality. The food of these insects, according to Straus, consists of vegetable matter, and not animal; but I have no doubt that they are carnivorous, as well as the other genera I have mentioned; as I have invariably found that of two groups placed in separate small vessels of clear water, the one having only particles of vegetable matter placed beside them, while with the others there were also introduced minute animalcules, the latter were stronger and more active and throve better than the former.

(To be continued.)

IV.—*Remarks on the Mosses found in the neighbourhood of Aberdeen.* By G. DICKIE, Esq.

BEFORE proceeding to enumerate the mosses found in this neighbourhood, it will perhaps be necessary to give an outline of the botanical character of the district in regard to its flowering plants. This I shall do as briefly as possible, taking as a guide the remarks made by Mr Watson at pp. 58, 59, &c. of his interesting work on the Geographical Distribution of British Plants. On comparing the Flora of Aberdeen with the remarks at pp. 60, 61 of the work referred to, it would appear that this district partakes of the character both of the *northern* part of the *Region of the Plains* and also of the *Upland Region*, the former toward the north being characte-

rized by the presence of *Pinguicula vulgaris*, *Parnassia palustris*, *Geranium sylvaticum*, *Trollius europæus*, *Lysimachia nemorum*, *Carex dioica*, *Gymnadenia conopsea*, *Habenaria bifolia*, *Hab. viridis*, *Narthecium ossifragum*, *Comarum palustre*, and more rarely *Empetrum nigrum*. All of these plants are extremely abundant about Aberdeen, with the exception of *Trollius Europæus* and *Habenaria viridis*, which are rare. *Empetrum nigrum* is abundant, growing upon our moors in a peat soil, occurring also in gravelly soil, and even growing in pure sand, and in this latter situation binding our sand hills along with *Ammophila arundinacea*, *Carex arenaria*, *Triticum junceum*, *Festuca rubra* (var. *hirta*), and others. Mr Watson, at p. 61 of his work, states that the *Upland Region* is marked by the presence of *Arbutus uva-ursi*, *Vaccinium vitis-Idæa*, *Polygonum viviparum*, *Linnæa borealis*, *Trientalis europæa*, *Cornus suecica*, *Corallorhiza innata*, *Sedum villosum*, *Oxytropis Uralensis*, *Galium boreale*, and *Listera cordata*. Of these, in this neighbourhood, *Trientalis europæa*, *Listera cordata*, and perhaps *Linnæa borealis* are of most general occurrence, and more plentiful than some of the others; *Arbutus uva-ursi*, *Vaccinium vitis-Idæa*, *Polygonum viviparum*, and *Galium boreale*, are principally confined to a few spots, but there they are abundant. The latter of these is only found on the banks of the Dee, and I believe has not yet been found on Don side. *Cornus suecica*, *Corallorhiza innata*, and *Oxytropis Uralensis* have not as yet been detected in this district. From this short sketch it will be perceived, that (as has been already mentioned) the neighbourhood of Aberdeen partakes of the nature both of the northern part of the *Region of the Plains*, and also of the *Upland Region*, approaching, however, more to the former than to the latter.

The following list of mosses comprehends all which have as yet been found within the distance of ten miles of Aberdeen; and it may be proper to mention that many localities within that range still remain to be investigated. All of them have been gathered by myself in the places mentioned, with the exception of a few; in which cases, however, I shall mention the individual who found them.

List of Mosses.

<i>Andræa rupestris</i> .	On detached rocks near Bridge of Dee.
<i>Phascum subulatum</i> . }	Abundant in several localities.
————— <i>cuspidatum</i> . }	
<i>Sphagnum obtusifolium</i> .	Abundant.
————— <i>squarrosum</i> .	Corsehill and Stocket Bogs.

Sphagnum acutifolium.	Same localities as last.
———— cuspidatum.	Loch Loirston, &c.
Gymnostomum ovatum.	Walls at Rubislaw.
———— truncatulum.	Banks of the Dee, &c.
———— fasciculare.	On mould in gardens.
———— microstomum.	Banks of Don and other places.
Anictangium ciliatum var α and β .	Frequent.
Splachnum ampullaceum.	This beautiful species has only hitherto been found in Corsehill Moss near Scotstown. It was found by Mr P. Grant of this place in July 1836.
Encalypta vulgaris.	Tops of walls near Denmore.
Weissia lanceolata.	Banks of Don and Dee.
———— cirrata.	On detached stones at Nigg.
———— curvirostra.	Banks at Denmore and Rubislaw.
———— crispula.	Along with W. cirrata.
———— controversa.	Banks near Girdleness and other places.
Grimmia apocarpa.	Var. α common. var. β Dens of Rubislaw and Cults.
———— maritima	Abundant on the coast near Aberdeen.
———— pulvinata.	Common.
———— tricophylla.	On stones at Rubislaw.
———— ovata.	Rocks near Aberdeen. Mr P. Grant.
Didymodon purpureus.	Everywhere abundant.
———— rigidulus.	Rubislaw quarry.
———— trifarius.	Banks of Don.
———— heteromallus.	Along with D. trifarius.
Trichostomum lanuginosum.	Den of Maidencraig.
———— canescens.	On stones at Middleton.
———— heterostichum.	Frequent.
———— aciculare.	Moist rocks at Leggart.
———— fasciculare.	On stones at Rubislaw, &c.
———— polyphyllum.	Along with T. canescens.
Dicranum bryoides.	Abundant in several places.
———— adiantoides.	Moist shady places at Nigg, &c.
———— taxifolium.	Moist banks of Don.
———— glaucum.	Moist fir-woods at Rubislaw.
———— cerviculatum.	Den of Maidencraig, &c.

Dicranum flexuosum.	Den of Rubislaw, &c.
———— squarrosum.	Moist places, Bay of Nigg.
———— pellucidum.	Rubislaw Den, in the burn.
———— undulatum.	At Belhelvie, near Aberdeen.
———— scoparium.	Abundant.
———— varium.	Rubislaw quarry, &c.
———— heteromallum.	With the last.
———— subulatum.	Banks of Don, and at Torry.
Tortula muralis.	Frequent.
———— ruralis.	Aberdeen Links, and other places.
———— subulata.	Abundant.
———— unguiculata.	Banks of Don.
———— fallax.	Frequent.
Polytrichum undulatum.	Rubislaw, Stocket, &c.
———— piliferum.	Frequent.
———— juniperinum.	Tops of walls.
———— commune.	Stocket Moss, and other places.
———— urnigerum.	Rubislaw quarry. Abundant.
———— aloides.	With P. urnigerum, and in other places.
———— nanum.	With P. aloides.
Funaria hygrometrica.	Abundant, generally associated with Tortula subulata, and Didym. purpureus.
Orthotricum cupulatum.	Craig of Nairb.
———— anomalum.	Walls at Drum.
———— affine.	Trees and wall in several places.
———— diaphanum.	On stones at Powis.
———— rivulare.	On stones at Gilcomston Dam.
———— crispum.	Dens of Rubislaw and Maidencraig.
———— pulchellum.	On birch trees, Den of Leggart.
Bryum androgynum.	In fissures of gneiss rocks, banks of Dee, and Den of Maidencraig.
———— palustre.	Bogs at Corsehill, Ferryhill, &c.
———— argenteum.	Abundant.
———— capillare.	Belhelvie and other places.
———— cæspitium.	Common.
———— nutans.	Rubislaw quarry, and other places.
———— turbinatum.	Banks of Black Dogburn, Belhelvie.
———— ventricosum.	Corsehill and Ferryhill mosses.
———— ligulatum.	Dens of Rubislaw and Leggart.
———— punctatum.	With B. ligulatum.
———— rostratum.	Old Town Links.

Bryum hornum.	Den of Rubislaw, &c.
——— cuspidatum.	With the last.
Bartramia pomiformis.	Banks of Don, Rubislaw, &c.
——— fontana.	Strocket Moss, and other places.
Buxbaumia aphylla.	“ Wood near Aberdeen, Mr Jackson.” Hooker’s Fl.
Fontinalis antipyretica.	Abundant in many places.
Hookeria lucens.	In a wood at Old Bridge of Don.
Hypnum trichomanoides.	Den of Cults.
——— complanatum.	On trees in several places.
——— undulatum.	Den of Rubislaw, &c.
——— denticulatum.	Den of Rubislaw.
——— populeum.	Shady rocks in several places.
——— molle.	Den of Rubislaw in the rivulet.
——— stramineum.	In Denburn.
——— purum.	Plentiful.
——— murale.	On walls at Rubislaw.
——— piliferum.	Den of Cults.
——— Schreberi.	Hazelhead woods.
——— catenulatum.	Moist rocks at Old Bridge of Don Mr P. Grant. On rocks upon the coast.
——— plumosum.	Banks of Don.
——— alopecurum.	Den of Cults.
——— dendroides.	Old Town Links.
——— myosuroides.	Den of Rubislaw and other places.
——— proliferum.	Frequent.
——— rutabulum.	Common.
——— velutinum.	Common.
——— ruscifolium.	Dens of Rubislaw and Cults.
——— striatum.	Banks of Dee, &c.
——— confertum.	Den of Rubislaw.
——— cuspidatum.	Ferryhill, Stocket, and other places in Bogs.
——— polymorphum.	Den of Rubislaw, Stocket, &c.
——— stellatum.	Corsehill Moss.
——— loreum.	Common.
——— triquetrum.	Abundant in woods.
——— squarrosum.	Woods at Rubislaw.
——— palustre.	Black Dog Burn, Belhelvie.
——— aduncum.	Moist banks at Torry.
——— uncinatum.	Den of Leggart.

Hypnum commutatum.	Den of Rubislaw.
———— scorpioides.	Ferryhill and Corsehills bogs.
———— cupressiforme.	Abundant.

From this list it will be remarked, that, of the twelve British species of Phascum, only two have hitherto been detected in this neighbourhood. This may perhaps be partly accounted for when it is considered that they are generally minute plants, and not, therefore, readily discovered. And, according to Sir W. J. Hooker, "the species are more frequent in the southern than the northern parts of Great Britain." It is, therefore, very probable that few if any other species remain to be discovered about Aberdeen. In Dr Greville's Flor. Edin. seven are mentioned. In the Parisian Flora of Merat, twelve species are enumerated; and at Hudson's Bay, where the mean annual temperature is low, no species of Phascum is found, according to Richardson, in Edinburgh Phil. Jour. Vol. xii.

The species of Didymodon and Trichostomum found in this district are, with one exception, the same as those mentioned in Flor. Edin. Didymodon purpureus is one of the most common and abundant mosses about Aberdeen, and occurs in many different varieties of soil and situation. It frequently springs up along with Funaria hygrometrica, where the Ulex Europæus has been burnt down. Of the species of Dicranum, D. pellucidum is the rarest in this neighbourhood. D. squarrosum occurs near the sea level, along with Jungermannia blasia. I have gathered the same moss at a considerable height in Glen Callader. Orthotrichum anomalum seems to be mostly confined to a range of serpentine rocks at the locality mentioned, where it is abundant. I have seen only a few specimens on gneiss. O. pulchellum and O. diaphanum are the rarest, O. crispum and O. affine are the most common and abundant. Of the twelve species of Bryum all are more or less plentiful, except the interesting B. androgynum, which is of rare occurrence, and found upon gneiss. I have never yet seen it in fruit. Gemmæ are frequent and abundant, and from the readiness with which they germinate, there is no difficulty in accounting for the propagation of this beautiful species. B. palustre and B. ventricosum are common in our peat bogs, along with Hypnum scorpioides and cuspidatum, and all these four occur along with Splachnum ampullaceum in the only locality where this elegant moss is found. Bryum palustre frequently bears gemmæ as well as capsules. B. ligulatum and punctatum are abundant in some places, and generally grow in company. Specimens of the former are found with nine setæ

arising from nearly the same point of the stem. *Buxbaumia* is mentioned upon the authority of Mr Jackson, in Hooker's Flora, Vol. ii., as growing near Aberdeen, but I have never had the pleasure of gathering it. *Fontinalis antipyretica* is very abundant in slow running streams. It is, however, rarely found here in fruit. The brilliant *Hookeria lucens* is plentiful in the locality mentioned. In Brit. Flora, Vol. ii. p. 74, it is mentioned that the stems sometimes reach a length of four inches. In this part of the country they never exceed two inches. *Hypnum catenulatum* is the rarest of the species enumerated. The list is, I suspect, rather deficient; many species of *Hypnum*, without doubt, have not yet been detected. Several of them, especially *H. loreum*, *triquetrum*, &c. afford a soil and shelter favourable to the growth of the elegant *Goodyera repens*, so plentiful in nearly all the old fir woods in the neighbourhood of Aberdeen.*

When engaged in examining the species of the genus *Hypnum*, I have frequently observed that there is a very evident difference in the form, and even in the cellular structure, of the stem leaves, and of the perichætal leaves. Might not this difference be assumed as a specific character in some cases? I leave it to some more experienced muscologist to follow out this suggestion.

List of Hepaticæ found near Aberdeen.

<i>Marchantia polymorpha</i> .	Abundant.
————— <i>hemisphærica</i> .	Banks of Don, &c.
<i>Jungermannia asplenioides</i> .	Abundant in several places.
————— <i>cordifolia</i> .	Banks of Don.
————— <i>crenulata</i> .	With the former.
————— <i>inflata</i> .	Corbie Den at Maryculter.
————— <i>excisa</i> .	Banks of Don.
————— <i>ventricosa</i> .	Den of Rubislaw.
————— <i>bicuspidata</i> .	Frequent.
————— <i>pusilla</i> .	Banks of Don and other places.
————— <i>umbrosa</i> .	Den of Rubislaw.
————— <i>undulata</i> .	Moist rocks upon the coast.
————— <i>albicans</i> .	Bay of Nigg.

* *Goodyera* occurs at the following places near Aberdeen: In a fir wood at Drumoak, at the thirteenth milestone, on the Deeside road; at Hazelhead, Denmore, Parkhill, in a fir wood opposite Fintray House, where *Linnaea borealis* also grows; at Loch of Skene, in two different woods. The firs at these places are from forty to sixty years old. The plant is also springing up in a wood at Middleton, three miles up Deeside. This wood does not much exceed twenty years.

Jungermannia cochleariformis.	With the former.
———— complanata.	On trees, Dens of Rubislaw and Leggart.
———— bidentata.	Stocket Moor.
———— barbata.	Den of Rubislaw.
———— serpyllifolia.	Abundant on trees.
———— Tamarisci.	Rocks upon the coast.
———— dilatata.	On trees, Den of Rubislaw.
———— multifida.	Common in several bogs.
———— Blasia.	Bay of Nigg and Den of Leggart.
———— epiphylla.	Frequent.

To these must be added a minute species which is found upon *Hypnum piliferum*, round the stems and leaves of which its slender branches are entwined. It is also sometimes found on *Polytrichum aloides*. The leaves of this species are ovato-lanceolate, acutely bipartite, and rather distant from each other. It seems to come near *Jungermannia Turneri*. I have not as yet found it in fruit. *J. Blasia* is said to be rare in fruit. It is abundant in the localities mentioned, both in fruit, and with the flask like bodies. *Jun. epiphylla* is mentioned in British Flora as bearing fruit in September. In this neighbourhood it invariably sends out its "white sparkling silvery threads," or fruit-stalks, in March and the beginning of April.

V.—*Observations on some New or Obscure Species of Plants.* No. I.

By G. A. WALKER ARNOTT, LL. D. F. L. S., &c.

CALOTROPIS, R. Brown. (Asclepiadeæ.)

IN the second volume of the *Hortus Kewensis*, Brown describes two species of this genus, one, the *C. gigantea*, from India, the other, *C. procera*, from Persia. Dr Hamilton, in the *Linnean Society's Transactions*, Vol. xiv. p. 246, conceiving that he had found the Persian plant also in India, described a new species as such, and to which Dr Wight, in his *Contribution to the Botany of India*, gave the name of *C. Hamiltonii*. Since then Dr Wight has made further observations on this species in the *Madras Journal of Literature and Science*, Vol. ii. p. 69. t. l. although, through inadvertency, he has resumed the name of *C. procera*. Having had no opportunity of examining the plant of the *Hortus Kewensis*, it may appear presumptuous in me to attempt to decide on the difference, if any, between it and Hamilton's; but having received from Arabia *Petræa*, a specimen of a *Calotropis*, which answers to the short character given by Dr Brown, I have little doubt of its being the same as that from

Persia, and between it and Hamilton's plant there is so considerable a difference in the form of the leaflets of the corona, that the two can be distinguished with great facility. In *C. gigantea* the leaflets of the corona are three-toothed at the apex, and then flat and close pressed to the column, while their base is spirally recurved: in *C. Hamiltonii* these have a conduplicate bifid patulous apex, and an acute simply recurved base: in what I consider the true *C. procera*, the apex is precisely as in *C. Hamiltonii*, but the base as in *C. gigantea*. The characters of the Indian species are given in Wight's Contributions and the Madras Journal; the Persian and Arabian one is distinguished as follows:—

C. procera; corolla campanulata segmentis patulis margine planis, coronæ stamineæ foliolis gynostegium æquantibus basi obtusa circinnatim recurva apice conduplicato bifido patulo, stigmatè plano.

It thus agrees most with *C. Hamiltonii*, but differs by the form of the base of the coronal leaflets.

BLYTTIA, Arn. (Asclepiadææ.)

Corolla rotata 5-partita. *Corona* staminea simplex, 5-phylla, foliolis ovalibus, obtusis, discretis, carnosis, planiusculis. *Antheræ* membrana terminatæ. *Massæ* pollinis ventricosæ, pendulæ. *Stigma* muticum. *Gynostegium* exsertum. *Folliculi* læves, abortu sub-solitarii. *Semina* comosa.

Fruticulus sesquipedalis glaber, ramis patulis rigidis. Folia opposita, petiolata, oblonga vel oblongo-lanceolata, obtusa. Umbellæ interpetiolares, pedunculatæ, folio breviores. Flores parvi.

1. *B. Arabica*, Arn.—*Periploca*? Stend. et Hochst. in Herb. Un. It. 1837. n. 816.

HAB.—In collibus granitosis prope Dscheddam: *W. Schimper.*

This genus is obviously closely allied to *Cynanchum*, particularly those species which have the corona deeply 5-partite; but here the leaflets are perfectly distinct and somewhat distant from each other. From *Xysmalobium* it differs by the corolla, and absence of denticuli between the larger leaflets of the corona.

RHINOLOBIUM, Arn. (Asclepiadææ.)

Corolla patens, profunde 5-fida. *Corona* staminea tubo filamentorum imposita, 10-phylla; foliolis 5, antheris oppositis, carnosulis, gynostegium æquantibus, subrotundis, intus sub apice recurvato dente erecto triangulari planiusculo auctis; 5 reliquis alternantibus minimis. *Antheræ* membrana terminatæ. *Massæ* pollinis teretes,

apice attenuato affixæ, pendulæ, appendiculis gracilibus. *Stigma truncatum pentagonum. Folliculi*

Herbæ ? *erectæ, vimineæ, graciles, simplices, subpubescentes. Folia opposita, linearia. Umbellæ interpetiolares, subsessiles; pedicelli filiformes, foliis multo breviores, ac calyces pubescentes. Flores parvi.*

1. *R. tenue* (Arn.) foliis lineari-filiformibus margine revolutis. Ad Caput Bonæ Spei legit *Cl. Harvey* (Herb. Harv. n. 629.)

This genus is allied in character to *Xysmalobium*, also from the Cape, but that is destitute of the projecting toothlet, which arises in this from the inside of the coronal leaflets. *Cynanchum filiforme* Thunb. is apparently another species with broader and flat leaves.

Besides the present, I have received only two other Cape species of Asclepiadeæ from Mr Harvey: one is *Cynanchum pilosum*, R. Br. (Herb. Harv. No. 413.); and the other *Secamone Alpini*, R. and S. (Herb. Harv. no number.)

In Wight's "Contributions," and Decandolle's fifth volume of the "Prodromus," two plants are referred to the genus *Blepharispermum*; but on account of the specimens of one of them being imperfect, the character was principally taken from *B. petiolare*. More lately, having received additional specimens of *B. subsessile* from Dr Wight, I am now enabled to describe it more fully; and as it cannot be conjoined into one genus with *B. petiolare*, (unless indeed *Athroisma* be also united,) I shall here give the reformed character of *Blepharispermum*, as well as of the new one.

BLEPHARISPERMUM, *Wight*. (Compositæ.)

Capitula innumera in glomerulum globosum coacervata; axi hemisphærica. *Bractea* sub glomerulo oblongo-lanceolatæ, membranaceæ. *Capitula* 4-flora, monoica. *Receptaculum* paleaceum. *Involucrum* oligophyllum. *Flores* exteriores 2, feminei, filiformes, tridentati; interiores 2, masculi, tubulosi, 5-dentati. *Anthera* basi sagittato-subcaudatæ. *Stylus* fl. masc. subinteger. *Achenium* femineum obovali-oblongum, tetragono-obcompressum, angulis laterilibus ciliatis, cæteroquin glabrum; mascul. tetragonum, lineare, glabrum. *Pappus* fem. e paleis scariosis, paucis, inæqualibus, acuminatissimis; masc. nullus.

Suffrutex *Ceylanicus, glaberrimus. Folia alterna, petiolata, ovato-lanceolata, acuminata, integerrima, penninervia. Glomeruli longe pedunculati, terni ad apicem rami, bracteis involucralibus glomerulo brevioribus.*

1. *B. petiolare*, D. C. in *Wight. Contr.* p. 12; *Prod.* v, p. 368; *Wight. Cat. n.* 1417.

HAB.—In Ceylona, prope Ugandamlej; *Klein*.

I have here followed Klein's views (as mentioned in Wight's Contributions) of the structure of the capitulum, in preference to those of Decandolle, as they agree better with my own observations. Decandolle himself, before he was aware of Klein's memoranda on the subject, appears to have had doubts if such were not the real structure.

LEUCOBLEPHARIS, *Arn.* (Compositæ.)

Capitula innumera in glomerulum hemisphæricum coacervata; axi plana. *Bractea* sub glomerulo ovata, mucronata, foliacea. *Capitula* 8-flora, monoica. *Receptaculum* paleaceum, paleis concavis. *Involucrum* oligophyllum. *Flores* exteriores 4, feminei, tubulosi, 4-5-dentati: interiores 4, masculi, apice latiores, 5-dentati. *Anthera* basi sagittato-subcaudata. *Stylus* fl. masc. integer, apice incrassatus. *Achenia* nigra, nitida, hinc plana, illinc convexa, marginibus dense villis albis longis erectis ciliatis; fem. late-ovalia, obcompressa, angulo dorsali paullum albo-ciliato; masc. angustiora, dorso convexiore subglabro. *Pappus* conformis, paleis scariosis, plurimis, flexuosis, inæqualibus, acuminatissimis, villis achenium marginantibus absconditis.

Herbacea, *glabra, simplex*. Radix *crassa, præmorsa, lignosa*. Folia *alterna, subsessilia, elliptica, utrinque obtusa vel attenuata, integerrima, triplinervia*. Glomerulus *terminalis, solitarius, subsessilis, bracteis involucralibus glomerulum superantibus*.

1. *L. subsessile*, *Arn.*—*Blepharispermum subsessile*, *D. C.* in *Wight. Contr.* p. 12; *Prod. v.* p. 368; *Wight. Cat. n.* 1418.

HAB.—In Mysore; *Heyne*. Prope Bellary; *Wight*.

By comparing this generic character with that of *Blepharispermum*, it will be seen that it differs very widely in the structure of the achenium and pappus of the sterile floret, in which respect it approaches much more to *Athroisma*; but in that genus the angles of the achenium are merely ciliated at the apex, and the pappus appears to be composed only of a few short hairs. The habit of these two genera is also very unlike.

MADAROGLOSSA, *D. C.* (Compositæ.)

This genus is said by Decandolle to be allied to *Blepharipappus* of Hooker, but to differ by the ray having no pappus. From a slight examination of specimens of both genera in Sir W. Hooker's Herbarium, it seems that both these distinguished botanists have the same in view; but that either ought to be separated into two genera.

Sir W. Hooker's character comprehends both ; but Decandolle's is more limited, so much so, indeed, as to exclude, perhaps, all the species he refers to it. In Lindley's Nat. Syst. of Botany, p. 443, I separated *B. glandulosus* under the name of *Eriopappus*, proposing to retain *Blepharipappus* for *B. scaber*. About the same time that my genus was published, or perhaps previously, Fischer and Meyer defined the same under the name of *Callichroa* ; and indeed, so far as I can judge by the description, *Blepharipappus glandulosus*, Hook. *Madaroglossa heterotricha*, D. C. Prod. v. p. 694, and my *Eriopappus glandulosus*, are scarcely distinguishable as species from *Callichroa platyglossa*, F. and M. To *Blepharipappus* I would refer *Madaroglossa hieracioides*, and *M. angustifolia* of Decandolle. In *Madaroglossa* the achenium of the ray is said to be glabrous, and the styles of the disk florets included. The latter is characteristic of what I consider the true species of *Blepharipappus*, and the former of *Eriopappus* or *Callichroa* ; but indeed *Mad. angustifolia* is expressly said to have the achenia of the ray villous.

LASTHENIA, Cass. (Compositæ.)

This genus, as defined by Decandolle, requires some elucidation. In his character, which it is unnecessary to quote at length, the capitulum is said to be nearly homogamous, that is, without any conspicuous ray, the female florets being small and tubular ; the involucre to be 5-8-15-toothed, and the pappus of 5-10 paleæ, or wanting ; while he adds, that it differs from *Gamolepis* by the capitulum being nearly homogamous, and by having a paleaceous pappus. Three species are described ; one with a paleaceous pappus and an obscure ray : this (*L. obtusifolia*, Cass.) which is the type of the genus, is the *Rancagua* of Poeppig, *Hymenatherum* of Lessing, (but not of Cassini,) and *Coilopodium Chilense* of Decandolle, Prod. v. p. 642, (noticed under *Hymenatherum Kunthii*) : to it the whole generic character given by Decandolle applies, with the exception of the involucre being 15-toothed, and a pappus of 5 or no paleæ. Another species is *L. glaberrima* ; of this the ray is not mentioned, but the involucre is said to be 15-toothed, and the pappus of 5 paleæ. What plant Decandolle has had in view, and which he received from the Horticultural Society, I cannot determine, but what I have received from Professor Lindley has a large ray, and is the same with *Burrielia gracilis* of Decandolle ; while that figured in the Botanical Register seems to have also a large ray, but no pappus, and to be either a variety of or closely allied to *L. glabrata*, Lindl. The third species, *L. glabrata*, mentioned by Decandolle,

has no pappus, and a large ray : and consequently, as far as the ray is concerned, must, along with that figured by Lindley, and quoted by Decandolle under his *L. glaberrima*, be removed from *Lasthenia*. It appears that this must have been Decandolle's first intention, and that the manuscript genus *Gamolepis* was intended to contain these. It is allied to *Baeria* of Fisch. and Mey., but in that genus the leaflets of the involucre are free from each other. I am therefore disposed to keep the Chilian plant alone in the genus *Lasthenia*, and adopt the genus *Gamolepis* for Decandolle's second section from California.

MONACTIS, H. B. K. (Compositæ.)

In the generic character the scales or leaflets of the involucre are said to be lanceolate-linear. The form is perhaps of little consequence, and I possess a plant collected by Mathews in the province of Chachapoyas in Peru, which seems principally to differ from *M. Flaveria*, Dec. by that character. Omitting then from Decandolle's character of the genus, the words "squamis lanceolato-linearibus," I would distinguish the two species thus :

1. *M. Flaveria*, (Dec.) squamis involucri lanceolato-linearibus.
2. *M. Kunthiana*, (Arn.) squamis invol. oblongis obtusis.

Kunth describes another species, *M. dubia*, but this Lessing has separated from the genus under the name of *Astemma*. In *Monactis* the ray is composed of a solitary floret ; in *Astemma* no ray whatever could be traced. I am, however, inclined with Kunth to refer the latter to *Monactis*, as it is not improbable that in the few specimens examined the ray had dropped off. As a species of *Monactis*, I scarcely know to distinguish it from *M. Kunthiana*, a name which perhaps ought to be retained, as that given by Kunth is inadmissible on the supposition of its actually, as in Mathews' plant, possessing one large ligulate floret in each capitulum, and being a true, not doubtful species of the genus.

HELIOPSIS, Pers. (Compositæ.)

Of this Decandolle describes the achenia, "angulato-compressa glabra, omnino calva." In the species which I have examined, I find uniformly the achenia, when young, to have a pappus of four small ciliated teeth, which may sometimes also be traced in the advanced fruit : the achenia of the ray are triquetrous, of the disk 4-quetrous.

MICROPSIS, Dec. (Compositæ.)

To *M. nana*, Dec., I refer a plant collected by Mr Bridges in

Chili, (n. 642 of his collections) : but Decandolle's generic character, although agreeing in most points, yet differs somewhat from the following drawn up from Bridges's specimens :

Involucrum scariosum subbiseriale : *capitulum* heterogamum pauci-(sub 9)-florum : floribus femineis uniserialibus, filiformibus in ambitu ; hermaphroditis tribus tubulosis in centro, intra rachidis bracteolas uniseriales isarithmas dispositis. *Anthera* basi bisetosæ. *Stylus* hermaph. ramis pube infra apicem decurrente obsessis. *Achenia* estipitata, erostria, oblonga ; fem. sericeo-villosa, villis pappum occultentibus ; hermaph. glabra, compressiuscula, hinc linea sericea notata, bracteolis membranaceis valde concavis apice scarioso-appendiculatis, dorso gibbis omnino involuta. *Pappus* conformis, coroniformis, brevissimus, crenato-dentatus, persistens.

Herba pygmæa, annua, albo-tomentosa. Folia oblonga-spathulata. Capitula glomerata, terminalia, foliis sub involucrio obvallata.

The principal difference between Decandolle's and the above description lies in the central florets, which he makes to be male, whereas I find them to possess a perfect style and achenium. He also says the receptacle is destitute of paleæ ; I find it paleaceous : he consequently arranges the genus near *Evax* and *Micropus* among the Plucheineæ, whereas I feel rather disposed to remove it near to *Filago* (*Giflago*, Cass. and Less.) among the Helichryseæ.

Having now noticed several genera of Compositæ, I may here mention that the genus *Clairvillea* of Decandolle appears to be quite the same as *Cacosmia* of Kunth, nor can I perceive any specific difference between the two plants. It belongs not to the Senecionideæ, but to the Vernoniaceæ, as proposed by Lessing. *Philoglossa* of Decandolle, if I be correct in referring to this a plant collected by Mathews in Peru, also belongs to the Vernoniaceæ, and is allied to *Alibum*. *Apalus* of Decandolle is not distinct from *Blennospermum* of Lessing : both authors describe the same species from specimens collected by Bertero, and named by him *Unxia anthemidifolia*. *Kuhnia Arabica*, Hochst. and Stend. in Herb. Un. It. 1837, n. 863, is a species of *Pegolletia*, and scarcely different from *P. Senegallense*, Cass.

SACCHARUM, L. (Gramineæ.)

While lately preparing materials for an *Agrostographia Indiæ Orientalis* along with my friend Professor Nees von Esenbeck of Breslaw, I, like many other botanists, experienced more difficulty

while studying the genus *Saccharum*, and the group to which it belongs, than almost any others of the family. The following *Clavis Analytica* of the species, which I drew up to lessen my own labours in future, may perhaps prove useful likewise to others. Most characters are excluded which are not essentially necessary for distinguishing the species mentioned from each other.

Valvula flosc. hermaph. inferior vel deficiens vel neutri valde dissimilis; (Glumæ dorso glabræ; villi involucales longi.)

Gluma saltem inferior pallide chartacea, Sect. 1.

Gluma basi brunneo-callosa, Sect. 2.

Valvula flosc. hermaph. inferior neutri fere similis et æquimagina.

Glumæ chartaceæ pilosæ, villi involucales longi, Sect. 3.

Glumæ brunneo-callosæ; villi involucales breves, Sect. 4.

Sect. 1.—*Eusaccharum*.

Flosculi superioris valvulæ subæquales, minutæ, ovarium subæquantæ, *S. officinarum*, L.

Flosculi superioris valvula superior lanceolata neutro dimidio brevior, inferior nulla, *S. Sinense*, Roxb.

Sect. 2.—*Tylosaccharum*.

Flosculi super. valvulæ nullæ, spiculæ ovatæ, folia subulata canaliculata, *S. canaliculatum*, R.

Flosculi super. valvula infer. lineari-lanceolata, superior brevissima subquadrata, spiculæ lanceolatæ,

Folia angusta nervo albo latiusculo canaliculato, panicula oblonga ramis compositis, *S. semidecumbens*, R.

Folia subulata omnino canaliculata, panicula linearis ramis sub simplicibus, $\left\{ \begin{array}{l} S. spontaneum, L. \\ (S. canaliculatum, N. \\ \text{ab E. in Wight. Cat.} \end{array} \right.$

Sect. 3.—*Trichosaccharum*.

(Glumæ subulato-acutata: valvula inferior flosc. hermaph. setuligera.)

Folia canaliculata anguste linearia, nervo albo lato canaliculato, *S. Munja*, Roxb.

Folia plana:

Paniculæ rami graciles laxi decompositi, $\left\{ \begin{array}{l} S. procerum, Roxb. \\ (S. Sara, Hook. et \\ \text{Arn.} \end{array} \right.$

Paniculæ densæ contractæ, rami stricti rigiduli:

Spiculæ distantes; rami paniculæ elongati polystachyi, $\left\{ \begin{array}{l} S. arundinaceum, \\ \text{Retz. } S. exaltatum, \\ \text{N. ab E. in Wight} \\ \text{Cat.} \end{array} \right.$

Spiculæ approximatae, (rhachidis internodia pedicello spic. pedicellatæ vix longiora,)

Paniculæ rami subelongati decompositi polystachyi, *S. Sara*, Roxb.

Paniculæ rami breves oligostachyi, *S. exaltatum*, Roxb.

Sect. 4.—*Gymnosaccharum*.

Spiculæ acutæ ; folia versus apicem supra scabra, . . . *S. Baka*, Ham.

Spiculæ obtusæ :

Folia versus apicem supra pilis brevissimis aspera, { *S. fusca*, Roxb. ? (*S.*
Narenga Ham.)

Folia utrinque lævia, , , . . . *S. Modhuja*, Ham.

How far these are really distinct species, I will not here inquire. The three of the last section were perhaps all included by Roxburgh under his *S. fuscum*. As to *S. Sinense*, it is as commonly cultivated in the West Indies as *S. officinarum*, and is indeed the *S. officinarum* of Kunth's En. Graminum. I have not yet had an opportunity of examining any specimen referable to the description given by Roxburgh of his *S. Sara*. All the others I have seen.

ARLARY, 10th October 1837.

VI.—*Contributions to the Natural History of Ireland*. By WILLIAM THOMPSON, Esq., Vice-President of the Belfast Natural History Society.

No. 4.—*On the Birds of the Order Insessores*.

CINEREOUS SHRIKE,—*Lanius excubitor*, Linn.—This species has in a few instances been obtained in various parts of Ireland. In the north, Mr Templeton records two specimens from Down and Antrim, (Mag. Nat. Hist. Vol. i. p. 404, New Series,) and three individuals have subsequently been procured in these counties. In the former, one in mature plumage was shot at Echlinville, late in the autumn about fifteen years ago, and in the latter, an adult male was killed at Beechmount, near Belfast, in November 1826. This latter is preserved in Dr J. D. Marshall's collection. A second individual was in company with it, and remained about the place for a few weeks afterwards. Near the same locality, another shrike was shot during the few days of frost that prevailed at the end of January 1835. One has been mentioned to me as obtained near Mullingar, in Westmeath, and two in the county Dublin. Of these latter, one was killed on Shankill mountain in 1822, or 1823, and the other in the Phoenix Park about 1831. I have been informed that it has occurred in Tipperary more than once, and Mr R. Ball tells me that he has seen a specimen which was shot near the city of Cork in 1824.

I cannot say whether this species has ever bred in Ireland. (See Selby's Ill. Brit. Orn. Vol. i. p. 148, 2d ed., and Journal of a Na-

turalist, p. 187, 3d ed.) The respective dates of its occurrence elsewhere than in the north are unknown to me.

THE SPOTTED FLY-CATCHER,—*Muscicapa grisola*, Linn.—Is a regular summer visitant to the north-east of Ireland, and probably to suitable localities throughout the country, though it has been but little noticed. From the dulness of its plumage, want of song, and its weak call being seldom heard, it is certainly one of the least obtrusive of our birds; the period of its arrival too, being prolonged until the trees have put forth their “leafy honours,” further serves to screen it from observation.

It is the latest of the summer birds, appearing in the neighbourhood of Belfast about the 12th of May, and remaining till autumn is far advanced. In addition to the ordinary places selected for nidification here, as holes in walls and trees, &c. I have seen a nest resting in part upon an aperture in a wall, and partly on the branch of a fig tree trained against it. An observant friend has remarked, that one which he saw placed against the unglazed window of an out-house was so covered with cobwebs inside and out, that no other material was visible. In another instance, the parent bird was very bold on its nest being approached, flying angrily so near the intruder, that it might almost have been struck by his hand. The Rev. Thomas Knox informs me, that the spotted fly-catcher breeds about Killaloe, (county Clare,) and he supposes has occasionally either two broods, or builds a second time if the first nest be destroyed, as on the 1st of August 1833, he saw one sitting on young birds, though on the 8th of June in the previous year, he knew a brood to have been hatched. On this subject see White’s Selborne, p. 179, ed. 1837, and Journal of a Naturalist, p. 207.

THE WATER-OUZEL—*Cinclus aquaticus*, Bechst.—Is as generally distributed over Ireland, as I may say from personal observation, it is in suitable localities in England, Wales, or Scotland. With the romantic and picturesque in scenery this bird is associated, frequenting the stream only so far as it can boast of such charming accompaniments; whenever it descends to the lowlands, to move sluggishly through the plain, the water-ouzel forsakes it to continue in its upland haunts. By Montagu and Selby it is described merely as a very early songster; but in the north of Ireland its song is occasionally heard at all seasons; and indeed most frequently in the winter months, the bright mornings and forenoons that occur during the most severe frost and snow, have always seemed to me the

favourite time. I have heard it sing when flying at a great height, as well as when perched just above the water.

It is remarked by Mr Selby, that these birds are seen "always on the margin of the stream, or perched in their particular attitude on some projecting stone in the middle of the water," and thus are they characteristically represented in his splendid "Illustrations of British Ornithology," as well as by Bewick, whose vignette more especially exhibits the species in its "rightful place" in connection with the scenery depicted; but about the ponds at Wolfhill, an elevated situation near Belfast, and where they have chiefly come under my observation, the willows that fringe the banks are their constant perch.

The first nest of this bird I remarked was placed in a hole in the clayey bank of a pond, where, owing to the shelter afforded, there was no occasion for the display of its domed architecture, and this was consequently dispensed with. This nest contained four eggs, from which three young were produced. As soon as these were fledged, they were to be seen early every morning, accompanied by their parents about the same pond, some singing, others diving from the rail on which they were perched into the water, none of them for a moment at rest; but when neither diving nor singing, going through the most grotesque and amusing evolutions. Thus were they a highly interesting group, presenting quite a picture of social happiness. Similar playfulness of manner I have frequently witnessed, though from being generally seen singly, the species is regarded as unsocial. In autumn, at a favourite haunt, I once saw a water-ouzel seated on a large stone singing, and jerking about its head most ludicrously, whilst a second individual moved in a saltatory manner round the base of the stone. The following note by a relative, who is an accurate observer, also illustrates the same trait: "On the 26th September,* a pair of water-ouzels, at the upper pond of Wolf hill, plunged several times into the water, which was some feet deep, and remained, moving about in it with only their heads above the surface; twice one of them disappeared altogether for a few seconds; they then pursued each other round the pond, alighted, when one of them sang, and they repeated over again several times all these manoeuvres." Of five other sites observed to be selected for nidification in this neighbourhood, three were in the fissures of rocks close to the finest cascades of our mountain streams. One of them was tastefully placed on a niche near the summit of a waterfall of 30 feet, the rock directly above it rising to such an elevation as to render it

* The date is mentioned, to show that they are not any of the captivating arts preceding the nuptial season.

inaccessible. Here the nest was very large, formed of moss, and of the regular domed structure, upon which the spray from the cascade seldom ceased to beat, the water flowing over the rock being only about two feet distant. This, however, I fear, caused the desertion of the nest, as it was abandoned before the production of a brood; it was not completed until the 20th of April. On the 27th of the same month in a subsequent year, a nest containing young, and lined with the dried stalks of grass, and a few leaves, was observed at the side of a rock bordering a stream, and elevated a foot only above its surface. A fifth was placed in the hole of a wall beside an artificial fall* of the river Lagan. Throughout the breeding season of 1832, a pair of these birds frequented a shade erected over a large mill-wheel of nearly forty feet diameter, at Wolf hill, where it was presumed they had a nest, though in such a place it was impossible to discover it. Their appearance emerging from this gloomy and dark abode often caused surprise, especially when they sallied forth between the arms of the gigantic wheel when in motion, a state in which it was almost constantly.

The stomachs of two individuals which I examined in the month of December contained only the remains of the larvæ of aquatic *colcoptera*, and one in January exhibited but the fragments of insects. The stomach of one examined in October was, excepting two full-sized dorsal spines of a three-spined stickleback, (*Gasterosteus*), filled with the remains of crustacea. A person who has had ample opportunities of observing the species, states, that from shallow water he has often seen it bring the larvæ of *phryganææ*, and break their cases on a stone to get at the contained animal. I have repeatedly seen this bird dive into a pond of clear spring-water ten feet in depth.

As several authors to whose works I have just referred differ in their descriptions of the colour of the water-ouzel's legs, it may be remarked, that two mature specimens particularly inspected by me had the entire front (and it only) of the tarsi and upper side of the toes of a whitish colour, being in general appearance like the clouded or opaque part of a quill: all the rest was blackish. †

* To take a wider illustration than Ireland can afford of its partiality to falling waters, it may be remarked, that on the Rhine between Cologne and Schaffhausen only once did this bird attract my attention, and then it was at the great fall near the latter city. On the sublime alpine torrents of Switzerland it is always attendant; and about the fall of Velino, near Terni, in Italy, said to surpass all other European cataracts in the beauty of its surrounding scenery, either three or four of these birds appeared to me at one view.

† Mr Selby having remarked that the water-ouzel is "probably" met with in Derbyshire, it may be added, that I never saw the species more plentiful any

THE MISSEL-THRUSH—*Turdus viscivorus*, Linn.—Has of late years extended its locality in Ireland, as in other parts of the British islands, and is now found throughout the country. Previous to the last twenty years, it was very partially known, but now, from the southern counties of Clare, Kerry, Cork, and Tipperary, my correspondents attest its gradual increase, though in some of them it has been known for a very few years. To the extreme north-west it has penetrated, and although in Down and Antrim it was at the earliest period alluded to, confined to the richly wooded valleys, it now inhabits the plantations far as they stretch towards the mountain tops.

Like some others of the genus, the missel-thrush is in England considered only as an early songster, but, with the exception of the moulting season, its song may be heard in Ireland at every period of the year. Within the first fortnight of December 1832, I have notes of its singing on five different days.

The missel-thrush's nest is generally most conspicuous, being in every instance that it has occurred to me placed in the forking or junction of the main stem, or branches of trees, whether these be wholly bare or clothed with cryptogamic vegetation. In young plantations, rising from twenty to thirty feet, I have frequently seen it. May it not be on account of this exposed site, which according to the dictates of nature, is selected, that this species is at the same time endowed with the extraordinary courage and perseverance manifested in the protection of its nest? Often have I seen a pair of these birds driving off magpies, and occasionally fighting against four of them. On one occasion, a pair of hooded crows (*Corvus cornix*) joined, or it may be followed in the wake of a pair of magpies, in their assault on a nest at the "Falls," when the thrushes were unfortunately routed. By an ornithological friend, a pair of these birds was seen pursuing a kestrel (*Falco tinnunculus*) that approached their nest,—though probably without any felonious intent—when one of them struck it several times, and was as often foiled in the attempt by the hawk suddenly rising to avoid the coming blow. Respecting the pilfering propensity of the missel-thrush, I may mention that a few years ago a lady residing near Ballymena lost a lace-cap in spring, when out drying; in autumn, when the leaves began to fall, something white appeared in one of the trees, and on inspection proved to be the cap that had been used by one of these birds in the construction of its nest. In another instance, a

where than in that county, especially about the romantic Dove, and the river at Matlock.

similar depredation, but of a minor degree of turpitude, was committed last summer ; a narrow piece of net, a yard in length, having been carried off when bleaching, and afterwards, in my presence, found composing part of the nest of a bird of this species.

As soon as the breeding season is over, these birds assemble either in families, or large flocks, and are very destructive to the fruit in certain gardens and orchards about Belfast. On the 5th of July, I once saw two or three families congregated ; and on the 1st of August 1832, my friend at the " Falls" reckoned fifty-four in a flock at his garden, where, during the month, they consumed almost the entire crop of raspberries. Several of the young birds were caught in rat-traps baited with this fruit. Towards the end of August this same year, they resorted in such numbers to an orchard, containing the most venerable fruit-trees in the neighbourhood, that on one morning, twenty-six, and on the next, seventeen of them were shot, and, with one or two exceptions, singly : here late cherries were the attraction. Missel-thrushes were this year more than ordinarily abundant. In 1833, the report of the gardener at the " Falls" was not, however, very satisfactory—that since they had eaten the greater part of the raspberries, and had cleared the trees of the late crop of cherries, he had not seen many. I have been thus particular, as similar depredations on the part of this species have not been related in any ornithological work with which I am acquainted. In his " History of Selborne," White remarks, that " missel-thrushes do not destroy the fruit in our gardens like other species of *Turdi*," and on this passage not one of his numerous commentators has made an observation. In an anonymous contribution to the Magazine of Natural History, facts similar to these I have brought forward are recorded. (Vol. iv. p. 184.)

The stomachs of two individuals, examined by me in January and September, contained the remains of coleopterous insects in addition to vegetable food.

THE FIELDFARE—*Turdus pilaris*, Linn.—Is a regular winter visitant to Ireland, appearing in the north towards the end of October. Its departure is occasionally prolonged until a late period. On the evening of the 7th May 1836, my friend, William Sinclair, Esq. at his residence, " The Falls", near Belfast, observed a large flock migrating in a north-east direction, and heard them calling as they passed overhead. He considers that they were on their way from some distant locality, as none had been seen in his neighbourhood for some time before ; but when the season was as far advanced

in the very late spring of 1837, they still frequented their winter quarters, the great body of them remaining longer than ever before known to him. I am likewise informed that they remained in the county of Kerry last spring until the end of April, a period later than had before been observed. With respect to his present neighbourhood, and that of Killaloe, his former residence, the Rev. Thomas Knox of Toomavarat, remarks in a letter to me, that the fieldfares are not so numerous, and are always later in appearing than the redwings, and that if the weather be mild, they retire for weeks together, though in the depth of winter, but one or two nights of frost are certain to bring them back again. When they disappear he thinks they visit the mountains. Such are their habits in the north, as in the open weather they frequent the upland districts, but are driven to the lowlands by frost and snow, (see *Journal of a Naturalist*, p. 259, third ed. for the opposite procedure.) Their favourite haunts around Belfast are the fields skirting the base, and most nearly approximating the mountains, more especially if surrounded by tall white-thorn hedges that for the sake of shelter have been permitted to grow to maturity in a state of unpruned and wild luxuriance.

When returning at a late hour from hunting, I have several times in the short days of winter raised flocks of fieldfares that were roosting near the summit of heath-clad hills considerably distant from their daily haunts, as well as from any hedges or plantations. A valued friend and correspondent states that he once saw a flock of about five hundred perched for the night on a spruce-fir near Youghal.

That fieldfares generally, as in England, leave the northern parts of this country when a severe frost sets gradually in, I have little doubt, from having at such times remarked their scarcity. Though the species is naturally wild and difficult of approach, such individuals as remain behind suffer so severely, perhaps from cold, in addition to the want of food, as to become easy victims to the most juvenile sportsmen.

As a difference of opinion exists among authors on the subject of the fieldfare's food, I give the contents of the stomachs of six individuals that I have examined, and which were killed at various times and places during two seasons. Of these one contained two *limacelli*, (internal shells of naked snails belonging to the genus *Limax*, Linn.) the remains of coleopterous insects, and some vegetable matter; with this last substance only the second was supplied; the third was filled with oats alone, though the weather had been mild for some time before, and when it was shot; the fourth contained worms and bits of grass; these last, together with pieces of

straw and the husks of grain, were found in the fifth,—the weather was severe and frosty for a week previously ; and the sixth was stored with the husks and a grain of oats.

THE SONG THRUSH—*Turdus musicus*, Linn.—Is very common throughout this country, in which it is permanently resident. Although I have seen flocks of thrushes late in autumn, I agree with Mr Selby, that it is not our indigenous birds that so congregate, but that these bodies are on their migration from more northern countries ; confirmative of which there seems not any diminution of the species in its accustomed haunts, nor are these flocks seen, except for a short time at a particular season.

In England the thrush is considered only as an early songster, beginning its melody at earliest by the end of January, (Selby,) and continuing it until July, (Jenyns,) but in Ireland, where our winters are milder, its song is in the north, with the exception of the time of moulting, continued in fine weather throughout the year, and, as if it felt the winter day too brief, its melody ceases not even when the sun goes down. By reference to memoranda, it appears that in December 1831, I heard it at Wolfhill, on the 5th, 30 minutes, on the 19th, 40 minutes, and on the 26th, 45 minutes after sunset. In summer, too, indeed, its notes are sometimes prolonged until a late hour. On the 27th of May, I once heard them at half past nine o'clock P. M. ; and a friend informs me, that about midsummer he on one occasion heard them, in this neighbourhood also, at a quarter to ten o'clock P. M. In June I have listened to its song so early as a quarter past two o'clock A. M. When travelling in the month of June over a very wild mountain tract between Cushendall and Ballycastle, (co. Antrim,) covered with heath, and having no trees within miles of it, I heard two thrushes singing ; the nearer one, which I saw and listened to for some time, was perched on a ragweed (*Senecio Jacobææ*) that overtopped the heath. The next day I saw one at a still wilder place, near the summit of the promontory of Fairhead.

The favourite site of the thrush's nest in the north of Ireland is in evergreen shrubs, and young trees, and in beech hedges, yet even where these abound, it not unfrequently prefers placing it in the holes of walls and beneath the roofs of sheds. In one of the latter situations I knew a pair to build on the top of a beam for three successive summers, though this house was in the midst of shrubberies and plantations. A relative, who has attended much to the nidification of birds, found the nest of a thrush containing five eggs, on the ground in a meadow, with grass about two feet high waving

over it. This also was at a place abounding in the ordinary situations that are selected. This same person once saw a nest in a pear tree in a well-kept garden, where mosses were scarce, that, excepting the inner coat of plaster, was entirely formed of hay. The thrush has commonly a second brood. I have several memoranda of young birds being unfledged late in August. The following remarkable instance of fecundity, &c. which seems worthy of being fully detailed, has been furnished me by Mr Edward Benn, an accurate observer:—Very early in 1836, a thrush built her nest in a beech hedge in our garden, at Saul, near Downpatrick. When the leaves were blown from the beech by the gales of early spring, she was quite exposed to view, but on perceiving herself looked at remained on the nest without being disturbed. We commenced feeding her with worms, which, to avoid startling her by a too near approach, were offered on the end of a long rod; then with bread, which was taken from the hand; she was now as tame as a domestic fowl. There were three young. When these were fledged a second nest was formed near the same place, and now she fed as before, but in a bolder manner. There were in this instance five young. When these were well grown, so as to fill the nest, she would perch on the edge, and feed from the hand, allow her plumage to be stroked, but if too much disturbed, became noisy, and struck with her wings at the intruder. When this brood could provide for themselves, a third nest was constructed, when the same part was repeated, and five young produced. These gone, she built a fourth nest at the farther end of the hedge from the house, but on going to feed her here one morning as usual, she appeared in great consternation on the bank, and the nest was found torn to pieces. A day or two afterwards she began the erection of a fifth, and, evidently for the sake of protection, this time chose a site quite close to the house. On this occasion four young got off in safety, after which we saw her no more. Thus seventeen young altogether were produced. Thirty persons at least witnessed what is here related, and fed the bird in her nest. She was indifferent to the presence of strangers.

Although thrushes are very destructive to our cherries and other fruits, the admiration in which their song is held generally pleads so strongly in their favour as to save them from destruction. In a friend's garden near Belfast, I have known a few of them to forfeit their lives by eating of the fruit, with which traps were baited for blackbirds. In the hothouse at this same place, the gardener one day caught a few of them regaling on his grapes. By several British authors, the *Helix nemoralis* is particularized as a favourite re-

past with this species, to which one author adds the *Hel. hortensis*, (Jour. of a Nat. p. 339,) and another the *Hel. lucida*, (Wern. Mem. Vol. iii. p. 180,) but its predilection for such food is far from being limited to these species. The beautiful *Helix arbustorum*, whose delicate shell is much more easily broken than either of the others, is an especial favourite; but this species is not by any means so generally distributed, particularly as the first mentioned. So eagerly is it sought for by the thrush, and probably also by the blackbird, that in some localities, when the fragments of shells they had broken first announced to me its contiguity, I have found it difficult to obtain specimens after their successful foraging.

In addition to the naked or externally shellless snails, insects, seeds, &c. the smaller *Helices* and other land shells form in winter a very considerable portion of the thrush's food. From a single stomach I have taken the *Helix cellaria*, *H. pura*, and *H. radiata*, in addition to *Limacelli*; and have similarly met with the *Bulimus lubricus*.

REDWING—*Turdus iliacus*, Linn.—The migration of this species, like that of the fieldfare, extends every winter over Ireland. In the north they generally arrive early in October, and remain until the beginning or middle of April; until the end of this month they delayed in the late spring of 1837. About Killaloe, I am informed that their average arrival is in the first week of November. In Kerry the redwing is reported to me as more common than the fieldfare, and in the north it likewise prevails numerically over this species. What has been said a page or two back on the haunts and occasional migration of the fieldfare equally applies to the redwing. In the severe winter of 1813 these birds were so reduced about Youghal that my informant killed several of both species with a stick thrown from the hand. In the north, I am told, this winter was remarkably fatal to birds generally.

In fine weather, and chiefly towards spring, a flock of redwings from a hedge or plantation sometimes delights us with a most agreeable concert, and a single bird occasionally utters a few melodious notes. A young friend resident at Cromac, near Belfast, who states that he has often heard single redwings sing their favourite tune, being early in the morning and forenoon, compares what he designates their song to that of the gray linnet, (*Fringilla cannabina*,) and remarks, that it is always in a low subdued tone; but from what we read of their melody in their native forests, they are called the

nightingale of Norway. * What is here mentioned seems to me nothing more than a repetition of their notes, or what bird-fanciers call "recording."

Of the stomachs of three redwings opened by me, one in January contained the remains of insects, two shells of *Helix cellaria* and one of *H. radiata*; two in December exhibited worms, vegetable food, (chiefly bits of grass,) remains of cloeopterous insects, and several *Limacelli*; one had in addition two of the *Bulimus lubricus*, a *Helix hispida*, and three of *H. rufescens*: of these shells some were perfect.

The common name of this species in the north is "small Felt," in contradistinction to the fieldfare, which is called "big or pigeon Felt."

THE BLACKBIRD—*Turdus merula*, Linn.—Is constantly resident, and very common in Ireland. The indigenous birds do not congregate, nor have I heard of flocks being ever seen on their migration from the north of Europe in any part of this country, as they appear in England. (See Selby's Ill. of Brit. Orn. Vol. i. p. 167, 2d. ed.) They are indeed stated to be more numerous about Tralee (co. Kerry) in winter than in summer, but their comparative scarcity in the latter season is attributed by my correspondent to the want of woods and thickets wherein to nestle. In the middle of June, I have heard the blackbird sing as early in the morning as a quarter past two o'clock. Thomas Walker Junior, Esq. of Belmont, Wexford, remarks in a letter to me, dated November 1836, that "last year numbers of people went to Mr Boxwell's of L yngestown, to hear a blackbird in his shrubberies that clapped his wings and crew like a bantam cock. The circumstance was mentioned in several newspapers at the time." A similar fact is particularly described in the Magazine of Natural History, Vol. iv. p. 433.

In the north of Ireland, they are very destructive to fruits of almost every kind; even apples when fallen to the ground suffer much from them. To the earlier fruits in a friend's garden near Belfast they were so injurious in the autumn of 1833, that he had recourse to the common rat trap for their destruction. It was baited with currants, cherries, and early peas, and although exposed to view, † forty of these birds soon fell victims to it, and at the same

* Mag. Zool. and Bot. Vol. ii. p. 312.

† For many species, such as the magpie, hooded crow, &c. it requires to be concealed, the bait only being exposed to view.

time three thrushes shared a similar fate. When a cherry and pear were placed on the trap, the former was always preferred to the pear. All of these birds but one were caught by the neck, thus proving that it was in the act of eating the fruit they were secured.

On observing some plants in the Belfast Botanic Garden in January last, that had been much injured by birds, I learned on inquiry from the curator, that he had seen blackbirds tearing up different species of saxifrage, even in mild weather ; and I saw plants of the *Saxifraga pedatifida* and *S. tridactylites*, of which hardly a fragment remained, though each had formed a round clump at least a yard in diameter ; beside these, I remarked a similarly large patch of *Sax. hypnoides* untouched ; but this species, I was told, had elsewhere been attacked in the garden. In the present instance it was uninjured, apparently in consequence of forming a more unyielding mass, and, besides, its green surface foliage was so dense, that insects, &c. could hardly lodge beneath it. In our mountain glens I have in winter observed tufts of the rein-deer lichen (*Cladonia rangiferina*) lying strewn about, and inferred it was the work of either the thrush or blackbird in search of food, and, from what is just stated, I have little doubt of the correctness of my inference.

Ten of these birds killed in November, December, and January in various years, the contents of whose stomachs I inspected, presented haws, coleopterous and other insects and their larvæ, earth worms, *limacelli* ; &c. in three of them were land-shells, one alone producing six specimens of *Bulimus lubricus*, and ten of *Helix radiata*—the weather was mild when this bird was obtained, as it was when another filled with haws was procured.

I have seen several Irish specimens of the blackbird variegated with white, in some instances obviously the result of disease. Some of them had the legs and toes also marked with this colour.

THE RING OUZEL—*Turdus torquatus*, Linn.—Extends its migration in summer over this country. It has occurred to me in the mountains of the extreme north-west in Donegal, * and at Achil Head, one of the most westerly points of Connaught. In the counties of Clare, Kerry, Cork, Waterford, Tipperary and Dublin, it is stated by correspondents to be met with ; and I have seen it on Carlingford mountain in Louth, as well as in the chain of Mourne moun-

* J. V. Stewart, Esq. mentions in a letter to me, that he has twice seen the ring-ouzel during winter in this county.

tains, &c. in Down, and the range of Belfast mountains and others in Antrim.

Not later than the middle of April it appears about Belfast, generally departs towards the end of September, but occasionally remains until the middle of October. Here commonly one, but in some instances two pairs, frequent the wildest and most rocky parts of every glen or ravine that intersects the chain of mountains to the westward of the town. Within the distance of five or six miles there are as many of these localities resorted to by them, and here only are they found, except at the periods of their migratory movements. When walking in the Crow Glen, one of these haunts, on a summer evening in 1829, with my pointer dog some paces in advance, it was amusing to see two ring-ouzel pursuing him with their loudest cries, and approaching so near as to strike the air violently within a few inches of his head. Many an earnest and expressive look the dog gave me, as if desirous of advice in his extremity, but finding it all in vain, at length ran up to me, when they, nothing daunted, followed, and gave myself as well as two friends who were with me, the same salute, flying so near that we could almost have struck them with our hands. At the beginning of the onset, a female bird appeared, as if inciting the males forward, and remained so long as they were attaining the highest pitch of violence, and then like another heroine, retired to a commanding eminence to be "spectatress of the fight." Had they been a pair of birds protecting their young, or assuming similar artifice to the lapwing in withdrawing attention from their nest, in which the ring-ouzel is also said to be an adept, the circumstance would perhaps be unworthy of notice, but they were both male birds in adult plumage. The chase of the dog was continued a considerable way down the glen, and for fully fifteen or twenty minutes.

The nest of the ring-ouzel is placed on the ground, and generally on the side either of the shelving or precipitous banks of our mountain streams. One of those found by a relative before alluded to, was artfully set beneath an overhanging bank, whose mosses, of which materials the nest was composed, entirely concealed it from ordinary view.

The stomach of a ring-ouzel which I obtained in the middle of September last, exhibited a quantity of the larvæ of insects of several kinds. In the north this species is known by the name of "rock or mountain blackbird."

GOLDEN ORIOLE—*Oriolus galbula*, Linn.—A bird described to

R. Ball, Esq. as having frequented a garden at Middleton, in the county of Cork, about the year 1817, he is satisfied must have been of this species. From the Zoological Journal (Vol. i. p. 590.) we learn that "a specimen of the *Oriolus galbula*, Linn. was shot in the county of Wexford in May last, (1823,) and is preserved in the Museum of the Dublin Society." In the spring of 1824, a female of this species was shot by a gentleman of my acquaintance near Donaghadee, in the county of Down. A male bird was soon afterwards seen about the same place.* Near Arklow, in the county Wicklow, I have been credibly informed that a specimen was procured about the summer of 1827. In a letter from Dr Robert Graves of Dublin, to a mutual friend in Belfast, dated November 1830, it is mentioned that a male golden oriole was shot in the previous summer by one of his pupils in a valley above one of the bays of the county Kerry.

THE HEDGE ACCENTOR—*Accentor modularis*, Cuv.—Is very common throughout Ireland. It is not confined to the country, but also takes up its abode in the plantations about the squares, &c. in towns. From a narrow skirting of shrubbery before our house in Belfast, I have frequently heard its song trilled forth in mild days during winter. It has always seemed to me one of the most peaceable of birds, but that it can be moved to enmity, I have the testimony of a friend, who at the end of May once witnessed a fight between two of them, in which one was killed; the victor after having slain his antagonist, twice or thrice uttered a song apparently of triumph, at the finale of which he each time flew at and struck his victim.

The bill and legs of the hedge accentor are occasionally in this country covered with large excrescences, like those described in the Magazine of Natural History, Vol. vi. p. 154. "Hedge sparrow" is the name applied to this species in the north. It is very agreeably treated of in the Journal of a Naturalist, p. 148.

VII.—*Dr Robert H. Schomburgh's description of Victoria Regina*,
Gray. Plate XV.

THE character of grandeur so peculiar to the productions of a tropical sun and a humid climate is highly developed in the object of the above description. The Holy Cyamus or Pythagorean Bean is said to have been derived from a plant closely related to the

* These are the same individuals alluded to by Mr Templeton, Mag. Nat. Hist. Vol. i. p. 405, New Series.

Nymphaceæ, (*Nelumbium speciosum*,) and not only that it is highly valued in India and China, and cultivated in large ornamental pots in the gardens and houses of the Mandarins, but it has been held in such high estimation that at last it was considered sacred. The description and illustrations which have been transmitted to us of this noble plant have raised the desire in many a botanist to see it in its native country. In my rambles through the West Indian Archipelago, I had frequently met the white water lily; but the remark of an eminent botanist, that these floating plants were entirely unknown on the continent of South America, did not make me expect to find a representative of that tribe, which, for the superior grandeur of its leaves, the beauty of its flowers, and its fragrance, may be classed amongst the grandest productions of the vegetable world. It was on the 1st of January this year, while contending with the difficulties nature opposed in different forms to our progress up the river Berbice, (in British Guiana,) that we arrived at a point where the river expanded and formed a currentless basin. Some object on the southern extremity of this basin attracted my attention. It was impossible to form any idea what it could be, and, animating the crew to increase the rate of their paddling, shortly afterwards we were opposite the object which had raised my curiosity. A vegetable wonder! all calamities were forgotten, I felt as botanist, and felt myself rewarded. A gigantic leaf, from 5 to 6 feet in diameter; salver-shaped, with a broad rim of light green above, and a vivid crimson below, resting upon the water. Quite in character with the wonderful leaf was the luxuriant flower, consisting of many hundred petals, passing in alternate tints from pure white to rose and pink. The smooth water was covered with them, and I rowed from one to the other, and observed always something new to admire. The leaf on its surface is of a bright green, in form almost orbiculate, with this exception, opposite its axis, where it is slightly bent up. Its diameter measured from 5 to 6 feet; around the whole margin extended a rim about 3 to 5 inches high, on the inside light green, like the surface of the leaf, on the outside, like the leaf's lower part, of a bright crimson. The ribs are very prominent, almost an inch high, radiate from a common centre, and consist of eight principal ones, with a great many others branching off from them. These are crossed again by a raised membrane, or bands at right angles, which gives the whole the appearance of a spider's web, and are beset with prickles; the veins contain air-cells like the petiole and flower stem. The divisions of the ribs and bands are visible on the upper surface of the leaf, by which it ap-

pears areolated. The young leaf is convolute, and expands but slowly; the prickly stem ascends with the young leaf till it has reached the surface; by the time it is developed its own weight depresses the stem, and it floats now on the water. The stem of the flower is an inch thick near the calix, and is studded with sharp elastic prickles, about three quarters of an inch in length. The calix is four-leaved, each upwards of 7 inches in length, and 3 inches in breadth; at the base they are thick, white inside, reddish brown and prickly outside. The diameter of the calix is 12 to 23 inches, on it rests the magnificent flower, which, when fully developed, covers completely the calix with its hundred petals. When it first opens, it is white, with pink in the middle, which spreads over the whole flower, the more it advances in age, and it is generally found the next day of pink-colour. As if to enhance its beauty, it is sweet scented. Like others of its tribe it possesses a fleshy disk, and the petals and stamen pass gradually into each other, and many petaloid leaves may be observed which have vestiges of another. The petals next to the leaves of the calix are fleshy, and possess air-cells, which certainly must contribute to the buoyancy of the flower. The seeds of the many-celled fruit are numerous, and imbedded in a spongy substance. We met them hereafter frequently, and the higher we advanced the more gigantic they became. We measured a leaf which was 6 feet 5 inches in diameter, its rim $5\frac{1}{2}$ inches high, and the flower across 15 inches. The flower is much injured by a beetle, (*Trichius*. "Spec?") which destroys completely the inner part of the disk, we have counted sometimes from 20 to 30 in one flower.—*Extract of a letter from Dr Schomburgh to the Botanical Society of London, 17th October 1837.*

VIII.—*Contribution towards a knowledge of the Crenilabri (Cuv.) of Ireland, including Descriptions of Species apparently new to Science.** By WILLIAM THOMPSON, Esq. Vice-President of the Natural History Society of Belfast. Plates XIII and XIV.

CRENILABRUS TINCA, and C. CORNUBICUS of Authors.

During the month of September 1835, which I spent at Bangor, on the coast of Down, I embraced the opportunity of examining these species in a recent state, as on every calm day they were in

* Read in part to the Zoological Society of London in June 1837, when specimens of all the species and varieties treated of were exhibited.

about equal numbers caught by lads, fishing from the rocks, who provided me with them.

This examination proved to my satisfaction that the *C. tinca* and *C. Cornubicus* are not distinct. The colour was as commonly described, in so far that the smaller specimens,* up to the length of six inches,—but not all under this size,—had on the body at the base of the caudal fin the black spot of *C. Cornubicus*, and the larger (*C. tinca*) wanted it; also, in the former being generally rather less brilliant in colour. Some specimens of an intermediate size, however, had the above-named spot of an obscure brown, suggesting, that this spot, originally black, may change gradually to this colour, and afterwards become obliterated,—an effect analogous to which, but to a much greater extent, takes place, according to Agassiz, in certain species of the *Salmonidæ*. The dorsal fin was similar in all, the spinous portion being marked alternately with longitudinal lines of green and red, and the soft portion red, with roundish green spots. In no other marking or distribution of colours was there any difference between them.

In not one of the many characters which come under the head of “*form*” was there any difference; the proportion of depth to length, denticulations of pre-opercle and teeth,† being similar in both. In these characters Mr Jenyns considers the *C. tinca* and *C. Cornubicus* differ, (Man. Brit. Vert. p. 398,) and from his great accuracy there cannot be a doubt that they did so in the specimens he examined; but it was, I presume, merely individual, as the differential characters he has assigned to each have occurred to me in the other.

Dr Fleming has brought these species together, (Brit. Anim. p. 208;) but we are not informed whether it was their general similarity, or an actual examination of specimens that led him to this conclusion.

Mr Couch remarks of *C. tinca* and *C. Cornubicus*, (Mag. Nat. Hist. Vol. v. p. 742,) that they differ in size, shape, colour, and habits. The three first differences have been already dwelt upon; but as to habits, I have only circumstantial evidence of their simi-

* In the collection of R. Ball, Esq. of Dublin, there are smaller specimens than any obtained at Bangor. Ten of these which I examined, and of which several were about $1\frac{1}{2}$ inch long, had the black spot conspicuous. The largest individual I have seen with this marking is $8\frac{3}{4}$ inches in length. It was procured on the northern coast of Ireland in the course of the Ordnance Survey.

† In two Bangor specimens of *C. Cornubicus* there are fourteen teeth in the lower jaw, a greater number than which is not possessed by any *C. tinca* I examined with them. The second row of teeth in the upper jaw is most apparent in the larger individuals, or, in other words, in *C. tinca*.

larity, by the supposed two species being taken in like quantity at the same time and place, and with the same bait. The *C. Cornubicus* is, under the name of "Corkwing," admitted by Mr Couch occasionally to want the black spot on the tail, (Mag. Nat. Hist. Vol. v. p. 18,) and is in this state considered by him to constitute the "Gibbous Wrasse" of Pennant. I, believing the *C. tinca* and *C. Cornubicus* to be identical, am inclined to think the gibbous wrasse is an accidental variety of *C. tinca*. The only thing like a specific difference that I can perceive in any of the characters included under "form" in the *C. gibbus*, is its greater depth, which is to its length as three to eight,—the average depth of *C. tinca* I find to be as three to nine, and the proportion varies,—though certainly, not so far as I have observed, according to any peculiarity of colouring, which is supposed to mark *C. tinca* and *C. Cornubicus*. The only difference between them in colour worthy of remark is, that *C. gibbus* has a "dusky semilunar spot above each eye," and the "pectoral fins marked at the base with transverse stripes of red." The *C. tinca* has a "dusky" mark behind the eye, which does rarely reach above it posteriorly, and amongst my specimens is one exhibiting three transverse stripes of red at the base of the pectoral fin, though all the others have but one stripe. Finding specimens of the *C. tinca* thus varying both in form and colour, I have not a doubt of the *C. gibbus* being an accidental variety of it, an opinion which is much strengthened by one individual only having ever occurred. With these views, it appears to me that the name of *C. tinca* should be used to designate the species, and *C. Cornubicus* and *C. gibbus* to mark its varieties. This species, in its ordinary aspect, and in that of the variety first mentioned, probably occurs on all the rocky parts of the Irish coast. I have seen specimens of both from a wide range of the northern, eastern, and southern shores.

Since the above was read to the Zoological Society, I have observed in the collection of my friend R. Ball, Esq. a fish named by him *C. gibbus*, which further serves to illustrate what has been just advanced. This specimen, which was taken at Youghal, is in length 8 inches, its greatest depth of body, exclusive of fins, 2 inches 7 lines,—the depth to length thus being as 1 to $2\frac{3}{4}$.—The fin rays are:

D. 16 + 9. A. 3 + 10. V. 1 + 5. P. 15. C. 15, and some short.

Its profile from the mouth to the commencement of the dorsal fin is even more vertical than represented in Pennant's figure of the gibbous wrasse, but here, instead of about the centre of this fin, is

its maximum height. From this point it falls away gradually to the tail, so that without including the dorsal fin, it does not present the depth relatively to the length described by Pennant. It is at the same time evidently his *C. gibbus*, and as evidently a mal-formed specimen of *C. tinca*. The original colour cannot now be accurately determined. It, however, wants the black spot of *C. Cornubicus*.

CRENILABRUS RUPESTRIS,* (Lutjanus rupestris, Bloch,)

Jago's Goldsinny.

On the 10th and 13th of September 1835, I detected two specimens of this fish at Bangor, (co. Down,) amongst a number of the *C. tinca* and *C. Cornubicus* that were taken by boys fishing from the rocks, and using as bait a species of *Nereis*, apparently the *N. rufa* of Pennant. The following short description, drawn up from them when recent, may not be unacceptable, as the species is subject to much variation. Total length $4\frac{1}{2}$ and $4\frac{3}{4}$ inches; number of fin rays,

D. 17 + 9. P. 14. V. 1 + 5. A. 3 + 8. C. 15, well developed. Br. 5.
18 + 9. 15. 1 + 5. 3 + 8. 15.

Depth, equal to length of head; head to length of body nearly as 1 to 3; lateral line taking the precise form of dorsal profile. A row of pores appearing near the margin of the pre-opercle is continued forward over the eye. Behind its upper portion they are numerous, and irregularly disposed. Caudal fin covered with scales for two-thirds of its length from the base, none upon the dorsal and anal fins, their base being concealed by the scales of the body. Colour above the lateral line greenish-brown, below it changing gradually to pale green, the colour of the belly. Some irregular rows of orange spots occur longitudinally beneath the lateral line. Pectoral fins orange-yellow, which colour, with lighter shades of yellow, prevails in all the fins except the anterior portion of the dorsal, which from the first to the fourth ray is black; of this colour also are the upper margin of the eye and orbit, and a roundish spot at the upper edge of the tail. The centre of the scales being of a rather darker shade than their margin, gives to these specimens the appearance of being faintly lined.

They seem to be identical with the species represented in the vignette to *C. luscus*, in Mr Yarrell's "British Fishes," (Vol. i. p. 301,†) though certainly not with the figure preceding the article,

* See Mr Selby in Mag. Zool. and Bot. Vol. i. p. 170.

† Mr Yarrell has subsequently informed me that this vignette was drawn from a specimen of *C. rupestris*.

nor with the description of *C. luscus*. The vignette differs from them in the mouth, which is placed too high, and is thus made unnaturally to resemble that of the *Trachinus vipera*.

Such were the observations made on these individuals in a recent state. In the month of February 1836, a specimen of the same fish, which was cast ashore at Bamborough, came into the possession of P. J. Selby, Esq., and formed the subject of a communication to this Magazine in the following August. Mr Selby here satisfactorily showed that it was the goldsinny of Jago, and *Lutjanus rufpestris* of Bloch, but of a different species from the fish now known by the former name. My specimens had not the least indication of transverse bands on the sides, as described and figured by Bloch and Selby, nor was there any appearance of blue either in spots or lines upon the head. On examination of several individuals in Mr Yarrell's collection, I found no appearance of transverse markings. Nilsson observes (Prod. Icht. Scand.) that the colour of the species is variable.

CRENILABRUS MICROSTOMA, Couch MS. Small mouthed Wrasse.
Plate XIV.

In the month of June 1836, a species of *Crenilabrus* was found on the beach of the county Antrim near Cairnlough, by my friend Dr J. L. Drummond, when engaged in collecting *Alga*, and on his return to Belfast shortly afterwards, was kindly handed over to me. Being apparently undescribed, I at once drew up a minute account of it. When in London at the beginning of last summer, I ascertained that the same species had been met with in Cornwall by Mr Couch, who likewise considered it as new, and sent two specimens to Mr Yarrell, under the appropriate name of *C. microstoma*, a term, which, although unpublished, I consider it but fair to adopt, as Mr Couch had the priority in obtaining the species.

Its most prominent characters are: Body rather deep, mouth small, teeth few in number, and rounded or truncated at the summits; scales very large, those on the body concealing the base of the dorsal and anal fins, but none on these fins, anal fin with five or six spinous rays, ventral scale half the length of ventral fin, no blackish spots on body or fins.

D. 19 + 6. A. 6 + 7. P. 13. V. 1 + 5. C. 14. and some short = Br. 5.

Detailed description.—Length 3 inches; depth to entire length nearly as 1 to $3\frac{1}{2}$; first quarter of dorsal profile sloping moderately upwards, second flat, third turning rather suddenly downwards, and terminating with the dorsal fin, thence straight to the base of the caudal fin;* ventral profile very convex, sloping equally from

* Two specimens have this form; the other two have the dorsal profile fine-

both extremities to centre ; head occupying about one-fourth of entire length ; jaws equal ; mouth small ; lips double, much resembling those of *Labrus maculatus*, Bl. ; teeth strong, rounded or truncated at the summits, not serrated, a single row of twelve, rather uniform in size in the lower jaw ; two rows at the interior part of upper jaw, those of the outer row the larger, and seven in number, exceeding the teeth of the lower jaw in size, eyes large, more than their diameter distant from the snout, their distance from each other equal to their diameter ; a row of pores round the eyes, and some on the top of the head ; pre-opercle somewhat rounded at the base, ascending rather obliquely, strongly serrated, the denticulations extending half-way along its base, covered with small scales ; opercle somewhat triangular, covered with large scales ; scales on the body very large, smooth, and roundish at their free margins, three rows above lateral line, nine below it ; lateral line for two-thirds anteriorly placed high, at one-fourth of the depth, and the precise form of dorsal profile ; ventral central ; dorsal fin commencing at one-fourth of the entire length from snout, and continuing to near the tail, ending almost in a line with the anal fin, first ray very short, but they gradually increase to the twenty-fourth, which is longest, a membranous filament near the point of each spinous ray ; pectoral fin two-thirds the length of head, originating in the same line with the dorsal fin ; ventral fin beginning at about one-third of the entire length from the head, ventral scale about half the length of ventral fin ; anal fin originating nearly in a line with the fifteenth spinous ray of dorsal fin, and like it, when laid against the body, reaching to the outer short rays of the caudal fin, the dorsal rather exceeding the anal in length ; caudal fin obscurely rounded, and covered with scales at the base for one-fourth of its length ; scales of the body concealing the base of the dorsal and anal fins, but none on the fins.

Having had an opportunity in the present month (October 1837,) of looking over the collection of fishes obtained on the coasts of the counties of Londonderry and Antrim, during the progress of the Ordnance Survey, I had the satisfaction of seeing three specimens of the *C. microstoma*, which were liberally offered for my use by Captain Portlock, R. E., who at the same time suggested, that, if desirable, a drawing of one of them should be made by the gentleman attached as draughtsman to the Survey. To this kindness I am indebted for the drawing which accompanies the paper, the original

ly arched, and from the centre slope equally to each extremity ; in these the ventral profile is rather less convex than in the former. The difference is probably sexual.

specimen having been too much dried up by exposure on the beach to be available for this purpose. Of these individuals, the first was obtained at the mouth of Lough Foyle, (co. Londonderry,) and the others in the small bay at Cairnlough, where the specimen was found by Dr Drummond. These are respectively $4\frac{5}{4}$, 5, and $5\frac{3}{4}$ inches in length, and those sent from Cornwall to Mr Yarrell, being about the same size, render it probable that they may be full grown. Their colour in spirits varies slightly, but the one which best retains its original markings may be described as having the sides of a deep salmon colour, with a dusky tinge; upper part of head purple; upper margin of eye and orbit blackish; stripes of violet and orange alternating below the eye longitudinally to near the mouth, where they become vertical; belly silvery white; some of the scales, including those on which the lateral line appears tinged, with a golden metallic lustre; dorsal fin violet blue at the base, with an orange stripe above; anal fin violet blue, striped with reddish orange; pectoral fin, brownish orange, with a dark stripe at its outer base, as in *C. tinca*; ventral fin diaphanous, tinged with orange; caudal fin dusky, towards the tip blackish. The fin rays of these three specimens are,

D. 19 + 7.	P. 14.	V. 1 + 5.	A. 5 + 7.	C. 13?	and some short =	Br. 5.
19 + 6.	13.	1 + 5.	5 + 7.	13.	do.	
20 + 6.	13.	1 + 5.	6 + 7.	15.	do.	

In the number of spinous rays in the anal fin, this species agrees with a British *Crenilabrus*, the "Scale-rayed Wrasse" of Couch, (Mag. Nat. Hist. Vol. v. pp. 18 and 742,) which, however, differs from it widely in the form and number of the teeth, in the number of dorsal fin-rays, (21 + 8,) in having processes of imbricated scales between the rays of the dorsal and anal fins, and above all, in form, being "very much elongated." With the *C. exoletus*, which has a wide range over the European seas, it accords more nearly than with any other species I have seen described. The number of spinous rays in the anal fin is the same, but the *C. exoletus*, as described in detail by Risso, (Hist. Nat. l'Eur. Merid. T. iii. p. 329, ed. 1826,) differs from it in the number of rays in the dorsal fin, (20 + 9,) and in having scales on its base, in the teeth, (which are pointed,) and in having a large black spot on the caudal fin. Linnæus in his description of this fish, (*Labrus exoletus*, Syst. Nat. T. i. p. 479, ed. 13,) gives about the same number of rays in the fins as the Irish specimens possess; but the brevity of his description*

* "Pina dorsali ramentacea, corpore lincis cæruleis, pinna ani spinis 5. D. $\frac{19}{2}$. P. 13. V. $\frac{1}{6}$. A. $\frac{5}{4}$. C. 13."

precludes farther comparison, and at the same time it leaves us in doubt whether his *Labrus exoletus* and the *Crenilabrus microstoma* may not be identical.

CRENILABRUS MULTIDENTATUS, Nob. Ball's Wrasse. Pl. XIII.

Three specimens of a *Crenilabrus*, taken at Youghal in the summer of 1835, have been kindly sent me for examination by R. Ball, Esq. As in the instance of the last species, I cannot, by careful research, find any fish described with which they accord, I with some hesitation bring them forward as new, under the name of *C. multidentatus*.

Their chief characteristics are—Form elongated ; mouth large and powerfully armed with pointed teeth ; pre-opercle obscurely denticulated ; scales of moderate size ; ventral scale one-fourth the length of ventral fin ; a blackish spot behind the eye, one at the base of the last ray of the dorsal fin, and a third at the lowermost portion of the tail.

D. 19+10. A. 3+8 P. 14. V. 1+5. C. 13, well developed = Branch. mem. 5.

The specimen from which the following description is drawn up is in length $2\frac{1}{2}$ inches ; depth $\frac{1}{4}$ of the entire length, and less than the length of head ; head to entire length is 1 to $2\frac{3}{4}$; upper jaw the longer ; lips prominent and double ; mouth large ; teeth numerous and large, two rows in the upper, one in the lower jaw ; number in lower twenty-six. The five hinder ones in each side equal, thence forward to the centre eight unequal, of which the two in front are considerably the largest, and curve inwards ; in the outer row of upper jaw twenty, the four hinder on each side of equal size, next six increasing somewhat gradually to the centre ; no serration visible with the highest power of a lens on any tooth ; the larger teeth in both jaws sharp and curving inwards. This number and arrangement of teeth relatively to size, the same in two out of three specimens. Eyes of moderate size, distance between them equal to their diameter ; a row of pores appears above each eye, extends back to the pre-opercle, and thence through its entire length a short way in from the margin ; pre-opercle ascending obliquely, obscurely denticulated, especially towards the base ; covered with small scales ; opercle covered with large scales ; scales of the body of moderate size, somewhat rounded at their free margins, strongly marked with concentric striæ ; lateral line takes the form of dorsal profile, and extends between one-third and one-fourth of the entire depth below it ; ventral central. Dorsal fin commences at one-third of the entire length, and ends considerably nearer the tail than the anal

fin, its soft portion one-third higher than the spinous ; a membranous filament from near the point of each spinous ray. Anal fin begins nearly in a line with the seventeenth spinous ray of dorsal fin, its distance from the caudal fin equal to its entire length. Pectoral fin rounded, more than half the length of head, originates a very little in advance of dorsal fin, and about one-fourth of its length in advance of ventral fin, placed low, its distance from the latter equal to its own base. Ventral scale about one-fourth the length of ventral fin. Caudal fin rounded. The central rays rather disproportionately long, one-third of its base thickly covered with scales, of which there are none in the dorsal and anal fins.

Colour of the specimen in spirits, very pale greenish brown over the back, olive green on the sides, becoming paler beneath ; sides with darker longitudinal bands throughout ; from dorsal to ventral profile above the lateral line, they take its form, below it they are straight. Three blackish spots, one on the pre-opercle behind, and rather below the centre of the eye, a second on the body at the base of the caudal fin, and at its lowermost portion, and the third at the base of the last ray of the dorsal fin.

It is perhaps worthy of particular mention, that the specimens under consideration have been critically compared with Risso's descriptions (ed. 1826) of all the numerous species of *Crenilabri*, and also with the *Labri*, in consequence of the pre-opercle being but obscurely denticulated, inhabiting the Mediterranean, as well as with all those described under the genera *Lutjanus* and *Labrus*, in the general works of Bloch and Schneider.

Explanation of Plates.

Pl. XIII. *Crenilabrus multidentatus*, natural size.

XIV. C ——— microstoma. a. scale nat. size.



REVIEWS AND CRITICAL ANALYSIS.

Dr Lardner's Cabinet Cyclopædia. Natural History. Natural History and Classification of Birds. By W. SWAINSON, Esq. A. C. G., F. R. S. L., &c. Vol. II. London, Longman and Co. 1837.

SINCE the publication of the seventh Number of the Magazine of Zoology and Botany, in which our review of this interesting department of the Cabinet Cyclopædia embraced the whole of the volumes then published, another has appeared, being the second of the ornithological series, and which, as bringing to a conclusion the author's observations and views on the natural history and arrangement of birds, is too important not to demand our early notice and attention. Of this volume we can venture to speak in terms of approval similar to those we have bestowed upon the previous labours of the distinguished author. It is a companion worthy to stand by its predecessors, exhibiting, wherever Mr Swainson has allowed himself to go into detail, the same luminous and philosophic views in regard to natural arrangement, and that thorough acquaintance with his subject, even to the minutest analytical detail, which proclaims him to be one of the first ornithologists, we may add naturalists, of the present age. We cannot however but regret, that the limit to which he has been restricted has obliged him to compress into one volume, matter sufficient to have occupied two, for with the exception of the Insectores, the other orders are comparatively left in an unfinished state; in some of them the great or primary division alone being glanced at. We undoubtedly are aware, that, with our present limited knowledge of the constituent parts of these orders, it is impossible to determine or arrange the whole of the inferior groups in a natural series, but we feel convinced that he could (had space permitted) have added considerably to that valuable information he has conveyed. Much, therefore, it is evident, remains to be done to work out and determine the minor natural groups of the Natatorial, Grallatorial, and Rasorial orders, but the impetus has

been given, the path pointed out ; and we confidently hope to see the various circles of these orders as fully and beautifully elucidated, either by the author, or the labours of other ornithologists who work in the same vineyard, as those of the orders *Raptores* and *Insessores*.

By those who are opposed to the Macleayan theory, or who have not studied natural history in the analytical mode pursued by Mr Swainson, it may be objected, that he has made his arrangement subservient to his theoretical views ; that is, he has, to prove the correctness of that theory, introduced and forced forms into situations they actually do not, or at least which he cannot satisfactorily prove, they occupy in nature. Now this we think is not the case, and that no systematist is less guilty of such a charge. We have punctually followed him pretty extensively in that analytical detail which he pursued, and so strongly recommends, and we must confess, it is only in a very few instances we have been obliged to differ from him in our conclusions.

This volume, like the rest of the work, is well got up, and is illustrated with a profusion of wood-cuts, all of which are intimately connected with the subject matter, and tend to elucidate what it is often very difficult to make intelligible or clear by mere verbal description. The fourth or concluding part of the volume is a " synopsis of a natural arrangement of birds," in which the reader will find the whole of the acknowledged genera up to the present time, arranged under the different orders to which they belong. In this synopsis, " some slight alteration in the arrangement of the groups from what they appear in the foregoing part" will be observed ; but this, he observes, " has resulted from further analysis, and by incorporating our researches up to the latest time."

Mr Swainson, it will be recollected, concluded his last volume with observations on the *Insectorial* or perching order, its primary divisions, and the analogies of the *dentirostral* tribe. The present commences with the enumeration of the families of this prominent division, viz. the *Laniadæ*, the *Merulidæ*, the *Sylviadæ*, the *Ampelidæ*, and the *Muscicapidæ* ; the three last forming the aberrant divisions, the *Laniadæ* and *Merulidæ*, the typical and subtypical groups. The family of the *Laniadæ*, with which he begins his exposition, from the rapacious habits of its typical representatives, and strongly notched bill, he justly considers as analogous to, or representing the *Raptores*. He finds it composed of the five following minor divisions or sub-families, viz. *Tyranninæ* or tyrant shrikes ; *Ceblepyrinæ*, or caterpillar-eaters ; *Dicrurinæ*, or drongo shrikes ;

Thamnophilinæ, or bush shrikes, and *Lanianæ*, or true shrikes. The affinities of these various groups, and the natural series in which they appear to follow each other, are then traced throughout their various ramifications, with a degree of skill which we cannot but admire, and which, so far as we have followed him in his analysis, we have proved to our own conviction to be correct. In concluding his account of this family, he offers a few pertinent remarks on two forms which have generally been supposed to come within its precincts, viz. genus *Vanga*, Buff. and genus *Platylophus*, Sw. ; but which he now would place in the family of the Corvidæ, belonging to the conirostral tribe, believing that the resemblance they bear to the shrikes is merely one of analogy, and not of affinity. In this view, particularly as regards the New Holland *Vangæ*, we are inclined to concur, having remarked the affinity that subsists between them and the genus *Barita*, a group which undoubtedly belongs to the corvine family. Of *Platylophus* we speak with more diffidence, not being acquainted with its habits and economy. The analogies of the sub-families of the shrikes to the tribes of Perchers are thus stated :—

Dentirostres.....	Lanianæ
Conirostres.....	Thamnophilinæ
Scansores.....	Dicrurinaæ
Tenuirostres.....	Ceblepyrinæ
Fissirostres.....	Tyranninæ.

The family next brought under consideration is that of the *Merulidæ*, “ the most numerous as well as the most diversified of the toothed-bill tribe,” and which he also considers in its typical groups as the most perfect in its organization, possessing advantages in the structure of the bill, feet, &c. which are either denied to, or but partially enjoyed by, the rest of the Dentirostres. This family, from the modifications of the typical characters as they exist in the blackbird, fieldfare, and other true thrushes, as well as the analogies its members bear to other tribes, is again divisible into the five following sub-families, viz. *Merulinaæ* and *Myiotherinæ*, constituting the typical and sub-typical groups, *Brachypodinæ*, *Oriolinæ*, and *Crateropodinæ*, the three aberrant. This exposition of the peculiarities and relations, both of analogy and affinity of these groups, though already so fully discussed in the second volume of the Northern Zoology, contains much additional and interesting matter ; but as our limits will not permit us to follow him through all his details, we must restrict our observations to the mode in which he considers the union of the various groups of this family with each

other, as well as with the other divisions of the tribe is effected. Commencing, then, with the short-legged thrushes, or sub-family *Brachypodinae*, he considers that its union with the shrikes or *Laniadae* is through *Trichophorus*, Temm. or bristle-necked thrushes, a genus limited to the warmer latitudes of Western Africa and Oriental India, and which appears to pass almost immediately into the Drongo shrikes. In addition to the typical genus *Brachypus*, under which are several sub-genera, this sub-family also contains, *Micropus*, Sw.; *Dasycephala*, Sw. also an American form is a fourth, and is so named from the stiff bristly feathers which surround the forehead and crown; and the fifth is *Cinclus*, Bechst. to which genus our well known dipper belongs. He concludes this chapter with a variety of interesting observations on the analogies of the *Myiotherinae*, with the other portions of the *Merulidae*, illustrated by a series of tables, which we recommend the student to compare with the types of the various forms before him. Many of these analogies will, no doubt, at first sight appear to be indistinct and far-fetched; but as we have before observed, it only requires patient and minute investigation to be convinced of the general correctness of our author's views, and of that law of representation or resemblance which appears to pervade all nature, and which, though less striking and apparent, as might be expected, in groups or in individuals far removed from each other, is no less true than that which is readily admitted to exist between those which are propinquant.

The next chapter treats of the family of the *Sylviadae*, a numerous assemblage of birds, mostly distinguished by their small size and delicate structure. The groups of this extensive division, Mr Swainson observes, "are found over all the habitable regions of the globe, and are destined to perform an important part in the economy of nature. To them appears intrusted the subjugation of those innumerable minute insects which lurk within the buds, the foliage, or the flowers of plants, and thus protected, escape that destruction from swallows (we may add flycatchers) to which they are only exposed during flight." The natural and primary division of this family is into the sub-families *Sylvianae* and *Philomelinae*, the typical groups, and the *Saxicolinae*, *Motacillinae*, and *Parianae*, which form the aberrant divisions. Commencing with the *Motacillinae*, which collectively represent the tenuirostral type of the perchers, and are the most aberrant section of the family, he points to the genera *Motacilla*, Linn., and *Icteria*, Vieil.; *Trichophorus*, Temm.; and *Phyllastrephus*, Sw. The passage from the short-legged thrushes to the orioles, *Oriolinae*, he supposes to be through the

palm-thrush, genus *Dulus*, Vieil. This beautiful group is distinguished by the prevailing yellow colour of its typical species, as exemplified in *Oriolus galbula*, &c. In it we find the regent oriole, *Sericulus chrysocephalus*, Sw. and the *Oriolus paradiseus*, Temm., as well as the lovely *Irena puella* of Horsf. By the regent bird, distinguished from its congeners by the length of the tarsi, the way is prepared for a direct passage to the next sub-family, *Crateropodinæ*, a group distinguished from the other thrushes by their long and powerful legs and feet, their short wings, and, generally speaking, sombre plumage. Of this group more requires to be known before its typical forms can be precisely defined, but the near approach of some of its members to the *Brachypodinæ* tends to prove the circular disposition of the three aberrant groups. Of the true thrushes or *Merulinæ*, which exhibit the typical perfection of the whole family of the Merulidæ, he points out the genera *Merula*, Ray.; *Orpheus*, Sw.; *Petrocincla*, Vig.; and *Chatops*, Sw. as four of the prominent groups. Like other pre-eminently typical forms, the true thrushes (*Merula*) are found in all parts of the world, while the mocking-thrushes (*Orpheus*,) which lead to the *Crateropodinæ*, are confined to the American Continent. By the rock-thrushes (*Petrocincla*) he finds a passage through *Myophonus* and other forms to the sub-family *Myiotherinæ*. In this division, which represents the sub-typical or dentirostral type of the family, we have the beautiful genus *Pitta* distinguished by the short tails and elongated legs of its members, with a richly varied plumage, in which blue, red, and brown predominate. *Myothera*, Ill. is a third genus restricted to tropical America, and in its own circle analogous to the *Thamnophilinæ* and *Budytes*, Cuv. answering to our wagtails as typical forms, nearly allied to which are the members of the party-coloured genus *Enicurus*, Temm. an Indian group, succeeded by *Anthus*, Bechst., which, placed as it were at the extremity of the *Dentirostres*, leads immediately to the family *Alaudinæ* in the circle of the *Conirostres*. A fourth form, intermediate, as he thinks, between *Anthus* and *Motacilla*, is his *Lessonia erythronotos*, a Chilian bird, but of whose affinities we have not ourselves had an opportunity of judging. He enters the next sub-family *Parianæ* by the *Sciurus auricapillus* (golden crowned thrush of the earlier writers,) considered as a subgenus of *Accentor*, Bechst. the members of which, he remarks, "stand at the confines of that group which contains the most scansorial warblers of the family," and which station must be conceded to *Parus*, and its nearly allied congeners. The other groups which complete the

circle of the *Parianæ*, are the genera *Parus*, Linn., *Sylvicola*, Sw., *Setophaga*, Sw., and *Trichas*, Sw. Upon each of them he digresses at considerable length, proving, we think satisfactorily, the correctness of his views by a minute analysis of their contents, and showing that their analogies or the law of representation exists in as great perfection in the sub-generic or lowest groups, as they do in those of a higher value. From the *Parianæ* he passes to the *Sylvianæ* by the intervention of the gnat snappers or genus *Culicivora*, Sw. an American group, with a bill intermediate between *Setophaga* and *Sylvia*, to which latter genus the pre-eminently typical groups of the whole family *Sylviadæ*, it directly leads. Besides *Sylvia*, Lath. under which he ranks *Regulus*, *Sylvia*, *Acanthiza*, and *Cyanotus*, as subgenera, he includes in it *Malurus*, Vieil. the subgenera of which are also given in the Synopsis, *Orthotomus*, Horsf: and perhaps *Praticola*, Sw. a remarkable Australian form, but whose economy and habits require to be better known before its real station can be precisely established.

The *Philomelinæ*, typified by the nightingale and its immediate congeners, form the fourth subfamily. In addition to the genus *Philomela*, it contains *Curruca*, Bechst. under which he has also included the genus *Salicaria*, Selb. represented by the hedge and reed warblers, which we think upon investigation will be found entitled to rank as a generic group, and not as a subgenus of *Curruca*, the last being more likely to prove a subgeneric form only of *Philomela*. The other members are classed under the generic heads of *Phenicura*, Sw. *Bradyptetus*, Sw. and *Agrobates*, Sw. the last typified by the *Sylvia galactotes* of Temminck. From *Phenicura* the passage to the robins, *Erythaca*, Sw. which introduces us to the fifth subfamily or *Saxicolinæ*, is easy. In this last division, we also find the genera *Saxicola*, Bechst. *Petroica*, Sw. *Thamnobia*, Sw. and *Gryllivora* Sw. the types of which will be found in the synopsis under their respective generic heads. The union of all the subfamilies of the *Sylviadæ* is there stated as being effected by the genus *Gryllivora*, just mentioned, uniting with that of *Enicurus*, which, as will be remembered, stands on the confines of the *Motacillinæ*, with which he commenced his analysis of the family.

The *Ampelidæ* or chatterers, forming the fourth great division or family of the *Dentirostral* tribe, is next brought under review. He remarks, "it is a family more remarkable for beauty and singularity, than for its extent; hence much difficulty has arisen in making out the subordinate divisions and successions of its groups." He has, however, pointed out what he conceives to be the types of the

subfamilies of which it is composed, suggesting, at the same time, that the accuracy of two of these, viz. *Leiotrichanæ* and *Pachycephalinæ*, remain to be further tested, by extended observation and analysis. Tropical America is the habitat of the typical species, the *Bombycilla garrula*, or waxwing, being the only European representative of the family. They are, he remarks, distinguished from all others of the *Dentirostres*, by the enormous width of their gape, which in many extends beyond the eye, and in some is nearly as wide as that of a goatsucker. The particular use of this structure is at once explained by the nature of their food. They live almost entirely on soft berries and small fruits, which, from being swallowed whole, naturally require a very wide passage to pass down the throat." The subfamilies are designated as follows, *Leiotrichanæ*, *Pachycephalinæ*, which he afterwards changes in the Synopsis to *Vireoninæ*, *Bombycillinæ*, *Ampelinæ*, and *Piprinæ*, the three first forming the aberrant, the two last the typical divisions. Under *Leiotrichanæ*, he places *Leiothrix*, Sw. and *Pteruthius*, Sw. each represented by a single species, natives of India,* and whose direct affinities appear to have been mistaken or overlooked by their first describers, the one having been included in the genus *Parus*, the other described as a species of *Lanius*. A minute examination of these birds is, however, sufficient to show that their appropriate station is within the limits of the present family. In *Vireoninæ*, he places the genera *Vireo*, Vieil. *Pachycephala*, Sw. and another which he now calls *Ptilochlorus*. In *Bombycillinæ*, the last of the aberrant division, and representing the *Fissirostres*, he places *Bombycilla*, Briss., *Phibalura*, Vieil., and *Procnias*, Hoff. The subfamily *Ampelinæ*, containing the true or typical chatterers, are united to the *Bombycillinæ* by means of the genus *Calyptomena*, Raff. *Chrysopteryx*, Sw. follows, and is succeeded by *Casmorhynchus*, Temm. and *Ampelis*, Linn. the first distinguished by the curious appendages with which the heads and throats of some species are furnished, the second, for the surpassing beauty and richness of the plumage of its members. The fifth form or genus of the subfamily is represented by *Rupicola*, Briss. rock manakin, which leads directly to *G. Phœnicircus*, Sw. (the *Ampelis carnifex* of Linn.) by which he enters the *Piprinæ* or subtypical group of the family, generally known by the name of manakins, from the diminutive size of most of the species. Under this division he includes *Pipra*, Linn. *Calyptura*, Sw. and *Pardalotus*, Vieil.

* The valuable collections of birds sent from Nipaul by Mr Hodgson contain a second species of *Leiothrix*.—ED.

The family of the Muscipidæ, which closes the circle of the *Dentirostres*, is next brought under review, and after a few appropriate observations upon the distinctive characters of its typical members and their peculiar habits, he proceeds to trace its primary divisions, referring the reader to a separate work upon the subject, entitled "the Natural History and Arrangement of the *Muscipidæ*, or Fly-catchers, in which"* "the contents of the whole family, together with the singular and beautiful analogies presented by the minor groups, even in their most minute details, are fully illustrated." These primary divisions or subfamilies are represented by the five following types, *Eurylaimus*, Horsf. *Muscicapa*, Linn., *Fluvicola*, Sw., *Psaris*, Cuv., and *Querula*, Vieil., under each of which he mentions the various genera and subgenera of which they are composed. The genera composing the *Eurylaminæ*, are stated to be *Eurylaimus*, *Cymbirynchus*, Vig., *Platystomus*, Sw., *Psarisomus*, Sw., and *Serilophus*, Sw.; but we think that further investigation is required to determine the exact value of each of these, and whether they are all really entitled to stand as subgenera, or even to attain that rank. By *Serilophus*, the crested or rasorial type, and its apparent analogy to *Bombycilla*, he finds a link of connection with the Ampelidæ. The numerous subfamily *Muscipidæ*, embracing the ordinary fly-catchers, contains the genera, *Todus*, Linn., *Muscicapa*, Linn., *Megalophus*, Sw., *Monacha*, Horsf. and Vig., and *Rhipidura*, Horsf. and Vig. Upon the two first of these the typical groups, and which are divisible into assemblages of lower value, he enters at considerable length, detailing the characters of the subgenera, and exemplifying the circles of the two genera, and their analogies by a table and diagram.

Under the *Fluvicolinæ* or water-chats, he enumerates, as types of generic groups, *Seisura*, Horsf. and Vig., *Fluvicola*, Sw., *Perspicilla* Sw., *Alecturus*, Vieil., and in the synopsis *Gubernetes*, Vig., which last leads to, if it does not actually enter the subfamily *Psarianæ*, of which only two generic forms, allowing *Gubernetes* to remain among the *Fluvicolinæ*, are at present recognized by *Psaris*, Cuv., and *Pachyrynchus*, Spix. The fifth subfamily or *Querulinæ*, represented by *Querula*, Vieil., and *Lathria*, Sw., closes the circle of the *Muscipidæ*; and although these birds evince a strong analogy, indeed affinity to the chatterers, we believe the present to be their true station, in which they form that prominent link which immediately connects the Ampelidæ with the Muscipidæ.

From the Dentirostral he now passes to the Conirostral tribe,

* This will form an early volume of the "Naturalist's Library." The drawings are now in the hands of the engraver.—Ed.

“ the most highly organized of all those which form the grand division or order of perchers, of which in consequence it is pre-eminently typical. The distinguishing characteristic of the tribe is the conic-shaped form of the bill, which is also less decidedly notched than in the members of the dentirostral, while the full and perfect development of the feet at once distinguishes it from the three aberrant circles of the *Fissirostres*, *Tenuirostres*, and *Scansores*.

Its primary divisions or families he considers to be the *Corvidæ* and *Sturnidæ*, forming the two typical groups; the *Buceridæ*, *Musophagidæ*, and *Fringillidæ*, the aberrant, although the mode in which these three unite to form a circle within themselves, is not yet discovered. The *Buceridæ* are described as a small, and, in a great measure, an isolated family, as no immediate link with other groups has yet been satisfactorily made out. It is at present restricted to a single genus, which, however, contains several species. He makes it the *Fissirostral* type, in consequence of the peculiar habit its members exhibit, viz. that of throwing up their food in the air, and catching it before it is swallowed,—an analogy in accordance with the habits of the *Pelicanidæ*, also a *fissirostral* type in its own order. The *Corvidæ*, or crows, which he deems the nearest allied to the last, though several intervening forms are wanting to complete the connection, is not only the family typically representing the great order *Insessores*, but in the genus *Corvus* of its subfamily *Corvinæ*, or true crows, “ exhibits the greatest perfection, and the most varied powers with which nature has invested this class of animals.” The natural series of its subordinate divisions is indicated by arranging the genera under the subfamilies *Frigillinæ*, *Corvinæ*, *Garrulinæ*, *Crypsinæ*, and *Coracinæ*, the disposition of which, under their appropriate genera and subgenera, will be found on a reference to the synopsis at the end of the volume. We observe that he very properly excludes from this family the genera *Epimachus*, *Coracias*, and *Gracula*, which by other authors were considered to belong to it; for ourselves, we had long since placed the *Rollers* among the *Fissirostres*, in near connection with *Eurystomus* and other birds belonging to the family *Meropidæ*. The *Sturnidæ*, or starling group, he further divides into the minor divisions of *Sturninæ*, *Lamprotorninæ*, *Scaphidurinæ*, *Icterninæ*, and *Agelainæ*. The *Scaphidurinæ*, so named from the structure of the tail, which is boat-shaped or concave on its upper surface, contains those large glossy crow-looking birds disposed under the genera *Scaphidura*, Sw., *Quiscalus*, Vieil., and *Scolecophagus*, Sw., all natives of America. He also places in it that splendid bird the *Astrapia gularis* of Vieil-

lot, which some writers, from the richness of its plumage, had associated with the birds of Paradise, but its affinities clearly show its station to be in that family whether it remains in the present group, or is removed to that of the Lamprotorninæ, the subfamily which immediately follows, and the members of which, as contained in the genera *Lamprotornis* and *Ptilonorynchus*, are remarkable for the metallic lustre of their plumage. The *Sturninæ*, or true starlings, succeed the Grackles or Lamprotorninæ; under this denomination, he includes the genera *Sturnus*, Linn.; *Pator*, Temm.; *Graculas*, Auct.; *Acridotheres*, Vieil.; and *Oxystomus*, Sw. The passage from this to the *Agelainæ*, or maize-birds, is effected by the *Sturnella vulgaris*, a well-known species. And under this subfamily are also included the genera *Agelaius*, Vieil.; *Leistes*, Vig.; *Dolychonyx*, Sw.; and *Molothrus*, Sw.; to which genus that remarkable bird the Cowpen bunting belongs. The last subfamily, or *Icterinæ*, are distinguished from the preceding by their arboreal habits and shorter legs. It contains the genera *Cassicus*, Daud.; *Zanthornis*, Cuv.; *Icterus*, Cuv.; and *Chrysomus*, Sw.; all of which, as well as the genera of *Agelainæ*, are natives of the American Continent. To enter the family of the Fringillidæ we are prepared by the small conic-billed species of the *Agelainæ*, some of which, as our author observes, "so closely resemble finches, that only an experienced naturalist can point out the distinction. The primary divisions, or subfamilies, are considered to be the *Coccothraustinæ*, *Tanagrinæ*, *Fringillinæ*, *Alaudinæ*, and *Pyrrhulinæ*, the two first the typical, the remaining three the aberrant groups. Under the *Coccothraustinæ*, of which our hawfinch is an example, he arranges "*Coccothraustes*, Briss. *Ploceus*, Cuv: *Tiavis*, Sw., *Carduelis*, Briss., and *Linaria*, Briss. In treating of the Tanagers, "the most diversified and numerous of all the groups in this comprehensive family," he states the difficulties which at present exist in making an arrangement, strictly according with their natural affinities. He thinks, however, that the following are likely to represent the genera or minor groups of which it is composed, viz. *Tardivola*, Sw., *Tanagra*, Linn., *Phænisoma*, Sw., *Nemosia*, Vieil., and *Aglaiia*, Sw. Of the sub-family Fringillinæ he considers *Fringilla*, Linn, and *Emberiza*, Linn., to be the typical groups, the aberrant being represented by *Pyrgita* or *Passer*, Auct. *Plectrophanes*, Meyer, and *Agrophilus*, Sw. Though he adds that "some uncertainty hangs over the latter, as to its real value," and whether it may not ultimately prove to be only a sub-generic type.

For the next sub-family, *Alaudinæ*, we are prepared by the genus

Plectrophanes, which resembles *Emberiza* in the shape of the bill, and the larks in the structure of the feet. It contains the following genera, *Alauda*, Linn. *Calendula*, Linn. *Agrodroma*, Sw., *Macronya*, Sw., and *Certhilauda*, Sw. We must observe, that the characters of *Agrodroma*, which he considers the insessorial or pre-eminent type, approach so near to those of others, that its type, *Anthus rufescens*, and the other two species, have hitherto always been arranged with the Pipits. He enters the *Pyrrhulinae* by means of the genus *Pyrrhulauda*, Sw., a small group, belonging to tropical India and Africa, which indicates an affinity to both sub-families, in the form of its bill and feet; under this division he also places the genera *Pyrrhula*, Auct. *Psittirostra*, Temm. *Hæmorhous*, Sw., and *Loxia*, Linn. It also seems probable, that the bird figured by Mr Gould under the title of *Paradoxornis* will enter among the bullfinches, whose circle requires to be further analyzed.

The fifth and last family of the Conirostres, is that of *Musophagidee*, or plantain-eaters, so named from the genus *Musophaga*, which contains the largest birds of the division, though, as he adds, "it is by no means clear that it is the real type of the whole family." That this is the proper station of the birds he has here assembled, we are strongly of opinion, though their connections at present with the other Conirostral families is not so prominent or well marked as might be wished for or expected. Three sub-families only appear to be recognized, under the titles of *Phytominæ*, *Colinæ*, and *Musophaginæ*. They are remarkable for the varied form and structure of their feet; in some, as the Colies, the whole of the toes, four in number, are brought forward,—a provision in beautiful accordance with the habit they have of suspending themselves from the branches of trees, head downwards. In the Touracous, *Corythaix*, the outer toe is partially reversible, or capable of an outward direction, in *Hyreus* the toes are only three, while in *Phytotoma* they are four and arranged like those of the finches. He then traces an analogy between the *Corythaix gigantea*, and the *Buceros galeatus*, through which he conceives the union of the two families is effected.

(To be continued.)

PERIODICALS—*British.*

Loudon's Magazine of Natural History, New Series. September and October 1837. (Continued from page 360.)

I.—*Zoology.*

Observations on the opposable Power of the Thumb in certain Mammals, considered as a zoological character; and on the natural affinities which subsist between the Bimana, Quadrumana, and Pedimana, by W. OGILBY, Esq. p. 449 and 517.—Description of the membranes of the Uterine Fœtus of the Kangaroo, by R. OWEN, Esq., p. 481.—WATERHOUSE on the Palm Squirrel, p. 496.—WEISSENBORN on the Habits and Economy of the common Fox, p. 507.—Some remarks on the Plumage of Birds, by EDW. BLYTH, Esq., p. 477.—Notes on the Pern or Honey Buzzard, by the same, p. 536.—G. R. GRAY on a new Subgenus, and some remarks on birds belonging to the family Laniadæ, p. 487.—GOULD on some species of the genus *Motacilla* of Linnæus, p. 459.—Characters of a new Form in the Fringillidæ, with a description of the only species yet referable to it, by ANDREW SMITH, M. D. p. 535.—Letter from Dr CLARKE of Ipswich to WILLIAM YARRELL, Esq. noticing the recent occurrence of the Fry of a species of *Hemiramphus* on the coast of Suffolk; with some additional observations by Mr YARRELL, p. 505.—Description of a new British Wasp, with an account of its Development from the Larva to the Imago, by W. E. SHUCKARD, Esq. p. 490.—Illustrated Zoological Notices, by EDW. CHARLESWORTH, viz. on the Argonaut, p. 526; on the head of a Crocodile, (? *Stenæosaurus*) lately discovered at Whitby, p. 532; and on a Form of cephalopodous Shells connecting the genera *Nautilus* and *Ammonites*, p. 533.—STUTCHBURY'S Additional Remarks on the genus *Cypræcassis*, p. 470.—J. E. GRAY on a new genus of Land Shells, p. 484.—Miscellaneous Zoological Notices, by J. B. HARVEY, p. 473.

There is no botanical communication in either number, but the usual supply of short notices. We have to thank the editor for the favourable notice he has been pleased to take of our labours; the Magazine of Zoology and Botany was neither begun in rivalry, nor from a wish to injure in any way the Magazine of Natural History, for the plan and object of the two works were at first essentially different, and there is still a specific distinction, which a careful reader will be at no loss to perceive.

PERIODICALS.—*Foreign.*

Annales des Sciences Naturelles. Zoologie, MM. AUDOUIN et MILNE-EDWARDS. *Botanique*, MM. AD. BRONGNIART et GUILLEMIN. Crochard and Co. Paris. Fevrier et Mars 1837. (Continued from p. 361.)

1.—*Zoology.*

Fevrier.—*Etude microscopique de la Cristatella mucedo*, Cuv. par M. TURPIN.—*Recherches sur les Polypes d'eau douce des genres Plumatella, Cristatella et Paludicella*, par M. P. GERVAIS. Of these interesting papers we shall, on a future occasion, give a very full analysis.—*Recherches expérimentales physico-physiologiques sur la température des tissus et des liquides sur animaux*, par MM. BECQUEREL et BRESCHET.—*Expériences sur le mécanisme du mouvement ou battement des artères*, par M. FLOURENS.—*Description du double système nerveux dans le Limneus glutinosus*, par A. J. VANBENEDEN.—*Note sur les ossemens fossiles des terrains tertiaires de Simorre, de Sanson, etc., dans le département du Gers, et sur la découverte récente d'une mâchoire de Singe fossile*, par M. LARTET.—*Description d'une troisième espèce vivante de la famille des Crinoïdes, servant de type au nouveau genre Holopus*, par M. D'ORBIGNY.—*Tabulæ synopticæ Scincoideorum*, par M. COCTEAU.—*Description d'une nouvelle espèce du genre Dreisseina*, par M. J. VANBENEDEN.

Mars.—*Analyse ou étude microscopique des différens corps organisés et autres corps de nature diverse, qui peuvent accidentellement se trouver enveloppés dans la pâte translucide des Silex*, par M. TURPIN. Very interesting.—*Recherches anatomiques sur le corps muqueux ou appareil pigmental de la peau, dans l'Indien Charrua, le Nègre et the mulâtre*, par M. FLOURENS.—*Note sur le Rhynchoanète, nouveau genre de Crustacés décapodes*, par M. H. MILNE-EDWARDS.—*Du genre Eligmodonte et de l'Eligmodonte de Buénos-Ayres, Eligmodontia typus*, par M. FRED. CUVIER.—*Rapport sur une note de M. RANG concernant le poulpe de l'Argonaute*, par M. de BLAINVILLE.—*Expériences sur la pression à laquelle l'air contenu dans la trachée-artère se trouve soumis pendant l'acte de la phonation*, par M. CAGNIARD-LATOUR.—*Rapport sur un mémoire intitulé: De la marche de l'ossification du sternum des oiseaux, pour faire suite aux travaux de MM. Cuvier et Geoffroy Saint-Hilaire*, par M. L'HERMINIER.

II.—Botany.

Fevrier.—The greater portion of the Number is occupied with a continuation of BRAVAIS' essay, *sur la disposition des fenilles curvisériées*. There are other two original articles—*Histoire de l'Indigo, depuis l'origine des temps historiques jusqu'à l'année 1833*, par M. AUG. de SAINT-HILAIRE.—*Précis des observations sur la famille des Hypoxylos*, par M. de A. LIBERT. The Number contains besides a short notice of ESENBECK'S well-known Genera Plantarum; and of a large systematic work on the Grasses by KUNTH. An error in the memoir of Jussieu is corrected. It is there stated, that in 1789, among other families, Jussieu established the *Paronychiæ*, but AUG. de SAINT-HILAIRE shews that he was really the author of this, as the former had himself acknowledged.

Mars.—The only original paper is a *Mémoire sur l'accroissement en grosseur des Exogènes*, par M. GIROU de BUZAREINGUES. The other contents are extracts from *Communications sur Java faites à MM. Wirtgen et Nees d'Esenbeck* par M. JUNGHUERE.—*Matériaux pour servir à l'étude des Algues*, par J. N. de SUHR.—*Énumération des plantes découvertes par les voyageurs dans les îles de la Société, principalement dans celle de Taïti*, par J. B. A. GUILLEMIN.

The American Journal of Science and Arts. Conducted by BENJAMIN SILLIMAN, M. D. Vol. xxxii. No. 2, July 1837. (Continued from page 282.)

On the Economical uses of some Species of Testacea, continued, p. 235.—The species treated of are *Murex*.—The shell purple of the ancients, *M. Tritonis*, Linn.—*Murex*,—affording the dye used by painters.—*Ostrea edulis*,—the history of this shell-fish is imperfect, the writer also considers the European oyster “smaller and thinner, and more rounded than the American, while the lower valve is less concave or vaulted. It is not beaked, and the fish, compared with the size of the shell, is smaller, and it possesses a different flavour, while their habits are so dissimilar, that there can be no doubt of their being distinct species.”—*Ostrea scabra*.—*Mya pictorum*.—*Turbo littoreus*, Linn.—*Pecten maximus*.—*P. opercularis*.—*P. concentricum*.—*Voluta gravis*.—*Cypræa moneta*.—*Chiton fasciatus*, cooked for the table in the island of Barbadoes.—*Murex despectus*.—*Solen siliqua*.—*Mytilus edulis*, differs from the British species, “in being flatter, not so much ridged, more angular, more extended at the lower end, more polished on the outside, and it seldom grows so large or thick, but it is probably only

a variety."—*Cardium edule*.—*Helix pomatia*.—*Unio*.—*Chama gigas*.—Some additional notes are given of the particular ornamental uses, &c. to which shells are put in various countries. At Mobile the roads are mended with them, (the species so used is not mentioned,) and they are found to answer well. Upon the whole, we have in this paper a useful outline of the economical uses of the Testacea.

Art. VIII. p. 292, is a favourable review of Dr Lindley's Natural System of Botany, 2d edit. It is introduced as an original article.—*Description of several new Trilobites*, by JACOB GREEN, M. D. p. 343.—*Description of the Skull of the Guadaloupe Fossil Human Skeleton*, by JAMES MOULTRIE, M. D. Professor of Physiology in the Medical College of the State of South Carolina. The remains alluded to are said to be portions of the Guadaloupe skeleton in the British Museum, and were procured on the spot by Mon. l'Herminière, and placed in the Literary and Philosophical Society of South Carolina. They consist of five fragments of the skull; and the investigation was made for the purpose of ascertaining, so far as possible, whether these relics belonged, as had been supposed, to an individual of the Carib race. Dr Moultrie considers that they certainly do not, but bear all the marks of the American variety; "In so much, that if it were possible to exfoliate, if I may so say, the fossil relics from their incrustation, the vacancies might be filled with the corresponding parts taken from the head of the Peruvian."—*The Miscellanies* contain the annual report of the Curators of the Boston Society of Natural History, which appears to be increasing rapidly.—Notice of the Discovery of the remains of the *Elephas primogenius* in 1833 on the Ironduquot creek in the town of Perintow, ten miles east of Rochester, N. Y., and at about the same distance from Lake Ontario.

Magazin de Zoologie, Journal destiné à faciliter aux Zoologistes de tous les pays, les Moyens de publier leur Travaux, et les especes nouvelles ou peu connues qu'ils possèdent. Par F. E. GUERIN-MENEVILLE. 8vo. Paris. Septieme année, Livs. 1, 2. (Continued from p. 364.)

Livraison 1, 7me année.

1. *Recherches Anatomique et Zoologiques sur les Mammiferes Marsupiaux*, par M. LAURENT, Professeur d'Anatomie. Part of an interesting memoir, proposing to treat, "1. De l'appareil mammaire des Marsupiaux et de la bouche de leur petits.—2. De l'os Marsupial.—3. Du périnée des Marsupiaux.—4. De leurs parties sexuelles ou génitales.—The first part is not completed.—2. *Me-*

moire sur les *Pachydermes Fossiles connus jusqu'à ce jour, et description du nouveau genre Dinotherium de M. Kaup.* par EMILE JACQUEMIN.—3. De LAFRESNAYE, *description of Mesange a Huppe Jaune, Parus flavo-cristatus.* This bird will not rank among the true *pari*. It has been long known in the British collections, but we believe is till now unfigured. A second new and closely allied species has been lately brought from the Alpine districts of India.—4. *Synopsis Avium ab Alcide D'Orbigny, in ejus per Americam meridionalem itinere, collectorum, et ab ipso viatore necnon a de Lafresnaye in ordine redactarum.* Specific descriptions in Latin are given with the species considered new.—5. *Description de deux especes d'Anodontes Fossiles, precedé de quelques details sur le terrain dans lequel elles se trouvent.* Par M. CHARLES D'ORBIGNY, with a plate.—6. *Note monographique sur le genre Limnadia, et description d'une espece nouvelle de ce genre,* par M. F. E. GUERIN, with figures of *Limnadia Mauritanica*, and *Hermannii*.—7. *Fulgora Castressii*, a new species described by Guerin, and beautifully figured. It is a native of Mexico.—8. *Calognathus Chevrolatii*, considered as a new species, and now described and figured as such by Guerin.

Livraison 2me. 7 année.

1. Continuation of “*M. Laurent, recherches anatomique et Zoologiques sur les Mammiferes Marsupiaux.*”——2. Continuation of “*Synopsis avium ab ALCIDE D'ORBIGNY.*”——3. *Notice sur la famille des Engoulevents, (Caprimulgidæ) et les differents genres dont elle se compare,* par M. de LAFRESNAYE. A useful paper regarding this little investigated group, accompanied with a figure of *Egotheles*, and the characters of M. Lafresnaye's principal sections. Two great divisions or sections are here proposed; 1st, *Les Engoulevents humicoles, Caprimulgidæ humicolæ*, restricted to the true Goatsuckers, having *C. Europeus* as Typical. 2d, *Les Engoulevents prehenseurs, Caprimulgidæ prehensoriæ*. Several species are described.—4. *Notice sur deux especes Africaines de Genre amphibène (amphibæna, Linn.)* par M. P. GERVAIS, with a figure.—5. J. PETIT de la SAUSSAYE, *description of “ Helice nemoraline, H. nemoralina, Petit.* A new species from the Island of St Thomas, found at an elevation of 1400—figured.—6. *Description de quelques especes nouvelles de coquilles fossiles de la Champagne,* par M. MICHAUD.—7. WESTWOOD on *Steira costata*, and *Luperus nasutus*.——8. *Memoire sur une seconde especes vivante de la famille des Crenoides ou Encrines, servant de type au nouveau genre Holope (Holopus)* par

M. ALCIDE D'ORBIGNY. The species was discovered at Martinique by M. Rang, and is named by its present describer *H. Rangii*.

Müller's Archiv für Anatomie Physiologie, &c. 1837. Parts 1 and 2.
(Contained from Vol. i. p. 587.)

This number contains a Description of *Euchytræus*, a new genus of Annelida, discovered by Dr Henle of Berlin. These animals are found in situations similar to the common earthworm, generally rolled together in pellets of damp soil, amongst which they are not easily seen until they have been detached by dissolving it in water. They are found in the greatest numbers in the inside of flower-pots, on account of which the generic name *Euchytræus* (from *χυτρος*, a vase,) has been bestowed upon them. They will live about fourteen days immersed in water. In length they vary from two to six lines. The head is pointed and conical and the tail truncated. The body is formed of a series of rings, each being barrel-shaped, or swelling out in the centre. The fifth or sixth nearest the head is proportionally longer than the rest. The number of rings varies greatly in individuals of different length. In twelve specimens, they ranged between nineteen and sixty-one. They are covered externally by an epidermis, beneath which is a muscular skin formed of longitudinal and transverse filaments. The organs of generation are always situate between the eleventh and twelfth rings, from which it is inferred that the growth of the animal takes place either by the addition of new rings, or by the subdivision of those already existing beyond the twelfth. Only one species belonging to this genus has hitherto been discovered, and from its colour the name *Euchytræus albidus* has been chosen for it. Like the common earthworm it moves by means of minute bristles, four groups of which are attached to each ring, viz. two on the belly, and one on each side. The average number of bristles on each side is three; in the earthworm the average is two, and several other points of difference occur between them. In *Euchytræus* they are straight and pointed, and they sometimes seem to be attached to each other by a membrane resembling the web of a swimming bird. They take their rise in the inner muscular skin before-mentioned. In the systematic arrangement of the Annelidæ, *Euchytræus* occupies a place next to *Lumbricus*, from the similarity of its form, its organs of locomotion, and its internal structure. *Lumbricus rivalis*, described by Fabricius in the *Fauna Grœnl.* p. 278, seems to approach the nearest to it, but his description is somewhat vague.—*Remarks upon the*

Hybernation of Animals. By Dr A. A. BERTHOLD. Although many reasons have been assigned to account for the sleep of several of the Mammalia during winter, Otto seems to be the first who has attributed it to a peculiar organization of the vessels of the brain, and not merely to a decrease in the temperature of the air. [The result of his latest researches tends to show, that the *carotis cerebialis* in such animals is carried through the aperture of the stapes or stirrup bone.]

Dr Berthold has kept for some time specimens of *Myoxus avellanarius*, some of which were captured when full grown, and others quite young in the nest. His observations upon them tend to confirm those of Pallas, Spallanzani, &c., and in some instances to correct the statements of other writers on the subject. The animals fell asleep whether they were kept in the open air or in a warm room. Saissy states, that *Myoxus glis* did not fall asleep until the temperature was below 44° Fahr. Dr Berthold's specimens of *M. avellanarius* were kept during the winter in a room, the temperature of which was never below 50°, usually from 59° to 63°, and sometimes as high as 68°, and they slept without intermission. Their sleep is more profound in a low than in a high degree of temperature, so that in the former case they may be shaken about for a long time without producing any effect, but in the latter, the shaking causes them to roll themselves up still more firmly, by pressing the head upon the breast, but even then they do not awake. Those kept in a warm room remained longer awake than others in a cold one. In October the latter began to sleep continuously, some, however, awoke every day for some time longer and took some food. Towards the middle of December their sleep became deeper and deeper, and from that time till the middle of March they only awoke two or three times at most. The sleep of those which were kept in a room of ordinary warmth was modified by sudden changes of weather, until it reached the most profound state. When snow or frost was coming on they slept more soundly; as the weather became milder they were more active, and often awoke for several hours, when they took some food, which they digested completely and then relapsed into sleep. Whenever they awoke under any of these circumstances, their character as nocturnal animals remained constant, as it always happened in the evening or during the night. When old ones, and their young which had not passed a winter, were kept together, the former fell asleep first, as the latter, not yet having attained their full growth, required more food, and their sleep was retarded by the calls of hunger. The temperature of the animals during their sleep

is regulated very much by that of the surrounding air. For instance, when a thermometer placed in the saw-dust which formed their nest indicated 36°, the heat of their bodies was 37°. At other times, the heat of the saw-dust and the animals was respectively,

38°	. .	50°		54°	. .	53°
60	. .	58		63	. .	63
56	. .	54		58	. .	61

Thus it appears that the temperature of the animals is sometimes higher, and at other times lower, than that of the surrounding medium. In order, however, to prove this more clearly, the nest was placed in the open air at night, when the thermometer stood at 23°, and the respective temperature of the animals and the nest was taken down every half hour. The result showed that the body is more slowly susceptible of change than the saw-dust; but that when the heat of the day is greatest, that of the animal soon surpasses it, and is longer in cooling down again. The heat of different individuals, however, is subject to variation. They are also so constituted, that they remain some degrees above 32° when the external air sinks below that point. In times of extreme cold, unless they are surrounded by a nest of warm materials, death ensues, and the slowness with which their heat is lowered to that of the air is no doubt a provision of nature to provide for their safety in such cases.

The author's view of the question is, that hybernation does not proceed from too great a degree of cold, nor from want of nutriment, (since animals fall asleep though kept in a warm place and supplied with abundance of proper food,) nor yet from the want of power to retain a due supply of heat whilst the temperature of the air is becoming lower; but he regards it as a part of the great system of nature, which exhibits a deficiency of vital energy in every branch of the animal and vegetable world at stated periods. This condition shows itself in some animals when instinct leads them to provide receptacles against the approach of winter, either singly or in societies, then in a state of inactivity, and a desire to sleep, and lastly, in a complete suspension of the action of the nerves, the circulation, the digestive organs, &c. or, in other words, which he calls the condition of "vita minima." This condition is represented amongst the Mammalia which do not hybernate by the shedding of fur, &c.; amongst birds by moulting, and by migrations; by concealment and torpidity amongst the Amphibia and the Invertebrata; and in the vegetable kingdom by the ripening of seeds, the falling of leaves, branches, &c. The same cause will account for the torpidity during summer of the Tanrec of Madagascar, of the crocodile,

and of various serpents in South America; in short, whilst the heat of the sun in tropical climates produces periodically a diminution of vital energy, the absence of that heat in our latitudes produces similar effects, as shown by the torpidity or "vita minima" of the animals under consideration, both being parts of a comprehensive and uniform system pervading every branch of animated nature. —Continuation of Prof. MITSCHERLICH's Observations on the effects of Oxyde of Copper on the Organization of Animals. — STANNIUS on the effects of Strychnine on the nervous system. — REICHART on the Changes which take place in the Viscera in Birds and Mammalia. — GRUBE on the Anatomy of *Sipunculus nudus*. — Professor WEBER's microscopic observations on the Motion of Lymph in the lymphatic vessels of the Larva of the Frog.

Linnaea,—*Ein Journal für die Botanik, &c.* Vol. xi. Parts 2 and 3.
(Continued from Vol. i. p. 588.)

BUCK on the Cape Plants of the genus *Echium*. — TRINIUS on a new grass, *Zenkeria elegans*, a native of the East Indies, allied to *Festuca*. — Remarks on Lichens by HAMPE. — Description of *Echinocactus xanthacanthus*, spec. nov. — Revision of the genus *Anoda* by D. VON SCHLECHTENDAL. — Description of *Webera Meyeniana*, spec. nov. from Chili, and of *Sporledera*, genus novum muscorum frondosorum Phascaceorum, by E. HAMPE. — CESATI on the genus *Ambrosinia*, on monstrous varieties of certain plants, and on some of the Umbelliferæ. — Description of a new species of cane, *Canna Altensteinii*. — *Notaresia*, novum genus muscorum, proposed by E. HAMPE, containing three species, *N. Cypensis*, *N. Virginica*, and *N. Italica*.

INTELLIGENCE.

ZOOLOGICAL.

Nemertes, Mag. Zool. and Bot. i. p. 529.—Accidentally turning over the “Edinburgh Journal of Natural and Geographical Science” for June 1831, my attention was caught by some observations on Planaria and allied genera by M. Ant. Dugés. From these it is evident that Dugés’ genus *Prostoma* is the same as that I have named *Nemertes*. He considers the organ described by me as a stomach to be the mouth; and the groups of points on each side of it he thinks are probably intended to retain the prey on which the worms feed. The ovarian pouches, according to him, open externally along the sides, and are capable of being protruded by compression. These are points which we shall soon, perhaps, have an opportunity of reconsidering when describing some additional species of the genus. It is to be remarked, that all those described by Dugés appear to be natives of fresh water.—G. J.

British Land and Fresh Water Shells found at Mickleham, near Box Hill, Surrey, Summer 1837.

Helix pomatia, abundant in lanes and woods.

—— *fulva*, common on a bank; Juniper Hill Estate.

—— *pura*, found with the preceding.

—— *rupestris*, under stones, &c.

—— *lucida*, in woods, &c. among decayed leaves.

—— *nitens*, common under stones, &c.

—— *alliaria?* do. do.

—— *crystallina*, among decayed leaves.

—— *virgata*,

—— *var.*

—— *ericetorum* } common in pastures, &c.

—— *var.*

—— *arbustorum*, in hedges.

Also the ordinary varieties of *Helix hortensis* and *H. nemoralis* in great plenty.

Carocolla lapicida, abundant in a copse on the Juniper Hill Estate.

Cyclostoma elegans, do. do.

Clausilia biplicata,
 ———— *laminata*,
 ———— *var. white*,
 ———— *rugosa*,
 ———— *parvula*? } in woods and coppices.

Pupa marginata,
 ———— *umbilicata*, } under stones.

Achatina Acicula, chalky banks, (rare.) I have never found this species in the neighbourhood of London with the animal alive.

Vertigo Juniperi, among moss at the foot of juniper bushes, (not common.)

Bulimus obscurus,
 ———— *lubricus*, } in woods, &c. among decayed leaves.

Ancylus fluviatilis, very plentiful, adhering to stones in the river Mole, (fine.)

DANIEL COOPER.

BOTANICAL.

Berkeley's British Fungi.—The third Fasciculus of this important botanical collection is now ready for distribution to subscribers. It is a double number, and contains preserved specimens of one hundred and twenty species.

Fungi under the Tropics.—After some stay at Weltevrede and Samarang, I am now at Djocjokarta (Java,) where I shall probably reside for eight months. This town is situated on a gently sloping plain, about twelve miles in extent, which reaches from the foot of the volcano, named Merapi, to the southern coast of the island; it is at an equal distance from the volcano and the shore. There are here many sandy places, particularly rich in leguminous plants, and the dry beds of the torrents contain an immense quantity of ferns. Calcareous rocks, scattered here and there, rise like towers to the height of almost a hundred feet. Up their steep declivities climbs the *Cissus scariosus*, Bl. whose roots serve as a matrix to the *Rafflesia Patma*, Bl. I have gathered the latter in all its states, and find it still every day. I owe the employment which gives me leisure for my botanical pursuits, to M. Fritze de Nassau, chief physician, who seconds with kindness my zeal for science, and favours to his utmost my study of natural history. I have already made several excursions in the *Sudgebirge*, a low chain of mountains which extends from this place to the south-east point of the island, inhabited by tigers and pea-

cocks, and which is covered by a vegetation of incomparable richness and beauty. Here rise woods of *Tectona grandis*, which require a whole day to cross; they are met with chiefly in places where the rocks "*de grès*" predominate. At their foot, and under their shade, I found such a great number of beautiful fungi, especially agarics, polypori, pezizæ, clavariæ, and spheriæ, (all quite different from our European species), that the vast hopes which Professor Blume had inspired were much below reality. Among these fungi, I remarked also several very interesting new genera. It appears that under the tropics, the vegetation of plants of this family is not limited, as with you, to certain fixed seasons of the year, for, at this moment, even in the middle of the dry season, I gather a greater number of them than in December, when abundant and continual rains prevail. Consequently these expressions: "when mushrooms predominate, autumn wanes, the leaves fall, and the vegetable kingdom thinks of a new spring," can apply only to what passes in the temperate zone. Indeed, to continue in this figurative style, here the sun is immoveable, the leaves preserve their verdure, the flowers exhale incessantly their delicious perfume, spring and autumn embrace each other; the virginal breath of the young plants is fatal to the old; the power of the fungous vegetation is similar then to these parasites, who, at the conclusion of a sumptuous banquet, on which they have largely fed, go to produce a new offspring. A transient autumn is quickly changed for an eternal summer, whose only clouds are the shades of the forests. The circumstances which principally favour the development of vegetables are found here: the *heat* is constant, and the difference of temperature between the wet and dry seasons is scarcely sensible; and *humidity* never abandons these primitive forests, where the arches of foliage rarely permit a ray of the sun to penetrate. Lastly, the rich and brownish humus of the plain, perpetually impregnated with this moisture, is of that softness which favours the growth of the fungi. The quantity of water raised in vapour by the heat of the day, and which the coolness of the nights deposits again, covers the leaves with a dew so abundant, that in the driest day, one can scarcely go far into one of these woods, without coming out quite soaked. Add to this, the immense quantity of twigs, branches, and even trunks, lying scattered on the ground,—trunks whose interior is already changed to mould, which the bark, so thin that one may easily break it, only preserves in its first form; and you may form to yourself an idea of the external circumstances which favour the uninterrupted development of fungi in the tropical forests, and decks them every

year with such different species, without it being possible to notice that their evolution is confined to any particular season of the year, as, for example, the autumn in the temperate zones. Besides, the same kinds are not limited in their vegetation to a fixed period, but individuals succeed without interruption those which have preceded them. Contrary to what takes place in Europe, where they enliven the forests in autumn, either by their beautiful colours, or by their union in great numbers, fungi here grow more solitary, and group rarely in large masses. It is also the polypori, principally those which grow parasitically on the trunks and branches, and they are almost all different from the European species, which attract us from a distance, and charm us by their lively, brilliant, and varied colours. In Europe it is the agarics, and chiefly the terrestrial kinds, which predominate, and give to its forests in autumn, a peculiar character.—JUNGHUHN in *Ann. des Sciences Nat. Mars* 1837.

Growth of plants inclosed in cases.—Led by the interesting discoveries of Mr Wood, I undertook about two years since, as many experiments on growing plants inclosed in cases, as my ingenuity suggested. In this pursuit I was induced recently to imitate a dripping cave, (the natural habitat of *Trichomanes brevisetum*, *Hygrophila irrigua*, &c.) The mode I adopted was as follows, I took a large packing case, glazed in front, fixed a number of inclined shelves to its sides and back, formed a trough at bottom, and a cistern at top having its bottom perforated, with small holes; over these I laid a sand bag to moderate the flow of water supplied each morning. I then planted my ferns, &c. in suitable soil on the inclined shelves, and in the trough; they were thus exposed to a constant gentle dripping of water, which escaped below, while little if any change of air was effected. The result has been the growth of the ferns in a luxuriance so greatly exceeding my anticipations, that I cannot refrain from recommending the plan to all who are desirous of witnessing the rapid development of these interesting plants in most exquisite verdure.—ROBERT BALL.

MISCELLANEOUS.

Corrections and additions to Report of Meeting of British Association, held at Liverpool 1837.—Mr Macleay expressed the greatest doubt, not only of the deadly effect of the bites of the *Argas Persicus*, but even of its poisonous nature. These doubts were founded, 1. on the circumstance of the genus *Argas* not giving a bite.

but only a puncture with its rostrum. 2. On the Argas reflexus, so common in pigeon-houses, being merely a bloodsucker. 3. On the puncture of the Ixodidæ, generally, to which family Argas belongs, producing a mechanical rather than a poisonous irritation, the teeth of the rostrum being directed backwards. 4. On the possibility that persons in a bad habit of body may have given rise to the Persian story, from having suffered under the inflammation consequent on this serrated nostrum being broken off in the wound. 5. On the fact, that two species of Argas, and those of the genus Ixodes, that is, two different genera, were exhibited under the denomination of the poisonous bug of Miannch; "so that it would follow, if the collector of these Arachnidæ be correct, that not only Argas is in that district of Persia a poisonous genus, but also Ixodes, a well known generic group, troublesome enough in our own and other countries, but never yet considered poisonous. Mr Hope remarked, that he had heard of a poisonous Ixodes in St Domingo; while Mr Macleay added, that he also knew the St Domingo species, which was common in Cuba; but that though it often covered the hides of the cattle, tormenting them greatly, it was never considered poisonous, and that Oviedo, an old Spanish writer, who describes them under the name of *Garrapata*, long since held the same opinion.

The eggs of the Ixodes produce a hexapod larva, which is the typical form of the young of the *Acaridea*, which form so vast a portion of the class *Arachnida*.

In reference to Captain Ducane's paper, Mr Macleay made the following remarks, which may be substituted for those at p. 375, (Report of Tuesday, 12th September :) "If Thomson, who professes to have observed the developments of the crabs, and Rathke, who professes to have observed the developments of the crayfish, be both right, it will be a singular fact, that the Brachyurous decapodes undergo metamorphosis, while certain Macrourous decapodes do not undergo it. It was also singular, that if Captain Ducane, who agrees with Thomson as to the metamorphosis of certain macrourous decapod crustacea, and Rathke were both right, then some macrourous decapodes, such as prawns and shrimps, do undergo metamorphosis, and others, such as the crayfish, do not." Mr Macleay has since his return from Liverpool received specimens of the "*Ditch prawn*," (mentioned p. 376,) and found it to be a true prawn or Palemon, the *P. varians* of Dr Leach, if indeed *that species* can be accurately distinguished.

BOTANICAL SOCIETY OF EDINBURGH, July 13, 1837.—Dr Bal-

four in the chair. Mr J. E. Gray, President of the Botanical Society of London, was elected a *Non-Resident* member. Donations to the library were announced from Mr Sowerby and Mr Leighton.

Mr J. M'Nab read an extract from his Journal of a Tour through Canada and the United States during the summer of 1834, containing a highly interesting account of an excursion to the Falls of Niagara, with particular reference to the botanical features of that celebrated locality. The *Arbor vitæ* (*Thuja occidentalis*) was observed to be exceedingly abundant in the neighbourhood of the Falls, overhanging the rapids in many places in the most curious manner. Drawings were exhibited of some of these which had sprung up in a very singular way. Several large lime trees had been cut down, many years ago, about two feet above the ground; and, after decay had commenced, some seeds of *Arbor vitæ* had got into the centre of them, where they had germinated, and now formed beautiful and handsomely shaped trees, upwards of 20 feet in height, with stems 20 inches in circumference. The deciduous trees chiefly consisted of platanus and tulip trees, oaks, elms, limes, ashes, walnuts, beeches, birches, and poplars. The herbaceous vegetation was very luxuriant, and presented many rare and interesting species. The exposed rocky ground above the Falls was richly adorned with dwarf shrubby plants, of which the *Hypericum Kalmianum*, then in full flower, was the most conspicuous, whilst the swampy grounds were profusely covered with the beautiful scarlet and blue cardinal flowers (*Lobelia cardinalis* and *siphilitica*.) *Impatiens biflora* was remarked as the plant growing nearest the descending water of the Falls, being constantly within the influence of the spray, and assuming a tall and spongy habit, without any appearance of flowers. On Goat Island, which separates the American from the British Fall, the herbaceous plants were very various, including *Hepaticas*, *Trillium*, *Cypripedium*, &c.; also *Sanguinaria Canadensis*, *Hedrastris Canadensis*, *Podophyllum peltatum*, *Arum triphyllum*, *Jeffersonia diphylla*, *Symphira racemosa*, &c. &c.*

Dr Graham stated, that, in consequence of the early, long-continued, and severe winter, a very considerable number of half-hardy shrubby plants in the Botanic Garden had been more or less injured; and that he proposed exhibiting in a tabular form the extent

* Several members of the Society requested Mr M'Nab to publish the Journal of his Tour, and stated their readiness, should he incline to publish it by subscription, to do all in their power to aid him in procuring the requisite number of subscribers.

of the injury,—distinguishing the plants according to their native country, their natural orders, and the situations they occupied in the garden, whether upon walls or in exposed or sheltered borders. He mentioned at the same time, that, in consequence of the much greater quantity of snow than usual, herbaceous plants had sustained little injury, and gave as an example the *Roscoea purpurea*, one of the *Zinziberaceæ*, which had lived in the open border without protection during several winters, and flowered freely each summer.

Specimens of *Cochlearia anglica*, from the “Banks of the Cree, and Palnure Burn, Kirkcudbrightshire,” where it was discovered by Dr G. M'Nab, were exhibited. Also specimens of *Festuca arenaria*, so named by Mr Gorrie, brought from the sands of Barry, by Dr Knapp, which were shown by Mr Campbell to be identical with a hairy var. of *Festuca rubra* from North Queensferry.

Several monstrosities were exhibited by Dr Balfour, Mr A. Mack, and Mr Arthur, Walltower Garden, North Berwick.

W. H. CAMPBELL, *Sec.*

BOTANICAL SOCIETY OF LONDON.—May 4th 1837. W. H. White, Esq. in the Chair.—The ordinary business of the evening having been accomplished, the Secretary proceeded to read a paper from J. Reynolds, Esq. illustrating the singular notions entertained by the ancients, with respect to plants and their uses in the cure of diseases, &c. A communication was then read from Arthur Wallis, Esq. on the Flora of Chelmsford. Mr G. Dennes also read a translation of Professor Meyen's Memoir from the *Annales des Sciences Naturelles* for November 1835, on the Circulation in Vegetables, which excited much interest. The meeting was then adjourned until May 18th.

May 18th 1837.—John E. Gray, Esq. F. R. S., President, in the Chair.—Names of visitors, donations to the library and Herbarium, and candidates' certificates having been read, a memoir was read by M. Hopkins, Esq. on *Vegetable Fermentation*, the subject of saccharine fermentation, and the formation of beet-root sugar, (of which specimens were exhibited,) having been discussed at full length, the President announced the donation of some valuable seeds from the Cape of Good Hope, presented by Monsieur Schmidt to the Herbarium. The Society then adjourned until June 1st.

June 1st.—The President in the Chair.—The names of visitors having been read, and members elected, Mr Hopkins continued his paper on *Vegetable Fermentation*. Mr Daniel Cooper, the curator, begged to inform the members that the plants in the Herbarium were

nearly arranged, and that the regulations respecting the time of distribution would shortly be announced. The meeting was then adjourned until July 6th.

July 6th.—The President in the Chair.—Donations of plants from Messrs G. Gardiner, G. E. Dennes, Daniel Cooper, Dr Bell Salter, Dr Macreight, &c. having been announced, Mr Hopkins concluded his interesting paper on Vegetable Fermentation. The meeting adjourned until August 3d.

August 3d.—John Reynolds, Esq. Treasurer, in the Chair.—Presents having been announced, Mr G. E. Dennes proceeded to read a translation of the report made to the Academy of Sciences by M. Mirbel, Dutrochet, and Auguste St Hilaire, reporting on the memoir relative to the structure and development of the generating organs of a species of *Marsilea*, found by M. Esprit Fabre, about the environs of Agde. The society then adjourned until September 7th.

September 7th.—J. E. Gray, Esq. F. R. S. President, in the Chair.—Names of visitors having been read, the secretary announced a collection of botanical works for the library, from Mr Pamplin of Wandsworth, and specimens of plants, amounting to upward of 3000, from Daniel Cooper, Esq. the curator; also plants from Mr Dennes and Mr Rich. A communication, accompanied by drawings, from M. Schomburgh, on a supposed new species of *Nymphaea*, found by him at the River Berbice, British Guiana. This interesting plant is described by M. S. as producing leaves 6 feet in diameter, and flowers upwards of 15 inches across. Upon examination it was discovered to belong to a genus intermediate between *Nymphaea* and *Euryale*, to which the name of *Victoria*, in honour of her Majesty, to whom the plants (drawings) had been sent, and received her approbation. The name of *Victoria regalis* has been given to this plant.* M. S. also communicated a new species of *Loranthus*, which he calls *L. Smythii*, in honour of Lady James Carmichael Smyth, a zealous patron of the science. M. S. was unanimously elected a foreign member. The society then adjourned until 3d October.

October 3d.—J. Reynolds, Esq. Treasurer, in the Chair.—Collections of plants were announced from R. Leyland, Esq. of Halifax, C. Conway of Pentywydd, and from Mr Freeman of Stratford, Essex. Mr Freeman then read a paper on the Flora of Stratford, Essex. A continuation of Mr Wallis's former paper was also read, accompanied by a donation of numerous specimens. The secretary

* See Plate in this Number, with extract from M. Schomburgh's letter.

then read some extracts from M. A. Decandolle's *Memoir on Alimentary Plants*, accompanied by a chart of the world, in which were laid down the boundaries, north and south, as mentioned by Decandolle.

Dr Bossey exhibited specimens of grasses affected with ergot. Mr D. Cooper stated that he had had in the course of the season, much conversation with the Essex farmers, and they informed him that since the increased navigation of steam-vessels in the Thames, their lands had been considerably more productive of late years,—which they attributed to the prevailing winds blowing the smoke and soot over their lands. This point having been fully discussed, the meeting adjourned until November 2d.

November 2d.—Dr Macreight, F. L. S. V. P. in the Chair.—Donations of plants were announced from Mr W. A. Lewis, Mrs Dennison, Mrs Gawler, Mr Hopkins, &c. Dr Bossey then read his paper on the Fungi which he had observed to attack grain. The paper led to an interesting discussion, and the meeting adjourned until November 16th.

NATURAL HISTORY SOCIETY OF NEWCASTLE.—On Thursday the 21st Sept. the anniversary meeting of the Natural History Society of Northumberland, Durham, and Newcastle upon Tyne, was held in the Society's new building, C. J. Bigge, Esq. the society's treasurer, in the chair. Mr W. Hutton, the senior secretary, read the report of the committee for the past year, which stated that they had to congratulate the members on the continued prosperity of the society. The treasurer's account showed a larger income than ever they had received in one year, and, though there was a balance against the society, the subscriptions which they had yet to receive would do more than cover that amount. They had often had to record the donations made to the society, and it was with pleasure that they now referred to the munificent gift of the Earl of Tankerville (in addition to a handsome annual subscription,) consisting of 500 specimens of corals, corallines, fossils, &c. in a large glass case. This splendid donation imparted quite a new feature to the museum, and the committee thought it their duty to order a new case for the reception of the specimens, in which they can be properly arranged and named, a display which the size of the original case did not admit of, and which, when completed, will form one of the most attractive portions of the museum. It was stated, in the report of last year, that the society expected a present of a series of casts from the fossil bones and shells in the *Jardin des Plantes*; the committee had to announce that these had arrived, and were very valuable, but

they were not yet arranged, and, for that purpose, the committee had ordered new cases to be made. The part of the society's transactions formerly announced were, from unavoidable causes, not yet ready for publication, and although the committee regretted the delay, yet they had, by it, been enabled to add to the part several local articles of great value. Often as those papers had been praised by others, and pleasing as that praise was to the authors, it would still be a greater pleasure to them to know that a law had been passed at the late meeting of the British Association at Liverpool, by which the authors of those papers were made free members of the council of that association. It also afforded the committee sincere pleasure to think that the efforts of the society, in conjunction with those of the Literary and Philosophical Society, had been crowned with success, and that it had been determined that the next meeting of the British Association was to be held in this town. Such a determination did the highest honour to the town, and, as the Natural History Society had taken an active part in inducing the Association to come to that determination, it would be their duty to do everything in their power for the Association when it came. The committee, therefore, ventured to express a hope that many members of the society would prepare papers to read at that assemblage, by which the society would maintain that credit with the Association which it had already gained, and that, afterwards, if it was found necessary, they would allow those papers to be printed for the benefit of science. The committee also recommended that the next anniversary meeting of the society should be held immediately after the close of the meeting of the British Association, and that some of the most learned members of the Association should be invited to attend the meeting, a circumstance which, the committee conceived, would be highly beneficial to the interests of the society. The committee, in conclusion, had to state that the plan, recommended previously, of admitting the public to the museum, had been acted upon by them; that certain days had been set apart for their admission, and that the museum had occasionally been opened in the evenings. By these means thousands had been gratified with a sight of the museum, and the committee had again the gratification of announcing that they were not aware of any loss or damage sustained in consequence of such unrestricted admission.

ORNITHOLOGICAL SOCIETY OF LONDON.—The four leading peculiarities which distinguish and recommend this society are, *first*, that it furnishes a gratuitous exhibition of birds, which

is open to the view of all classes of the metropolitan public; *second*, that it forms a museum peculiarly adapted for the purposes of science; *third*, that the museum and library are to be always open without restriction to scientific persons and artists; and, *fourth*, that practical advantages are aimed at by the introduction, naturalization, and gratuitous distribution of useful and ornamental foreign birds.

With regard to the first of these points, a very interesting and valuable collection of aquatic birds is now open to the view of all classes in the beautiful garden in St James's Park. The study of natural history is so conducive to our moral and corporeal health, that we rejoice over every institution and project which is intended to diffuse more widely among our fellows that pure happiness which we ourselves are conscious of having derived from this enchanting source. The Horticultural and Zoological Gardens have added greatly to the enjoyment of the inhabitants of the crowded metropolis; but those gardens are generally accessible to none but the higher and more wealthy classes, and gardens of natural history for the poor were a desideratum hitherto unsupplied, until the Ornithological Society stepped forward to supply it. We trust that this benevolent example will be followed, and that we shall live to see the royal parks of London converted into gardens of botany and zoology, sculpture and statuary. Such a conversion might easily be effected without the slightest loss, but, on the contrary, with a most remarkable addition to the beauty and picturesque effect of the parks, and an incalculable improvement, moral and intellectual, of the people.

With regard to the second point, the scientific character of the museum, it is intended to form a complete collection of skeletons and of skins, which, as every ornithologist knows, are far more useful for examination than mounted specimens; to preserve anatomical preparations of parts; to collect eggs, nests, &c. so as to teach (as it were) ornithology by the eye.

Upon the third point, the opening of the museum and library without restriction to scientific persons and artists, it is unnecessary to make any explanation,—the intention is as wise as it is liberal.

The last point, viz. the introduction, naturalization, and distribution of foreign birds, is one of some difficulty, but of exceeding interest and value. With the pheasant in our woods, the turkey and Guinea-fowl in our farm-yards, and the parrot and Canary bird in our cages, it is wonderful that these examples of the advantages of the introduction of foreign birds have not excited us to more en-

terprising and efficient endeavours to introduce the numerous species which might so advantageously be added to our stock of domesticated birds. It is positively disgraceful to this country, that we have no ponds planted with *Valisneria*, and stocked with the canvass-back duck, that venison of the feathered race. The Curassows are still strangers in the land. The glorious capercaillie has not been recalled from exile; and for cage-birds, why, the very sounds are mockery. Humming birds, and a bird of Paradise, have been brought alive into this country—Here is encouragement for the enterprise of this society! We must not forget to mention, that all the superabundant eggs and birds are to be gratuitously distributed among the members: this will not only act as an inducement to join the society, but is perhaps the very best means that could be devised for diffusing the introduced species throughout all parts of the united kingdom.

Shows are to be instituted, and premiums given; ornithological works are to be published and patronized; and lectures have been already commenced. At the last general meeting on the 7th July, when the ordinary business had been completed, Mr Vigors delivered a masterly and interesting introductory lecture, exhibiting the five types, and aberrations from the types, of ornithological forms, explaining their typical stations, and adaptations to their modes of life. The lectures will be resumed in November.

There are now about two hundred members. The scientific character of the society may be estimated from the following selection from the list: Dr Burchell, the Earl of Derby, J. E. Gray, John Gould, Dr Horsfield, W. S. Macleay, the Bishop of Norwich, Dr Royle, Wm. Swainson, Col. Sykes, N. A. Vigors, and Wm. Yarrell. In addition to the above, Dr Richardson, Mr Selby, and Dr Andrew Smith, have promised their assistance.—H. C.

OBITUARY.

On the 15th of April 1837, at his residence in Norwich, JOSEPH SPARSHALL, Esq. F. L. S., in the 45th year of his age. There is a notice of his character in the *Mag. Nat. Hist.* for October, p. 559. He was a well-known practical entomologist.

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MAGAZINE

OF

ZOOLOGY AND BOTANY.

ORIGINAL COMMUNICATIONS.

I.—*A Revision of the Genera of Bats (Vespertilionidæ), and the Description of some new Genera and Species.* By JOHN EDWARD GRAY, F. R. S., President of the Botanical Society of London, &c. &c.

SOME of the older authors placed these animals with the Birds, but Ray (Syn. Anim. Quad., p. 43,) properly arranged them with the Mammalia, and formed them into a particular group, of which he only knew a single species; Linnæus divided the few species he knew into two genera, which, on account of the difference in the number of their teeth, he placed in two different orders, an error which he was not often guilty of committing, and which Pennant, Pallas, and Brisson corrected, by referring them back to a single genus; but the latter author (Le Règne Animal, 4to,) in 1762, divided in his specific characters, the fruit-eating bats from the insectivorous ones, by the number of their claws; and this group was long afterwards converted into a genus by Geoffroy, under the name of *Pteropus*; Daubenton in 1759 (Mem. Acad. Paris,) described several new species, and gave some figures of the heads of these animals, which greatly facilitated their determination. Pallas, in 1767, (Spic. Zoolog. 6,) when describing many new species, showed that the bats might be divided into sections by the number of their teeth; and Erxleben (Sys. Anim.) 1777, acting on Pallas's suggestions, divided the bats into two genera, giving to those that have four cutting teeth in the upper and lower jaw the name of *Pteropus*, and retained in the genus *Vespertilio* the other bats; which he divided into sections according

to the absence, presence, and number of these appendages. These divisions were adopted by Gmelin (*Syst. Nat.* 1. 45.), who reduced the genus established by Erxleben to the rank of a section. In 1805, M. Geoffroy St Hilaire, who was then employed in naming the Mammalia in the Paris collection, commenced a series of papers in the *Annales du Museum*, in which he established various genera of these animals, described the different species which he referred to them, and illustrated them with figures. Cuvier in 1817 (*Règne Animal*,) placed the bats with the insectivorous Mammalia, and divided the insectivorous genera into groups according to the number of the phalanges of the index and middle finger; and his system has been very generally followed, and from time to time new genera have been added by Dr Horsfield, F. Cuvier, Charles Bonaparte, and others. Dr Leach, in 1822, (*Linn. Trans.* xiii.) published two papers, in which he described and figured some new genera. One of the papers is on those "bats with foliaceous appendages to the nose;" and the other for those that were without these organs. In 1823, Spix, in his work on the South American monkeys and bats, adopted these divisions, and gave a Latin name to them, and he has been generally quoted as the founder of these sections. Such was the state of the science when, in 1826, I published a short paper in the *Annals of Philosophy*, and in 1829 a second in the *Zoological Journal* (p. 242,) in which I divided the bats into five natural sections; and in the *Philosophical Magazine* for the same year I printed a revision of the genera from personal examination, and added to it an artificial table, for the purpose of facilitating the discovery of them. This paper was translated into Latin by Dr Fischer (*Synop. Mamm.* 659,) and into German by Oken in the *Isis*, and into French by Lesson in his *Manuel*; and the arrangement has been adopted by Mr Swainson in *Lardner's Encyclopædia*; and, lastly, by the anonymous writer on bats in the *Penny Encyclopædia*, who, having merely translated the article from Lesson's *Manuel*, erroneously attributes it to that author, though Lesson quotes me as the author of the tribes. The accompanying paper may be considered as an abridgement of a further revision and extension of that article; and for the purpose of writing it, I have examined all the bats which have passed through my hands, or that I have been able to see in the English collections and in the Government museums of France, Germany, and Holland; and I hope, that I shall not now hear persons complain of the difficulty they experience in making out the species, much less the genera of these interesting animals. I believe that the real cause of the difficulty is the little attention that zoologists have paid to them, and, as a proof of this inattention, I am induced to give a sketch of the history of

the discovery of the various species which inhabit this country. Ray and Merret, as I have before observed, only knew a single species, and this was the only one recognized as British, until the year 1738, when Albin first figured (Birds, t. 101.), and 1766, George Edwards again figured the long-eared bat in his work on Birds (t. 201. f. 3.); and Pennant recorded these two in his first edition of the British Zoology. In his succeeding editions he extended the number to 4, adding the *Noctule* on the authority of the Rev. Dr Buckworth, who had observed a large bat, which Pennant thought to be this species, (Brit. Zool. Illust. 1770-85,) at Queen's College, Cambridge; but the Rev. Gilbert White had written to him, and given him a good history of this bat in 1769, (Hist. Selborn, 1779, 75, 76,) and secondly, the horse-shoe bat, *Rhinolophus ferrum equinum*, which had been discovered by Mr (afterwards Dr) Latham at Dartford. In 1806 (Ann. Mus. viii. 198,) M. Adolphe Brongniart, when travelling from Dover to London, discovered a new species which was described under the name of *V. emarginatus*; and, in 1808, Montagu in the Linnæan Transactions (i. 71,) added to those already known, the little horse-shoe (*Rhinolophus hipposideros*), and the barbastelle (*Vesp. Barbastellus*;) but it is doubtful if the animal described by Montagu was the real barbastelle, for the remains of the specimen so named in his collection, was certainly *Vesp. mystacinus* of Kuhl, but the fact of the *Barbastelle* being British was fully established in 1805, by the figure of it given by Mr Sowerby in his British Miscellany, from a specimen found by Mr Peate at Dartford.

In 1825, Dr Leach described and figured in the Zoological Journal, (7, t. 22.) what he considered as a new species, under the name of *Vespertilio pygmeus*, sending the specimen described to the British Museum. In 1826, feeling from the experience that I had gained when studying with that great reformer of zoology in England Dr Leach, that the British bats had not had the attention paid to them that they deserved, I examined the various specimens collected by Dr Leach, myself, and our correspondents, which were then in the British Museum, and in the Zoological Journal (p. 108) for that year, I gave a list of the specimens then in the collection, and by that means added the four following species, viz. *Vespertilio Bechsteinii*, *V. Nattereri*, *V. serotinus*, and *V. mystacinus*. Dr Fleming having overlooked my paper in 1828, when his work on British Animals appeared, merely gave the species that were known before its publication; while the Rev. Leonard Jenyns and Mr Bell, in their works on the British Mammalia, have been able to add two more species to the list, viz. *V. Leisleri* and *V. discolor*, which I had added to the mu-

seum collection since the publication of my paper, the latter of them having been sent from Plymouth by Dr Leach. In 1833, Mr Leonard Jenyns (Lin. Trans. xvi. 55, t. 1, f. 2.) described what he considered as a species under the name of *Plecotus brevimanus*; but from the observations which I have been enabled to make on the development of the wings of these animals, (Phil. Mag. and Annals, vi. 1829-35,) which do not gain their full size until after the animal has done suckling, I am now certain that both the *Vesp. pygmeus* and *Plecotus brevimanus* are only the young states of other species, the latter being the young of the long-eared bat, and the former most probably the young of the pipistrelle; and I am borne out in this opinion by the soft state of the cranium, the large size of the joint arising from the epiphysis of the bones not being knit, of the specimen of both these animals which have come under my notice, and I may observe, that the first joint of the middle-finger of all the adult bats I have examined is as long as the arm-bone, which is not the case in these animals.

Fam. V. VESPERTILIONIDÆ.

The limbs elongated; fingers of the fore-hands and tail enclosed in a nearly naked membrane, serving for wings; fingers very long; thumb free, clawed; toes of hind-feet short, equal clawed; teeth variable.

A. ISTIOPHORI, or *Leafnose bats*. Nostrils placed in a bald space, often elevated behind into a leaf; teeth acutely tubercular; index-finger not clawed.

TRIBE I. *Leafnose kind*. PHYLLOSTOMINA.

Nose-leaf expanded into a leaf behind, simple and pierced with the nostrils in front; ears lateral, separate.

† *Forehead pitted; ears close together.* Old World.

1. RHINOPOMA, Geoff. Tail long, exerted beyond the short interfemoral membrane; forehead with a deep pit; ears close together; nose-leaf small.

Indian Rhinopome. *Rhinopoma Hardwickii*, Gray. Zool. Misc. 37. Inhabits India. Gen. Hardwicke.

Egyptian Rhinopome, *Rhinopoma microphylla*, Geoff. *Vesp. microphyllus*, Schreb. Brunnich, Cat. Copenh. t. 6, f. 1-4. Inhabits Egypt. Dr Rüppell.

See also *Rhinopoma Carolinensis*, Geoff. if a true *Rhinopome*?
 †† *Forehead simple, ears lateral, tongue short, under lip entire with a triangular smooth space in front.* New World.

2. ARCTIBEUS, Leach.—*Phyllostoma*, Spix.—Tail round (none?) interfemoral membrane deeply cut in, forehead simple, ears far apart, lateral, nose-leaf simple lanceolate.

* *The inner edge of the lips not fringed.*

Jamaica Arctibeus. *Arctibeus Jamaicensis*, *Leach*.—*Phyllostoma Jamaicensis*, *Horsf.* Zool. Journ. ; young, *Madateus Lewisii*, *Leach*.—Tragus with 1 or 2 lobes on the middle of its hinder edge. Inhabits Jamaica, Cuba, Mr Redman.

See also *Arctibeus planirostris*. *Phyllostoma planirostre*, *Spix*, Braz. t. 36, f. 1. "Tragus lobed," *Spix*.

Fringed-lipped Arctibeus. *Arctibeus fimbriatus*, *Gray*.—Nose-leaf elongate, lanceolate, apex with a broad midrib ; fur mouse-colour, very soft, with pale tips, rather paler beneath than above ; fore-arm and under side of the wing near the fore-arm and side of the body with scattered fur ; the front of the lower lip with a semi-ovate space, with a central tubercle surrounded by small warts. Expanse 17". Inhabits Brazil.

Sooty Arctibeus. *Arctibeus fuliginosus*, *Gray*.—Fur sooty-black ; wings and membrane black ; chin with a triangular space, having 5 or 6 warts on each side ; nose-leaf ovate-lanceolate, acute, with a deep groove parallel to the edge of each side, front part free on the edge ; lips fringed ; ears moderate, rather naked, black. Expanse 16" ; body and head 3", arm-bones 2" 6". Inhabits S. America. Museum Lyons.

See also *Arctibeus lineatus*, *Gray*.—*Phyllostomus lineatus*, *Illiger*, Licht Doub. 3, *Phyll. lineatum*, *Geoff*.

* * *Lips not bearded internally.*

Lobed Arctibeus. *Arctibeus lobatus*, *Gray*.—Tragus 3 lobed. Inhabits—? British Museum.

Arctibeus perspicillatus.—*Phyllostoma perspicillatum*, *Geoff*. Ann. Mus. xv. t. ii. P. *superciliarum*, *Pr. Max.* P. *lineatum*, *Geoff*. ? *Vesp. perspicillatus*, *Linn.* Grande fer de lance, *Buffon*, Suppl. vii. t. 74, cop. *Encycl. Meth.* t. 32, f. 4. *Phyllostomus lituratus*, *Illig.* Licht. *Phyll. lineatus*, *Illiger*. Collection of Mr Swainson.

3. *VAMPYRUS*, *Geoff*. Vampire.—Tail none, interfemoral membrane large, with 3 diverging lines, truncated at the end ; muzzle long ; central upper cutting teeth lobed.

Pale Vampire. *Vampyrus spectrum*, *Leach*.—*Phyllostoma spectrum*, *Geoff*. Ann. Mus. xv. t. ii. f. 4 ; head and skull. Dict de Sc. Nat. *Vesp. spectrum*, *Linn. Seba*, i. t. 58, f. 1, cop. *Schreb.* t. 54, *Shaw*, t. 43. *Vampyrus sanguisuga*, *Lesson* ; front of lower lip with 2 small smooth warts in front. Inhabits Brazils. British Museum.

4. *PHYLLOSTOMA*, *Geoff*. *Phyllostome*. *Vampyrus*, *Spix*. Tail very short, on the upper side of the interfemoral membrane tips.

* *Front of the lower lip with a triangular space, having a large wart on each side and a series on the edge.*

Javelin Phyllostome. *Phyllostoma hastatum*, Geoff. Ann. Mus. xv. t. ii. *Phyllostomus maximus*, Pr. Max. Abbild. t. 71. *Vesp. hastatus*, Pall. Le Chauve-souris fer de lance, Buff. H.N. xiii. t. 33, cop. Schreb. t. 46. Encyc. Meth. t. 30. f. 4. *Vesp. perspicillatus*, Schreb. t. 46, a. *Pteropus hastatus*, Erableb. Javelin Bat, Penn, t. 30, fig. 4. Variable in colour, hair brown, tipped with gray. 1. male, fulvous brown; 2. female, brown; 3. male, blackish. Inhabits Brazil. British Museum.

See also *Phyllostoma elongatum*, Geoff. Ann. Mus. xv. t. 6. f.—*Phyllostoma crenulatum*, Geoff. Ann. Mus. xv. t. 6, f. Desm. Nouv. Dict. xxvi. t. m. 28, f. 3. Encyc. Meth. t. 3, f. 10. Inhabits — ?

Sooty Phyllostome. *Phyllostoma fuliginosum*, Gray.—Sooty-black, hair of head and neck with greyish tips, beneath greyer; nose-leaf ovate-lanceolate, quite entire, $1\frac{1}{2}$ as long again as broad; ears sharp; wings black; tail end free. Inhabits S. America. British Museum. From Sir Everard Home.

** *Lower lip with an half ovate group of crowded warts.*

Children's Phyllostome. *Phyllostoma Childreni*, Gray.—Brown, slightly grizzled, with grey tips to the hairs, beneath greyer; ears large with rather membranaceous rounded at the ends; nose-leaf ovate-lanceolate, rather longer than wide; wings brown; warts of lower lip in 3 or 4 arched series, crowded. Expanse 12". Inhabits S. America. British Museum. From J. G. Children, Esq.

*** *Front of lower lip with a small smooth ovate space formed of two small tubercles, as in Vampyrus.*

Bennett's Phyllostome. *Phyllostoma Bennettii*, Gray.—Fulvous brown, rather paler beneath; hair very long, soft, with greenish tips; ears very large, rather acute; nose-leaf very large, ovate-lanceolate, with a thick convex midrib; wings brown. Exp. 12"; nose-leaf 8". Inhabits S. America. British Museum. Named in memory of my excellent friend, whose early death all zoologists must deplore.

**** *Front of the lower lip with a large central wart, having a series of large oblong transverse warts on the edge, the upper warts sometimes divided into 2 or 3.*

Soricine Phyllostome. *Phyllostoma soricinum*, Fischer. *Vampyrus soricinus*, Spix, Braz. t. 36, f. 2-6. Inhabits Brazils.

5. CAROLLIA. Interfemoral membrane large, truncated; tail none; tragus very small.

Brazilian short-eared bat. *Carollia Braziliensis*. *Phyllostoma brachyotum*, Pr. Max. t. f. 1-2. Inhabits Brazils.

6. *LOPHOSTOMA*, *Orb.* Interfemoral membrane large, truncated ; tail rudimentary ; tragus entire.

Lophostoma sylvicola, *Orbigny*, *Voy. Amer. Merid.* t. 6. Inhabits S. America. Perhaps the same as the former.

7. *EDOSTOMA*, *Orbigny*. Edostome. Tail none ; interfemoral membrane very small, marginal ; heel-bone none ; nose-leaf double, erect, anterior pierced with the nostrils, hinder erect, larger, separated from the front one by a considerable space.

Ashy Edostome. *Edostoma cinerea*, *Orbigny*, *Voy. Amer. Merid.* t. 8.

8. *MACROPHYLLUM*, *Gray*. Macrophyllle. Tail elongated, reaching to the truncated tip of the large interfemoral membrane, under lips —?

Prince Nieuwied's Macrophyllle. *Macrophyllum Nieuwiedii*, *Gray*. *Phyllostoma macrophyllum*, *Pr. Max. Abbild.* t. Inhabits Brazil.

9. *BRACHYPHYLLA*, *Gray*. Cavern Bat. Tail very short, interfemoral membrane deeply nicked, two rayed ; nose-leaf small, surrounded by a deep groove, which separates it from the face ; front of under lip with a smooth triangular space bearded on the edge.

Cavern Bat. *Brachyphylla cavernarum*, *Gray*, *Proc. Zool. Soc.* ii. 123. Inhabits St Vincents (West Indies.) *Brit. Mus. and Zool. Soc. Mus.*

10. *DIPHYLLA*, *Spix*. Tail none ; interfemoral membrane none ; nose-leaf double, one being placed behind the other ; tragus lanceolate ; under lip —?

Diphylla ecaudata, *Spix*, *Braz.* t. 36, f. 7. *Glossophaga diphylla*, *Fischer*. Inhabits Brazils.

11. *STENODERMA*, *Geoff.* *Desmodus*, *Pr. Max.* ? Tail and interfemoral membrane none ; nose-leaf very small, scarcely elevated ; nostrils with an arched ridge behind ; thumb long, free ; under lip —?

Stenoderma rufum, *Geoff.* *Dict. Sc. Nat.* t. Inhabits Brazils. *Mus. Paris*, (bad state.) Is the *Desmodus rufus*, *Pr. Max. Abbild.* t. *Rhinolophus ecaudatus*, *Schinz.* distinct ? *Temminck* considers this to be a young *Dysopes* !

† † † *Forehead simple ; ears lateral ; tongue long, fitting into the notch of the chin ; lower lip deeply cut in the centre of the front, and often fringed ; head elongated ; chin with reflexed whiskers.* New World.

12. *PHYLLOPHORA*, *Gray*. Tail short ; apex enclosed in the large truncated interfemoral membrane ; apex superior.

Phyllophora amplexicaudata, *Gray*. Glossophaga amplexicaudata, *Spix*. *Braz.* t. 36, f. 4. Inhabits Brazils. British Museum.

13. GLOSSOPHAGA, *Geoff*. Tail none ; interfemoral membrane is large and deeply cut out.

Soricine Bloodsucker, *Glossophaga soricina*, *Geoff*. *Vespertilio soricinus*, *Pall.* *Misc.* t. 5. *Spic. Zool.* iii. t. 3-4, cop. *Schreb.* t. 47 ; and *Encyc. Meth.* t. 32. f. 5. *Edwards' Birds*, t. 201, f. 1. *Pteropus soricinus*, *Erxleb.* *Phyllost. soricinum*, *Geoff.* *Ann. Mus.* xv. t. 2. Leaf-bat, *Pennant*. Inhabits West Indies. British Museum, from Thomas Bell, Esq.

14. MONOPHYLLUS, *Leach*. Tail short, prominent above the very small deeply cut interfemoral membrane ; thumb elongated, thick ; heel-bone rather elongated ; head short,

Redmann's leaf-nose bat. *Monophyllus Redmanni*, *Leach*, *Linn. Trans.* xiii. 76. Brown, beneath rather paler ; membrane black ; lower lip fringed, and with two slight tubercles in front. Inhabits Jamaica.

Glossophaga caudifera, *Geoff.* *Mem. Mus.* iv. t. 17, cop. in *Dict. Sc. Nat.* ; may not be different from the former.

15. ANOURA, *Gray*. Tail-less Bat. Tail none, interfemoral membrane small, just margining the hind legs ; heel bone very short ; cutting teeth $\frac{2 \cdot 2}{0}$; thumb very small and slender.

Geoffroy's tail-less bat. *Anoura Geoffroyi*, *Gray*. *Glossophaga ecaudata*, *Geoff.* *Mem. Mus.* iv. t. 181. *Pr. Max.* *Abbild.* Inhabits Brazil. British Museum.

† † † *Forehead simple ; ears large, united over the forehead.*

16. MEGADERMA, *Geoff*. Broad-winged bat. Nose-leaf simple, erect, front part flat, on the nose behind ; lips simple ; wings, interfemoral membranes and ears, large, membranaceous ; tail none ; cutting teeth $\frac{0}{0}$. India.

Megaderma trifolium, *Geoff.* *Ann. Mus.* xv. t. 12, head. *Megaderma spasma*, *Geoff.* *Ann. Mus.* xv. t. 12, from *Vesp. spasma*, *Linn.* from *Seba*, i. t. 56. f. 1. cop. *Schreb.* t. 48. *Shaw's Zoology*, t. 41. *Vesp. lanceolata*, *Deschamp*, MSS. Inhabits Java. Museum Leyden.

Lyre-nosed broad-winged bat. *Megaderma Lyra*, *Geoff.* *Ann. Mus.* xv. t. 12. cop. *Encycl. Meth.* t. 3. f. 11. B. *Dict. Sc. Nat.* Inhabits India. British Museum.

17. LAVIA, *Gray*. Nose-leaf simple, erect behind, with an expanded elevated edge in front, and a fold forming a canal in the upper edge of its centre ; lips simple ; tail none ; cutting teeth $\frac{2}{0}$. Africa.

Lavia frons, *Gray*. *Megaderma frons*, *Geoff.* *Ann. Mus.* xv.

t. 1, head: la Feuille, *Daubenton*, Acad. Paris, 1769. Inhabits Africa, (Egypt, Senegal, Gambia.) British Museum.

Nose-leaf large, membranaceous, hairy, the hinder part elongated, with a deep fold on each side forming a broad central tapering kind of midrib, the lower part of each fold furnished with a membranaceous expansion covering the nostrils. The front of the leaf large, with a broad expanded free edge, furnished with a fold in centre of the front, forming a conical canal.

? 18. MORMOOPS, *Leach*. not *F. Cuv.* Nose-leaf simple; ears large, close together in front, united to the nose-leaf above, and to the membranaceous ridges round the mouth and chin; interfemoral membrane large, truncated; tail short, inclosed; apex free above; cutting teeth $\frac{4}{4}$.

Mormoops *Blainvillii*, *Leach*, Linn. Trans. xiii. t. 7. Inhabits Jamaica.

The genus described by M. F. Cuvier under this name appears to be perfectly different. This genus differs from *Vampyrus* in the large ears, the mouth being fringed with membranes, wartiness of the chin, and in the under lip being entire in front.

TRIBE II.—RHINOLOPHINA.

Nose disk expanded into a leaf behind, and with a pit or process between the nostrils in front.

* *Interfemoral membranes very small; tail none; disk with a large deep pit between the nostrils.*

19. ARITEUS, *Gray*. *Istiophorus*, *Gray* (not *Cuv.*) Nose-leaf erect, lanceolate, simple behind, rounded in front; ears lateral; separate tragus; lanceolate-toothed; interfemoral membrane only margining the legs; heel-bone, moderate.

Yellowish Ariteus. *Ariteus flavescens*, *Gray*. *Istiophorus flavescens*, *Gray*. Zool. Misc. 37. Inhabits —? British Museum.

* * *Interfemoral membranes large; tail long.* (Old World.)

20. RHINOLOPHUS (*Noctilio*, *Bechst.*) Horse-shoe Bat. Nose-leaf thin, extended into a transverse lanceolate leaf, with 4 cells at its base, and with a toothed longitudinal crest in the middle space, between the nostrils in front, and a slight pit in its front; ears large, separate; pubes with distinct false teats. Tragus small.

Rhinolophus hipposideros, *Geoff. Leach*. Misc. t. 121. *Rh. bihastatus*, *Geoff.* Ann. Mus. xx. t. 5. *Temm.* Mon. n. *Vesp. minutus*, *Montagu*, Linn. Trans. ix. t. 18, f. 6. *Noctilio hipposideros* *Bechst.* (1801.) *V. ferrum-equinum* β *Gmel.* *Petit fer a cheval.* *Daubent. Buffon*, N.H. iii. t. 20. Inhabits Europe. Brit. Mus.

Rhinolophus ferrum-equinum, *Leach*, Zool. Misc. Vesp. ferrum-equinum, *Schreb.* t. 62, upper fig. Vesp. hippocrepis, *Hermann*. Noctilio ferum-equinum, *Bechst.* Grand fer a cheval. *Daubent.* Mem. Acad. Paris, 1759, t. 1. f. 4. *Buffon*, N.H. viii. t. 17. f. 2. *Rhinolophus unihastatus*, *Geoff.* Ann. Mus. xx. t. 5. *Temm.* Mon. No. 13. Inhabits Europe, Asia, and Africa. (Britain, Turkey, Syria.) British Museum.

Rhinolophus megaphyllus, *Gray*, Proc. Zool. Soc. iii. 52. Inhabits New Holland. British Museum.

See also 1. *Rhinolophus minor*, *Horsf.* Java, t. f. a, b, head. *Temm.* Mon. No. 14. 2. *Raffinis*, *Horsf.* Inhabits Java. Museum, India House; and 3. *Rhinolophus griseus*, *Meyer.* Bonn. Trans. 1824. Inhabits — ?

Rhinolophus Capensis, *Licht.* *Rhinolophus clivosus*, *Ruppell.* Atlas, t. 18. *Temm.* Mon. No. 15. *Rhinolophus Geoffroyi*, *A. Smith*, Zool. Journ. Inhabits Africa, (Egypt, Cape of Good Hope,) and Europe, (Dalmatia, Sicily,) Asia, (Levant.) British Museum.

21. *HIPPOSIDEROS*, *Gray*. *Phyllorhina*, *Bonap.* The nose disk extended into a short reflexed leaf behind, with a thick cross rib on the front of its base, to which it is attached by 3 longitudinal bands, the front part flat, simple, pierced with the nostrils. Tragus none.

a. Forehead pierced with an expansile pore; pubal teats distinct.

* Face leafy on the sides of the nose disk.

Hipposideros insignis, *Gray*. *Rhinolophus insignis*, *Horsf.* Java, head. *Temm.* Mon. No. 3, t. 1, f. 2. Vesp. cyclope, *Desch.* MSS. Ears acute, front, with a narrow and a broad hairy band; tail end not produced. Inhabits Java. Museum, India House.

Dr Horsfield's specimen of *Rhin. deformis*, (t. 7, f. 9, head,) appears to be a specimen of this species, the base of the tail of which has been drawn out when the animal was skinned.

Hipposideros apiculatus, *Gray*. Ears acute, front edge hairy, hinder edge plicated; last joint of the tail elongated and produced; fur soft, silky; base whitish; tips dark-brown. Inhabits India. W. Elliot, Esq. British Museum.

* * Face not leafy on the sides of the nose disk.

Hipposideros fulvus, *Gray*. Fur reddish fulvous; silky, rather paler beneath; ears very large, rounded, dark, with a few short scattered hairs on the outsides, and 2 or 3 lines of long hairs on the front edge; last joint of tail slightly produced. Inhabits India, (Madras.) W. Elliot, Esq. British Museum.

Mouse-coloured Horse-shoe-Bat. *Hipposideros murinus*, *Gray*.

Fur pale mouse-colour, hairs with brown ends, and very small white tips; whitish beneath; ears very large, rounded, with 2 or 3 lines of long hairs on the front edge; tail, last joint slightly produced. Inhabits India, (Madras.) W. Elliot, Esq. British Museum.

This difference of colour is not sexual, as Mr Elliot had male and female of each. See also *Rhinolophus armiger*, *Hodgs.* from Nepal.

b. Forehead concave, deep, with a tuft of rigid brown hair in the front, in the place of the frontal pore; (tail destroyed;) sides of face leafy.

Pencilled Horse-shoe Bat, *Hipposideros penicillatus*, *Gray*. Brown, with a tuft of brown hair on each side over the eyes, and a small pencil of rigid brown ones on the front of the forehead. Inhabits India, (Madras.) W. Elliot, Esq.

c. Forehead simple; nose leaf entire, rounded; tail as long as the membrane; muzzle leafy on side of nose disk. (India.)

Hipposideros diadema, *Gray*. *Rhinolophus diadema*, *Geoff.* *Ann. Mus. xx. t. 5. Temm. Mon. n. 2.* Inhabits Timor.

Hipposideros nobilis, *Gray*. *Rhinoloph. nobilis*, *Horsf.* Java, Head from dry specimen, *Temm. Mon. No. 1, t. 1, f. 1.* Inhabits Java. Museum, India House.

Hipposideros larvatus, *Gray*. *Rhinolophus larvatus*, *Horsf.* Java, head. *Temm. Mon. No. 9.* Inhabits Java. Museum, India House.

Hipposideros vulgaris, *Rhinolophus vulgaris*, *Horsf.* Java, t. 7. f. E. head. Inhabits India. British Museum. Museum, India House.

See also *Rhinolophus Commersonii*, *Geoff.* *Ann. Mus. xx. t. 5,* head. Only known from Commerson's drawings; tail half as long as the thigh. Inhabits Madagascar. See also *R. torquatus*, *Hodgs.* of Nepal.

d. Forehead simple; nose leaf 3-toothed; tail longer than membrane; pubal teats none. Asellia.—Gray.

Three-toothed Horse-shoe Bat. *Hipposideros tridens*, *Gray*. *Rhinolophus tridens*, *Geoff.* *Descrip. Egypte, t. 2, in Ann. Mus. xx. t. 5, head. Dict. Sc. Nat. Temm. Monog. No. 6.* Cheeks with longitudinal ridges. Inhabits North Africa, (Egypt.) British Museum.

The difference in the form of the front part of the nose-leaf, on which Dr Horsfield founded part of his specific character, appears to depend on the drying of the specimens. All the specimens described by that excellent zoologist were in a dry state. I have made the foregoing references to his species after the examination of

his own specimens in the India House, and those which he sent to the British Museum as types of his species.

B. ANISTIOPHORI, or *Simple nosed bats*. Nostrils simply pierced in the end of the muzzle without any nasal leaf.

Tribe III.—VESPERTILIONINA.

Grinders acutely tubercular, wings broad, large; tail elongated, as long as, and enclosed in, the large conical interfemoral membrane, upper cutting teeth near the canines, with a central space.

† *Ears united or approximate; nostrils each placed in the front of a groove, the grooves are close together in front, diverging from one another behind, and are covered by their spirally convolute outer margin, which is lobed in front for the passage of the air.*

22. NYCTERIS, Geoff. Ears large, united over the forehead; tragus distinct; wings and interfemoral membrane large; tail long, forked at the tip.

* *Ears united on the forehead.* Africa.

Nycteris Thebaica, Geoff. Descript. Egypte, t. 1, No 2. Ann. Mus. xx. t. 1, head. Vespert. hispidus, Schreb.? Nyct. Geoffroyii, Temm. Inhabits Africa. (Egypt and Guinea?) Brit. Mus.

Add also 1. Nycteris Capensis, A. Smith, Zool. Journ. iv. and 2. Nycteris affinis, A. Smith, Zool. Journ. iv. Inhabits Africa. (C. G. H.)

* * *Ears not united in front, forehead with a large deep oval naked concave pit, having a naked groove in front running down between the nostrils.* Asia. (Petalia, Gray.)

Nycteris Javanica, Geoff. Ann. Mus. xx. t. 1. N. Kuhlii, Temm. Vesp. polycaris, Deschamps. Inhabits Java. Mus. Ind. House.

† † *Ears united; nostrils in the front part of a short lunate groove.*

23. NYCTOPHILUS, Leach? Temm. Barbastellus, Gray. Nose grooves united together behind by an elevated membranaceous crest, extending across the nose; forehead bare with a central longitudinal furrow having inflexed bald edges.

Australian Nyctophile. Nyctophilus Geoffroyii, Leach. Linn. Trans. xiii. 78? Temm. Vy. (1833.) Barbastellus Pacificus, Gray. Zool. Misc. (1831) 38. Inhabits Pacific Islands. Mus. Brit. and Linn. Soc. Mus.

24. BARBASTELLUS, Gray. Nasal groove simple lunate, extending a short distance behind the nostrils; forehead flat with an oval bald longitudinal line; ears large, broad, subquadrate; skull convex; face narrow.

Common Barbastelle. *Barbastellus communis*, Gray, B. Daubentonii, Bell. *Plecotus barbastellus*, Lesson. *Vesp. barbastellus*, Schreb. Barbastelle, Daubent. Mem. Acad. Paris, 1759, t. 2. f. 8. Buffon, H.N. viii. t. 19, f. 1, copied, Schreb. t. 559, Encycl. Meth. t. 38. f. 6. Geoffroy, Ann. Mus. viii. t. 46. 48. Europe. Brit. Mus.

25. *PLECOTUS*, Geoff. Nasal groove simple, lunate ; forehead with a linear bald streak ; forehead flat ; ears and tragus very large, elongate.

Common long-eared bat, *Plecotus communis*, Lesson. *Plecotus auritus*, Geoff. *Vesp. auritus*, Linn. Oreillard, Daubent. Mem. Acad. Paris, 1759, f. 1. and 2 (head). Buffon. H.N. viii. t. 17. f. 1, cop. Schreb. t. 50, and Encycl. Meth. t. 83, f. 1. Geoff. Ann. Mus. viii. t. 47 head. Edwards' Birds, t. 201. Penn. B. Zool. t. 103. Shaw's Zool. t. 40. Young, *Plecotus brevimanus*, Jenyns, Linn. Trans. xvi. t. 1, f. 2 ♀. Europe. Var. *α*. *Egyptiacus*, Geoff. *β*. *Austriacus*, Desm. Brit. Mus.

See also 1. *Plecotus cornutus*, Lesson. *Vesp. cornutus*, Faber, Isis 1826. Inhabits Jutland. 2. *P. Bonapartii*, *P. brevimanus*, Bonap. 3. *Plecotus Peronii*, Isidore St Hilaire, Mag. Zool. t. 3, f. 1. Inhabits—? 4. *Plecotus leucomelas*, Ruppell, Atlas t. 28 b. Inhabits N. Africa. 5. *P. Macrotis*, Le Conte.

Christie's long-eared bat, *Plecotus Christii*, n. s. Fur pale, hairs whitish with dusky tips ; beneath white ; spur very long ; interfemoral membrane with 11 or 12 cross lines of vessels on the back of the thigh and skin ; tragus half as long as the ears. Inhabits N. Africa. Dr Turnbull Christie. British Museum.

† † † Ears lateral, separate ; nostrils in the front of a long simple edged groove.

26. *ROMICIA*, Gray.—Nostrils small, ovate, apical ; each in the front of a converging groove, which are united behind into a groove on the centre of the nose between the swollen cheeks.

Long-spurred *Romicia*, *Romicia calcarata*, Gray.—Chin with two small warts on each side, and a large one on the front part of the throat ; fur brown with grey tips ; the tips of the hair on the under side longer and whiter, tragus elongated, oblong, blunt ; ears rounded ; wings black ; interfemoral membrane with regular muscular bands ; heel-bones very long, two-thirds the length of the margin, with a lobe on the outer edge of the base ; the other third of the margin with a strong muscular band. Inhabits —? British Museum.

† † † † Ears lateral separate ; nostrils with only a very short nasal groove behind them.

27. *VESPERTILIO*. Head round ; forehead convex ; face small, pro-

duced, nearly covered with hair; wings and ears thin, membranaceous; body covered with woolly hairs; tail long, the whole length of the interfemoral membrane, cutting-teeth $\frac{2-2}{4}$; skull globular; jaws produced, narrow; eyes large, exposed.

† *Thumb moderate; ears short.*

Vesp. mystacinus, *Leisl.* (Kuhl. l. c.) Europe. British Museum.

Vesp. Nattereri, *Kuhl. Wetter. Ann. iv. t. 2, 3*, (head.) Inhabits Europe, (London.) British Museum.

Vesp. Daubentonii, *Kuhl. Wetter. Ann. iv. t. 25, f. 1*, head. Inhabits Europe. British Museum.

Hardwicke's bat, *Vespertilio Hardwickii, Horsf.* Inhabits Java. British Museum. East India Company.

Painted bat, *Vespertilio pictus, Pallas.* V. kerivoula, *Bodd.* Inhabits Java (and Ceylon.) British Museum. East India Company.

See also 1. V. fuliginosa, *Hodgs.* 2. V. capaccini, *Bonap.* 3. V. emarginatus, *Brong.*

** *Thumb moderate; ears large.*

Large eared bat, *Vespertilio myotis, Bechst.*—Vesp. murinus, *Geoff. Ann. Mus. viii. t. 47 and 48*, (not Linn.) *Daubenton, Mem. Acad. 1759, t. 1, f. 1.* *Buffon, H.N. viii. t. 16, cop. Encycl. Meth. t. 38, f. 2.* Jun. Vesp. murinus, *Bechst. var. Vesp. submurinus, Brehm.* Inhabits S. of Europe, ("not found in Sweden," *Nilsson.*)

*** *Thumb very long.*

Vesp. Bechsteinii, *Leisl. Kuhl. Wetter, Ann. iv. t. 22, f.* Inhabits Europe.

**** *Thumb moderate, end of tail rather produced.*

Vesp. Capensis, *Smith, Zool. Journ. iv.* Inhabits Cape of Good Hope. M. Jourdan.

28. FURIA, *Fr. Cuv. Furipterus, Bonap.*—Head round; forehead compressed, convex; face small, broad, produced, nearly covered with hair; wings and ears thin membranaceous; tail bony for half its length, cartilaginous at tip, cutting teeth $\frac{4}{6}$, upper acute.

Furia horrens, *Fr. Cuv. Mem. Mus. xvi. t. 9.* Vesp. Furia, *Fischer.* Inhabits S. America. Does not the peculiarity of the tail arise from the bones having been partly withdrawn when the animal was skinned?

29. NATALUS, *Gray.* Head small; face depressed; nostrils apical, ovate, separated by a central ridge; lower lip callous, grooved; hind legs and tail very long; the heel-bone extending the whole length of the interfemoral membrane.

Natalus stramineus. Vesp. longicaudatus, *Gray, MSS.* Fur pale yellow-brown; paler beneath. Inhabits—? British Museum.

30. *MINIOPTERUS*, Bonap. 1837. Head subglobose; forehead convex; face short; ears small, thick, rounded; tragus lunate; eyes partly hid; feet long; tail very long; interfemoral membrane very large, folded on each side

Miniopterus Ursinii, Ch. Bonap. Fauna Ital. Italy, and M. Sciboldii, Japan. Museum, Leyden.

31. *SCOTOPHILUS*, Leach. *Nycticejus*, Rafin? Horsf. *Pipistrellus*, Bonap. V. *Pachyote*, Gloger. Head oblong; forehead flat; face swollen on the sides, naked in front; wings and ears thick, rather coriaceous; body covered with short fine adpressed thick-set hairs; cutting teeth $\frac{2}{6}^2$, when young $\frac{1}{6}^1$; when adult; skull flat above; forehead shelving; eyes small, hid in the fur.

The genus *Nycticejus*, Rafinesque, from an old specimen, as *Scotophilus*, Leach, is from a young specimen of this genus; *Nyctalus*, Bowdich, is only a species with ticks in its ears, and interfemoral membrane nearly bald.

Common bat. Penn. *Scotophilus murinus*, Gray. *Vespertilio Pipistrellus*, Schreb. V. *murinus*, Linn. Junior, *Vesp. pygmæus*, Leach. Zool. Journal, iii. Inhabits Europe. Colour variable. Leach's specimen of *V. pygmæus* is so young that the bones of the skull are neither united nor hardened, and the epiphyses are visible in all the joints.

Serotine *Scotophile*, *Scotophilus serotinus*, Gray. *Vesp. Serotinus*, Schreb. V. *noctula*, Geoff. Ann. Mus. viii. t. 47, 48 head. Le Serotine, Daubenton, Acad. Par. 1759, t. 2, f. 2. Buffon, HN. viii. t. 18, f. 2. cop. Schreb. t. 53, and Encycl. Meth. t. 23, f. 4. Serotine bat, Penn. Inhabits Europe.

Scotophilus Noctula, Gray. *Vesp. Noctula*, Schreb. t. 52. Fr. Cuv. Mam. Lith.—var. *Sumatrana*, Fr. Cuv. Inhabits Europe. Brit. Mus.

Scotophilus Kuhlii, Gray. *Vesp. Kuhlii*, Natterer. Kuhl. l. c. Inhabits Europe.

Scotophilus Leisleri, Gray. *Vesp. Leisleri*, Kuhl. V. *dasycarpus*, Leisl. MSS. Inhabits Europe.

Scotophilus discolor, Gray. *Vesp. discolor*, Kuhl. Wett. Annal. iv. t. 25, f. 2. Inhabits Europe (Bucharia.)

Scotophilus Schreibersii, Gray. *Vesp. Schreibersii*, Kuhl. Inhabits Europe.

Scotophilus Leachii, Gray. *Scotophilus Kuhlii*, Leach, Linn. Trans. xiii. 72. (Young) male chesnut, female brown. Inhabits —? British Museum.

Scotophilus Temminckii, Gray. *Vesp. Temminckii*, Horsf.

(Young) Vesp. Belangeri, *Isid. Geoff.* Belanger, Voy. adult. Inhabits India. E. India Company.

Scotophilus castaneus, *Gray.* Vesp. castaneus, *Gray.* Illustr. Ind. Zool. Inhabits India. General Hardwicke.

Scotophilus Heathii, *Gray.* Nycticejus Heathii, *Horsf.* Proc. Zool. Soc. 114. Inhabits India, (Madras.) Mus. Zool. Soc. Probably only a variety of Scotophilus Leachii?

Scotophilus Javanicus, *Gray.* Vesp. Javanica, *Fr. Cuv.* Nouv. Ann. Mus. 1. 21. Inhabits Java.

Scotophilus Coromandra, *Gray.*—Vesp. Coromandra, *Fr. Cuv.* Nouv. Ann. Mus. i. 21. Inhabits India. Vesp. formosa, *Hodgs.* Inhabits Nepaul. (If it is not Scot. Leachii, *Leach.*)

See also 1. Vesp. Alcitoe; 2. V. Leucippe; 3. V. Aristippe; 4. V. Savi, and 5. V. Vispistrellus, *Bonap.*; *Fauna Ital.*

** Upper surface of interfemoral membrane slightly covered with hair. (Pachyotus.)

† Face villose.

Scotophilus polythrix. Vesp. polythrix, *Isid. Geoff.* Ann. Sc. Nat. iii. 443.

† † Face partly bald.

Scotophilus lævis, *Isid. Geoff.* Ann. Sc. Nat. iii. 443.

** Upper surface of interfemoral membrane covered with close hairs
Lasiurus—Atalapha, *Rafn.*?

Scotophilus pruinosis. Vesp. pruinosis, *Say*, Long's Exp. 167. Inhabits N. America, (River Missouri.) British Museum.

Scotophilus lasiurus, *Gray.*—Vesp. lasiurus, *Schreb.* t. 62, B. cop. Encyc. Meth. t. 31, f. 4, *Geoff.* Ann. Mus. viii. t. 47, head. Inhabits Cayenne.

Scotophilus Blosssevillii. Vesp. Bonariensis, Voy. Coquille, t. 2, f. 1. Vesp. Blosssevillii, *Lesson*, Bull. Sc. Nat. viii. 95. Inhabits S. America (La Plata.)

See also, Scotophilus Noveboracensis. New York bat, *Penn.* Syn. t. 31, f. 2, cop. Encyc. Meth. t. 34, f. 5. Atalapha Americana, *Rafn.* Vesp. Noveboracensis, *Erxleb.* Doubtless belong to this section, but want further examination.

TRIBE IV. NOCTILIONINA.

Grinders acutely tubercular; wings long and narrow; body thin; tail thick.

* Tail short, tip on the upper surface of the large interfemoral membrane.

32. TAPHZOUS, *Geoff.* Saccopteryx, *Illiger.* Head conical, de-

pressed; forehead with a large pit; cutting-teeth, $\frac{0}{4}$; throat of males with a transverse slit. Inhabits Old World.

Taphozous perforatus, Geoff. Descript. Egypte, t. 3. f. 1. Dict. Hist. Nat. t. T. Senegalensis, Geoff. (dry?) from Lerot Volant, Daubenton. Tail rather longly produced. Inhabits Africa, Egypt. British Museum.

Taphozous lepturus, Geoff. Saccopteryx lepturus, Illiger, from Vesp. lepturus, Schreb. t. 57. Vesp. marsupialis, Müller, Naturf. 19. Said to come from Surinam; scarcely appears to differ from the former.

Taphozous nudiventer, Rüppell. Atlas, t. 27. Inhabits Africa (Nubia) Dr Rüppell. British Museum.

Taphozous rufus, Harlan, from the Red bat, Wilson. (Am. Orn. vi. t. 50. f. 4.) is a *Scotophilus* from the manner in which it bends its tail, perhaps *Scot. pruniosus*.

33. NOCTILIO, Linn. Celaeno, Leach. Head conical; forehead flat; muzzle acute warty; lips dependent; cutting-teeth, $\frac{4}{2}$ young, $\frac{2}{2}$ adult. America.

The genus *Celaeno* of Leach is only a specimen in which the bones of the tail have been withdrawn out of the skin. The original specimen is in the museum of the University College, London.

Noctilio Americanus, Linn. N. unicolor, Pr. Max. Vesp. leporinus, Linn., Schreb. t. 60. Seba, t. 55, f. 1. Peruvian Bat, Penn. Inhabits South America.

Noctilio mastivus. Vesp. mastivus, Vahl. Selsk. Skriv. iv. t. 132, f. 7. (1797.) *Noctilio dorsatus*, Pr. Max. Beitr. N. vittatus, Pr. Max. Abbild. t. Pteropus leporinus, Erxleb. Jun. N. albiventer, Spix, Braz. t. 36. f. 2. Desm. Mamm. Inhabits South America. British Museum.

? *Noctilio rufus*, Spix, Brazil, t. 35, f. 1. Inhabits S. America.

34. PROBOSCIDEA, Spix. Embalanura, Kuhl. Head long, conical; muzzle sharp, produced; forehead flat; upper jaw longest; cutting teeth $2 \frac{2}{6}$.

* *Interfemoral membrane truncated.* (Proboscidea, Spix.)

Proboscidea saxatilis, Spix, Braz. t. 35, f. 8, bad. Vesp. naso, Pr. Max. Abbild. t. Embalanura saxatilis? Temm.?

Proboscidea rivalis, Spix, Braz. Inhabits Brazils.

Proboscidea canina. Vesp. caninus, Pr. Max. Abbild. t. Inhabits Brazils.

** *Interfemoral membrane produced conical; heel-bone very long,*
Centro nycteris.

Proboscidea calcarata. Vesp. calcaratus, Pr. Max. Abbild. t. Vesp. Maximiliani, Fischer. Inhabits Brazils.

* * * *Interfemoral membranes, &c.*——? (*Embalanura, Kuhl.*)

Proboscidea monticola. *Embalanura monticola, Kuhl.* Face depressed; forehead rounded; wings brown; expanse 6 inches; heel-bone 4 lines. Inhabits Java. Museum, Leyden.

35. *AELLO, Leach.* Head subconic; forehead flat; ears large, separate; cutting-teeth $\frac{2}{4}$; upper, chisel-shaped, 2 cut; tail rather elongated with a membranous band to the tip of the large truncated interfemoral membrane; heel-bone very slender.

Aello Cuvieri, Leach. Linn. Trans. xiii. 71. Inhabits ——? Museum University College of London.

†† *Tail produced beyond the bend of conical interfemoral membrane.*

36. *PTERONOTUS, Gray.* Ears lateral; tragus elongate lobed; chin with a reflexed cartilaginous edge to the lower lip, and an erect membranaceous ridge across its lower part; wings only affixed by a narrow line to the middle of the back, which is covered with fur beneath them; hind-feet long; the ankle rather produced and exposed; the lower angle of the wing lies folded over it.

Pteronotus Davyi, Gray. Mouse-coloured, wings baldish; exp. 12 inches. Inhabits Trinidad. Museum Fort Pit, Chatham. Tail imperfect. In honour of Dr John Davy, so well known for his physiological papers.

††† *Tail thick, produced beyond the end of the short transversely-folded interfemoral membrane; thumb large, swollen beneath; cutting-teeth very variable in number.*

37. *CHEIROMELES, Horsf.* *Dysopes, Temm.* not *F. Cuv.* Ears small, separate, lateral; back nearly naked; great toe very large, versatile, bearded.

Collared-handed Bat. *Cheiromeles torquatus, Horsf.* Java, t. copied in *Dysopes cheiropus, Temm. Mon. t. 7, and t. 23, f. 15.* *Molossus torquatus, Fischer.* *Molossus cheiropus, Less.* Inhabits India, (Siam.) Museum, India House.

38. *NYCTINOMUS, Geoff.* Ears very large close together, or folded down on the forehead; muzzle obliquely truncated, bristly; lips very large, transversely grooved, and with scattered bristle-like hairs; thumb and little toe with a patch of white tufted hairs.

Nyctinomus plicatus. *Molossus plicatus, Fischer.* *Vesp. plicatus, Buchanan, Linn. Trans. v. t. 13.* *Dysopes plicatus, Temm.* *Nyctinomus tenuis, Horsf.* Java t. (dry) cop. *Dysopes tenuis, Temm. Mon. t. 19, 20, t. 23, f. 30.* 16 skeletons. *Nyctinomus Bengalensis, Geoff.* *Vesp. labiata, Hodgs.* *Dysopes labiatus, Temm. MSS.?* *Nyctin. dilatatus, Horsf.* Java. *Gray's Illustr. Ind. Zool. 2.* *Molossus dilatatus, Lesson.*

The upper edge of the nose disk surmounted by a series of short close processes; face, with scattered flattened hairs, which are curv-

ed at the tip, some of them forming a tuft on the front of the lip ; ears united in a common tubercle in front ; the pad of the great and little toes narrow, hairs slender, long. Inhabits India (Bengal) Java. British Museum.

Nyctinomus Rüppelli. *Dysopus Rüppelli*, *Temm.* Mon. t. 18, t. 23, f. 6, 8. *Molossus Rüppelli*, *Lesson*. Upper lip with scattered straight black bristles, intermixed with flat hooked ones ; pad of great and little toes very large. Inhabits Egypt and Fernando Po. British Museum.

Nyctinomus pumilus. *Dysopes pumilus*, *Rüppell*, Atlas, t. 27, a. Inhabits North Africa, (Egypt.) Dr Rüppell.

Nyctinomus murinus, *Gray*, *Griff. A. K.* v. 187. *Molossus murinus*, *Fischer*. Petit chauve-souris obscure, *Azara*? Face hairy, with black bristles ; upper lip simple in front ; ears round, separated at the base in front ; tragus slender ; pad of great and little toes large, broad. Inhabits South America, (Brazils ;) West Indies, (Jamaica.) British Museum.

Nyctinomus nasutus. *Molossus nasutus*, *Spix*, *Braz.* t. 35, f. 7. *Dysopes nasutus*, *Temm.* Mon. t. 24, f. 2, 3. *Nyctinomus Braziliensis*, *I. Geoff.* Ann. Sc. Nat. I. t. 22, f. i. cop. *Zool. Journ.* t.

39. *MOLOSSUS*, *Geoff.* Ears very large, close together and folded down on the forehead ; face conical ; nose rounded at the end ; lips smooth or hairy ; great and little toe with a pad of hooked hairs ; throat with a central pouch in front ; lower joint of thumb swollen.

Molossus velox, *Lesson*. *Dysopus velox*, *Temm.* Mon. t. 22, f. 1. t. 23, f. 22 ; upper lip with a roundish group of close slender hooked hairs in front ; throat-pouch large. Inhabits Brazils, Cuba. British Museum.

Molossus fuliginosus. Face naked, black with a bunch of hairs on each side, just before the eyes ; upper lip with a triangular patch of hooked white hairs in front ; lips smooth, inner edge slightly fringed with rather stiff hairs in front ; tragus long pointed ; tail half free ; nose-disk convex with denticulations on the edge, with a triangular bunch of hair below the nostril ; end of face hairy ; throat-pouch small. Inhabits — ? British Museum.

Molossus rufus, *Geoff.* *Dysopes rufus*, *Temm.* Mon. t. 23, f. 19. teeth. *Dysop. perotis*, *Pr. Max.* Abbild. t. . Upper lip with a narrow erect triangular group of hooked hairs between the nostrils ; edge of the nose disk finely crenate ; ears close together in front. Inhabits Brazils, Surinam. British Museum.

Molossus australis. Dark-brown, rather paler beneath, with a broad pure white streak down each side, between the wing and the body, and a narrow white streak round the edge of the rump beneath ; ears large, broad, rounded ; tail nearly one-half free. In-

habits New South Wales. (Major Macarthur.) United Service Museum.

40. *THYROPTERA*, *Spix*. Ears large, close together, and folded down over the forehead; lips thick; muzzle obliquely truncated; thumb thin, with a large rounded dilatation at the middle-joint; hind feet weak, small.

Thyroptera tricolor, *Spix*, *Braz*, t. 36, f. 1, evidently young. Black-brown above, beneath pale-white; wings and ears black. Inhabits Brazil.

41. *MYOPTERIS*, *Geoff*. Ears large, lateral; muzzle short and blunt; cutting teeth, $\frac{2}{2}$, upper pointed, close together.

Myopteris Daubentonii, *Geoff*. from *Rat volant*, *Daubenton*, *Mem. Ac. Paris*, 1759, 386. Inhabits N. America. Is it a *Noctilio*?

See also *Nycticegus cynocephalus*, *Le Conte*.

* * * *Tail very short, many-jointed, enclosed in a two-valved sheath, placed at the base of the extended interfemoral membrane.*

42. *DICLIDURUS*, *Pr. Max*.

Diclidurus Freyreissii, *Pr Max*. *Isis*, 1819. *D. albus*, *Pr. Max*. *Abbild*, t. Inhabits Brazils. Museum, Neuwied. Perhaps more allied to *Vespertilionina*.

TRIBE V.—PTEROPINA.

Grinders bluntly tubercular; nose simple; nostrils slightly produced; end of index finger-clawed; head conical; ears simple, lateral; tragus none; wings long; lower joint of thumb long, united to the wing by a membrane; interfemoral membrane short; tail none, or short; living on fruit in Indian islands and Polynesia.

43. Ternate Bat, *PTEROPUS*. Head long, conical; muzzle acute; grinders $\frac{5}{6}$ or $\frac{4}{6}$; tongue short; wings from the side of the body; tail none, or short.

* *Tail none; ears large.*

Black Ternate Bat, *Pteropus edulis*, *Pennt*. *Pt. Javanicus*, *Desm. Temm. Mon.* t. 15, f. 1. *Pt. Edwardsii*, *Geoff.*? *Vesp. vampyrus*, *Linn.* *Vesp. Celaeno*, *Herm. Seba*, t. 57, f. 2. Ternate Bat, *Pennt*. *Var. Pt. Edwardsii*, *Geoff.* Inhabits Java, Sumatra, Timor, Bengal?

Indian Ternate Bat, *Pteropus medius*, *Temm.* Inhabits India, (Calcutta, Pondicherry.)

* * *Tail none; ears small.*

Pale-faced Ternate Bat, *Pteropus phaiops*, *Temm.* Inhabits Madagascar.

Grey-headed Ternate Bat, *Pteropus poliocephalus*, *Temm.* Inhabits New Holland.

Red-necked Ternate Bat, *Pteropus dasymallus*, *Temm.* Mon. t. 10, t. 13, f. 10, 11, cran. *Pteropus rubricollis*, *Siebold*, not *Geoff.* Inhabits Japan.

Common Ternate Bat, *Pteropus vulgaris*, *Geoff.* Roussette, *Buff.* H. N. x. t. 14. cop. *Vesp. caninus*, *Schreb.* t. 44. Inhabits Isle of France, Bourbon, (Madagascar?)

Red-collared Ternate Bat. *Pteropus rubricollis*, *Geoff.* Pt. collaris, *Licht.* *Vesp. Vampyrus* β . *Erxleb.* Roussette, *Buff.* H. N. x. t. 17. Inhabits Cape of Good Hope, *Lichtenst.* Bourbon and Madagascar, *Temm.*

Pale Ternate Bat, *Pteropus pallidus*, *Temm.* Mon. t. 15, f. 8, 9. Inhabits Banda.

Keraudren's Ternate Bat, *Pteropus Keraudrenii*, *Quoy* and *Gaim.* Voy. Uran, t. 3. *Temm.* Mon. t. 15, f. 7. cran. Pt. *Marianus*, *Desm.* Inhabits Island of Guam. *Quoy* and *Gaimard.*

Amboyna Ternate Bat, *Pteropus Dussumieri*, *Isid. Geoff.* *Belanger*, Voy. 9, 8. Inhabits India and Amboyna.

Grey Ternate Bat, *Pteropus griseus*, *Geoff.* Ann. Mus. xv. t. 6. cop. *Temm.* Mon. t. 11. Inhabits Timor. *Pennt.*

Masked Ternate Bat, *Pteropus personatus*, *Temm.* Mon. 189. Inhabits Ternate Islands.

See also *Pteropus leucocephalus*, *Hodgson.* Inhabits Nepal.

* * * Tail very short.

Pteropus Aegyptiacus, *Geoff.* *Pteropus Geoffroyi*, *Temm.* t. 15. f. 14, 15. Inhabits N. and E. Africa. *Dr Turnbull Christie.*

Pteropus Leachii, *A. Smith*, Zool. Journ. Inhabits Cape of Good Hope.

Pteropus stramineus, *Geoff.* *Temm.* Mon. 1, t. 15, f. 12, 13. Inhabits Timor.

* * * * Tail rather elongated. ($\frac{1}{2}$ inch.)

Pteropus Leschenaultii, *Desm.* Inhabits Pondicherry.

Pteropus amplexicaudatus, *Geoff.* Ann. Mus. xv. t. 7. Cop. Dict. Sc. Nat. t. and *Temm.* Mon. t. 13. t. 15, f. 16. Inhabits Timor, Amboyna, Sumatra, Siam. (C. Good Hope?)

44. CYNOPTERUS, *F. Cuv.* *Pachysoma*, *Isid. Geoff.* Head short broad; lips thick on the sides; grinders $\frac{4}{3}$; tail short, free; wings from the side of the back.

Cynopterus marginatus, *Fr. Cuv.* *Pteropus marginatus*, *Geoff.* Ann. Mus. xvi. t. 8. cop. *Temm.* 1, t. 14. Inhabits India.

Cynopterus titthæcheilus. *Pteropus titthæcheilus*, *Temm.* Mon. t. 13, f. 17, 24. *Pachysoma mammilevre*, *Geoff.* Male with a tuft of hair on the side of the neck, white in young, reddish in adult. *Is. Geoff.*

Cynopterus brevicaudatus. *Pachysoma brevicaudatum*, *Is. Geoff.*

Inhabits Sumatra. Tail very short. This and the next are probably varieties of the former.

Cynopterus Diardii. Pachysoma Diardii, *Is. Geoff.* Inhabits Sumatra.

Cynopterus Duvancellii. Pachysoma Duvancellii, *Is. Geoff.* Inhabits Sumatra. Thumb of wing elongated.

Cynopterus melanocephalus. Pteropus melanocephalus, *Temm.* Mon. t. 12, t. 18, f. 3, Scel. f. 4, teeth. Pachysoma melanocephalum, *I. Geoff.* Inhabits Java. Wings very short, rounded.

The Vespertilio Sphinx, *Vahl.* Natur. Selsk. Skriv. iv. 130, from Tranquebar, probably belongs to this genus.

45. EPOMOPHORUS, *Bennett.*—Head very large, muzzle acute long; grinders $\frac{5}{2}$ front lower small; tail none? wings far back.

a. Tuft of white hair near the ears, and another on the sides of the body, false grinders $\frac{3}{2}$.

Epomophorus Whitii. Pteropus Whitii, *Bennett*, Trans. Zool. Soc.—Pt. epomophorus, *Bennett*, Proc. Zool. Soc. Inhabits W. Africa.

b. Tuft of white hairs at the base of the ears; head very long.

Epomophorus macrocephalus. Pteropus macrocephalus, *Ogilby*, Proc. Zool. Soc. iii. 100. Pt. megacephalus, *Swains.* Lardn. Cycl. 92, p. 31 and 154. Inhabits W. Africa. British Museum.

c. Tuft of white hairs at the front base of the wing, head moderately long.

Epomophorus Gambianus. Pteropus Gambianus, *Ogilby*, l. c. W. Africa.

46. MACROGLOSSA, *Lesson.* Macroglossum, *F. Cuv.* not *Fabr.* Head elongated; muzzle slender, subcylindrical; tongue long, slender, exsertile, smooth; wings from the sides of the back; live chiefly on the fruit of *Eugeniæ*.

Macroglossa minima. Pteropus minimus, *Geoff.* Pt. rostratus, *Horsf.* Java, t. *Temm.* Monog. t. 15, f. 25, 30, t. 16, f. 1, 2, M. kiodes and M. Horsfieldii, *Lesson.* Inhabits Java, (Gen. Hardwicke.) British Museum. East India Company.

47. HARPYIA, *Illiger.* not *Cuv.* Head short broad; lips thick; grinders — ? wings arising from the centre of the back; index-finger clawed; tail very short.

Harpyia Pallasii, *Desm.* Cephalotes Pallasii, *Geoff. Ann. Mus.* xv. Vesp. cephalotes, *Pall.* Spic. Zool. iii. t. 1 and 2. cop. *Schreb.* t. 61. Cephalote, *Buffon*, H. N. Suppl. iii. t. 2. Molucca bat, *Penn.* Pteropus Cephalotes, *Tiedem.* Inhabits Molucca Islands.

See also Cephalotes tæniotis, *Rafn.* from Sicily.

48. CEPHALOTES, *Fr. Cuv.* Hypoderma, *Isid. Geoff.* Head short, broad, lips thick; wings arising from the centre of the back; index-finger not clawed.

Cephalotes Peronii, Geoff. Ann. Mus. xv. t. 9. cop. Dict. Sc. Nat. t. Hypoderma Peronii, Isid. Geoff. jun. Pteropus palliatus, Geoff. Ann. Mus. xv. 99. Inhabits Timor.

II.—*Account of a Botanical Excursion in the Alps of the Canton of Valais, Switzerland, in August 1835; and Catalogue of the Plants collected, with occasional Remarks.* By R. J. SHUTTLEWORTH, Esq. (Continued from p. 196.)

235. *C. scabiosa*, L. α . *macrophylla*, foliis radicalibus maximis ly-rato-pinnatifidis, laciniis integerrimis, terminali ovato-obtuso maximo. γ . *leptophylla*, foliis radicalibus subbipinnatifidis, caulinis pinnatifidis, laciniis fere linearibus acutis subintegris, subtus, præsertim junioribus, subincano-tomentosis. *C. scabiosa*, γ . *tenuifolia*, Gaud ?

H. α . In dumetis inter Thermas Leucenses et Inden; β in colli-bus apicis inter Varen et Siders.

Obs. Folia radicalia in spec. meis var. α , 6 ad 8 uncialia lacinio terminali 2-3 uncias lata et 3-5 longa. Caulina etiam maxima sublyrata profundissime pinnatifida, laciniis etiam integerrimis arcuatis, recurvis. In var. β . capitula fere duplo minora quam in var. α ., involucri majis ovato, et. phyllis pallidis breve ciliatis. Varietatem inter α . et γ fere mediam in segetibus Hiberniæ legi, foliis subbipinnatifidis, laciniis ovato-lanceolatis inciso-dentatis.

236. *Carlina vulgaris*, L.

H. In apricis inter Inden et Varen.

237. *Xeranthemum inapertum*, Willd.

H. In arvis incultis inter Varen et Siders, copiose.

238. *Hieracium pilosella*, L. H. foliis integerrimis obovato-ellipticis, stolonibus repentibus, involucri squamis lineari-lanceolatis, scapo monocephalo. α . viride. Ser. foliis utrinque viridibus, sparse pilosis. H. P. β . viride, Gaud. Helv. v. p. 71, β . vulgare, foliis dorso-tomentosis, pilis utrinque sparsis longis hirtis. H. P. α . vulgare, Gaud. l. c. γ . arenarium mihi, late repens, pluriscapum, foliis minoribus facie viridibus pilis sparsis longis hirtis, dorso, stolonibusque, incano-tomentosis; capitulis parvis involucri incano. δ . incanum, involucri, foliisque utrinque incano-tomentosis, tomento brevissimo, vix pilosis. H. P. β . incanum, DC. H. Fr. iv. p. 23. H. P. γ . incanum, Gaud. l. c. ϵ . pilosellæforme, foliis dorso-incanis, facie sparse pilosis, scapo elato incano, pube brevi atra conspersa; capitulis majoribus, phyllis lineari-lanceolatis latioribus incanis, pube brevi atra ad carinam consitis. H. pilosellæ forme Hoppe, Gaud. l. c. H. pilosella alpina Hoppe exst. β . Peleterianum, foliis obovato-lanceolatis elongatis, sub-

tus tomentosus, scapo anthodioque longissime villosis. *H. peleterianum* Mérat. Rchb. H. P. γ . Dub. Bot. Gall. δ Gaud. l. c. H. β . ad viam inter Inden et Varen; γ . in arenosis ad Rhodanum prope Leuk; δ . in pascuis M. Fünelen et in alpinis supra Tæsch; ϵ . in collibus graminosis inter St Nicholas et Zermatt et in pascuis alpinis supra Zermatt.

Obs. Inter α . et ϵ . nullos limites invenire potui, variant nempe involucro incano vel viridi, phyllis linearibus, lineari-lanceolatis vel lanceolatis; capitulis majoribus minoribusve; foliis utrinque vel tantum facie sparse pilosis, dorso sæpius incano-tomentosis. Var. β . me judici potuis quam ϵ . a stirpe separanda: δ . sæpe extolonosum, sed etiam ut ϵ . stolonibus longis sæpe præditum; folia majuscula, capitula sæpe majuscula. γ . varietas insignis; stolones repentes nempe instar *Polypodia Americana* minora demum indurescunt, et scapi plures ex eodem nodo prodeunt.

239. *H. dubium*, Willd. *H. auricula*, Rchb. Germ. exc. No. 1719, α . vulgare, β . uniflorum, γ . pilosum, foliis facie longe pilosis.

H. α . et β . In pascuis alpinis M. Schwarzseeberg et Fünelen; γ . Ad viam inter Stalden et St Nicholas.

240. *H. angustifolium*, Hoppe!

H. In pascuis et ad moles glaciales M. Schwarzseeberg, Fünelen, et supra Tæsch.

241. *H. piloselloides*, Vill. Rchb. *H. florentinum*, ii. piloselloides Gaud. β . acutifolium, minus alpinum, scapo brachiato 3-4 flo. Gaud. l. c. p. 8.

H. In arenosis inter Sidens et Leuk, et ad viam inter Stalden et Visp., β . In pascuis M. Schwarzseeberg.

242. *H. alpicolum*, Schleich! Gaud. l. c. p. 73.

H. rarissime ad moles glaciales, M. Fünelen.

Obs. Stirps rarissima. Caulis submonophyllus, 1-2 cephalus stellato-tomentosus, superne pilis longis sericeo-albidis, aliis brevibus glanduliferis nigris intermixtis, tectus: folia lineari-lanceolata dorso stellato-tomentosa, facie longe setosa: Involucrum subglobosum, pilis luridis hirsutissimum. Planta paradoxa huic *Piloselloideis* (*H. angustifolio*, Hoppe,) inde *eriocephalis* (*H. glandulifero* Hoppe) affinis.

243. *H. glanduliferum*, Hoppe! *H. glabratum*, Schleich! Thom! exs. non Hoppe. *H. Schraderi glabratum*, Gaud?

H. In M. Gemmi supra Schwarrenbach, in M. Fünelen.

Obs. Caulis pollicaris, semipedalisve, monocephalus, nudus vel folio unico minimo instructus, ubique sed præsertim superne indumento duplici tectus, tomento albo brevi et pilis glanduliferis nigris numerosissimis: Folia anguste-lanceolata, acuta glaucescentia glabruscula vel facie pilis longis albidis, præsertim ad petiolum in-

structa, sæpius undulata. Involucrum densissime luride-villosum ut bene observat cl. Rchb. "Anthodium quasi murinam pellem sistat." Præcedenti magis quam *H. alpino* vel *Schraderi* affine.

244. *H. Schraderi*, DC.

H. In saxosis M. Gemmi ad talis glaciales Lammerngletscher, 31 Aug. 1836.

Obs. Involucro ad *H. glanduliferum* Hoppe, foliis magis ad sequentem et. *H. villosum*, L. occedit.

245. *H. subnudum*, Schleich!

H. In alpihus supra Tæsch.

Obs. Caulis submonocephalus, folia elliptico-lanceolata obtusa involucroque villosissima. Folia caulina pauca minima. Cum *H. Schraderi* conjunxit cl. Gaudin, sed *H. villosum* magis affine, quo transit varietate foliis acutis.

246. *H. valde pilosum*, Vill.

H. In saxosis M. Gemmi supra Schwarrenbach et ad lacum Dauben.

Obs. Caulis foliosus, folia caulina numerosa lata, amplexicaulia involucroque villosissima. In planta alpina caulis plerumque monocephalus, in planta ϵ Jurasso capitula 2-5.

247. *H. villosum*, L. α . folia integriscula. β . caule humili foliis radicalibus longe petiolatis ad basin sinuato-dentatis vix longiori.

H. α . In M. Gemmi supra Schwarrenbach. β . in umbrosis supra Kandersteg.

Obs. Folia caulina pauciora angustiora quam in præcedenti, vix amplexicaulia: involucrum, caulis, et folia piloso-villosa.

248. *H. rupestre*, All. ? Auct. ad Ped. Tab. i. f. 2, (sed non omnino cum nostra planta convenit.) α . caule scapiformi 1-2 flora nudiuscula, foliis dorso villosis. Gaud. Helv. v. p. 92. *H. rupestre*, Schleich. Thom. exs.!

H. In saxosis M. Gemmi supra Schwarrenbach.

Obs. Folia lanceolata, utrinque attenuata, firma, dentata, subtus pilosa, facie glabra.

249. *H. staticifolium*, Vill.

H. Ad viam et in apricis inter Inden et Varen, prope Leuk, inter Stalden et St Nicholas et (caule monocephalo) in glareosis M. Fünelen.

250. *H. amplexicaule*, L.

H. Prope Kandersteg.

251. *H. Halleri*, Vill. *H. hybridum*, Vill. Dauph. iii. Tab. 26.

H. In M. Gemmi supra Schwarrenbach.

252. *H. intybaceum*, Jacq. *H. albidum*, Vill.

H. *Zermatt. In M. Grimsula infra Hospitium.

253. *H. prenanthoides*, Vill. β . ramosum, caule elato, ramoso multifloro, foliis maximis firmioribus.

H. In pratis humidis prope Kandersteg ; β . inter Thermas Leucenses et Inden.

254. *H. murorum*, L. var *alpina*.

H. In glareosis et petrosis ad nives perennes M. Gemmi.

Obs. Caulis humilis pedalis, oligo (sæpius) monocephalus, sub nudus vel folio unico angustissimo instructus : folia radicalia brevè-petiolata lanceolata acuminata vel ovalia acuta, basi truncata, satis profunde inciso dentata dentibus patulis, mucroni glanduloso teretifiliformi terminatis. Capitula mediocra, involucrio incano-pubescenti. Ad varietatem pictum et incisum auct. accedit, sed non omnino.

255. *H. prunellæfolium*, Vill.

H. In glareosis M. Gemmi ad nives perennes supra Schwarrenbach. Copiosissime in consort. *Apargiæ Taraxaci* et *Ranunculi parnassæfolii*.

256. *H. sabaudum* L. var. γ . β . villosum, Gaud. *Helv.* v. p. 109?

Caule, foliisque ovato-lanceolatis amplexicaulibus sursum decrescentibus, summis minimis, hirsutis ; capitulis corymbosis et axillaribus solitariis, involucrio pubescenti.

H. In apricis umbrosis inter Inden et Varen.

Obs. Hanc plantam etiam in Jurasso legi, et ab am. Thomas ut *H. sylvaticum* Gouan accepi.

257. *H. lanatum*, Vill.

H. In apricis inter Inden et Varen, et prope pagum Fünelen, supra Zermatt.

258. *H. blattarioides*, L. *Soyeria*—Monn. *Catorica*—Mœnch.

H. In umbrosis pascuisque humidis prope Kandersteg.

259. *Phanicoopus decurrens*, Cass. *Prenanthes viminea*, L.

H. Inter Stalden et St Nicholas.

Obs. Cum icone All. *Ped. Pl.* LII. f. 2, vel xxxiii. f. 1. (*P. ramosissima*) haud bene convenit nostra planta, et fateor has species non omnino intelligo. Ut *P. ramosissima*, plantam a cl. B. albis missam possideo, quæ, pusilla et ramosissima, diversa videtur. Nostræ plantæ, caulis bipedalis et ultra ramosus, ramis gracilibus elongatis ; capitula aggregata subsessilia secus ramos approximata, numerosa ; folia glabra concoloria, caulina inferiora pinnatifida, laciniis anguste linearilanceolatis bifidis vel integerrimis, summa linearia decurrentia ; Achenia striata scaberrima in stipitem longam aterrimam attenuata.

260. *Picris hieracioides*, L. β . *alpestris*, lævior, foliis lanceolatis, cordato-amplexicaulibus, sinuato-dentatis vel integriusculis ; ramis rigidis divaricatis, pedunculis valde incrassatis. γ . petiolata, scabra hirtaque sæpe multicaulis, caule pedali sesquipedali vix ultra, foliis radicalibus longissimis, caulinisque inferioribus

lineari-lanceolatis, lanceolatisve, obsolete sinuato-dentatis, in petiolum longum attenuatis, superioribus sessilibus, summis amplexicaulibus vix auriculatis; corymbo terminali simpliciusculo, pedunculis brevibus vix incrassatis. P. hieracioides β . longifolia, Gaud? P. umbellata, Nees ab Es.?

H. β . in umbrosis humidis prope Kandersteg. γ . in pratis humidis inter Varen et Siders.

Obs. In var. β .—forma foliis sinuato-dentatis asperior est quam forma foliis integriusculis, cujus caulis glabriusculus. Planta Britannica asperrima a forma vulgari Helvetica recedit, pilis longioribus numerosissimis intricatisque. In var. γ .—variat interdum corymbo subdichotomo, ramis elongatis erectis, foliisque caulinis superioribus sabauriculatis.

261. *Barchhausia fætida*, DC.

H. In incultis prope Varen, Siders, et in arvis inter Stalden et St Nicholas.

262. *Chondrilla juncea*, L.

H. In arvis incultis prope Siders et Leuk.

263. *C. acanthophylla*, Bork. in Rchb. Germ. exc. No. 1802. *Chondrilla* foliis, "radicalibus sinuato pinnatifidis, dentibus acuminatis pectinatis," (Rchb. l. c.) caulinis lineari-lanceolatis, lanceolatis, ovato-lanceolatisve, setaceo-dentatis, involucre farinoso canescenti. α . angustifolia mihi, foliis lineari-lanceolatis setaceo-dentatis vel interdum subintegris, dentibus paucis ad basim instructis. *Ch. acanthophylla* Rchb. exsic! β . latifolia mihi, foliis lanceolatis vel ovato-lanceolatis setaceo-dentatis. *C. rigeus*, Rchb. Germ. exc. No. 1803? *C. graminea*, M. Bieb. Tour. Cauc. ii. 244? (Plantam ϵ Volga sub hoc nomine a cl. Bieberstein missam possideo, quæ nullo modo a nostra differt, folia nempe etiam summa ovato-lanceolata marginibus setaceo-dentatis, dentibus tantam minus conspicuis quam in planta nostra: sed cum diagn. cl. auctoris male convenit.)

H. Ad viam et in arvis inter Stalden et St Nicholas.

Obs. Glauescens, caulis ad basim hispidus, in α (ut in Spec. Rchb.) satis ramosus, ramis minus longis quam in *C. juncea*, suberectis; in var. β . minus ramosus, ramisque brevioribus. Capitula majora, involucre farinosis: achenia ut in *C. juncea*, nisi forsitan longiora, superne ad angulos exasperata, et apice dentibus 5 longioribus coronata. Helvetia nova cives, a *C. juncea*, distinctissima, sed forsitan cum *C. latifolia*, MB. l. c., mihi ignota, conjungenda, quæ differt squamis involucri "setis longiusculis patentibus hispidis."—Differentiæ ϵ colore ligularum a cl. Rchb. sumptæ, me judici, nulli momenti sunt.

264. *Lactuca sacriola*, L. α . foliis radicalibus ad carinam aculeo-

latis, panicula laxa, ramis adscendenti-patentibus. β . foliis omnibus ad carinam muticis, &c. γ . foliis omnibus ad carinam muticis panicula exacte-pyramidata, ramis deflexo-patentibus.

H. α . Ad viam inter Siders et Leuk. β . in arvis inter Stalden et St Nicholas. γ . in incultis prope Varen.

265. *L. perennis*, L.

H. In apricis inter Stalden et St Nicholas.

266. *Podospermum laciniatum*, L.

H. In incultis prope Siders.

267. *Leontodon alpinus*, Jacq. *Apargia* Host.

H. In pascuis M. Fünelen.

268. *L. crispus*, Vill.

H. Ad pagum Fünelen supra Zermatt.

Obs. In exempl. macrioribus scapus interdum divisus, dicephalus.

269. *Apargia taraxaci*, Willd. β . demidata, involucri pilis brevibus minus copiose hirsuto, foliisque minus dentatis.

H. In glareosis M. Gemmi supra Schwarrenbach copiose. β . rarius.

Obs. Planta Scotica, cujus spec. nimis manca possideo, videtur diversa. Involucrum var. β . vix magis hirsutum quam in *Leontodon* Alpino, sed scapus valde incrassatus omnino *A. taraxaci* α .

270. *A. hyoseridifolia*, Less. Syn. p. 132. *Hieracium*, Vill.

H. rarissime in glareosis ad lacum Dauben M. Gemmi in consort.

A. taraxaci et *rariunculi parnassifolii*. 31 Aug. 1836.

Obs. Pulcherrimæ rarissimæque stirpis nova localitas.

271. *Taraxacum lævigatum*, DC. Rchb. Germ. exc. No. 1796.

H. Ad nives perennes M. Schalmetti in M. Gemmi.

272. *Tragopogon campestris*, Bess. ? *En. Pl. Volh.* p. 84. Tr. involucri sub 8-phylo, phyllis decoloratis flosculos æquantibus vel superantibus, pedunculo subincrassato; foliis linearibus, linearilanceolatisve carinatis planis strictis, Achenius incurvatis muricato-striatis.

H. In pratis inter Thermas Leucenses et Inden.

Obs. Caulis bi-tripedalis ramosus, ramis erectis strictis; capitula parva semi aperta (non ut in *T. pratensi* horizontaliter patentia,) involucri flosculos interdum multo excedens, sed sæpius æquans vel paulo superans, phyllis 5-8. Flosculi flavi, antheris fuscis atropurpleisve. Hanc plantam etiam copiose in segetibus vallis Lignieres in Jurasso inveni: seruis floret quam *T. pratensis*, (in Jurasso 10, &c. Jul. in Valesiæ, 19. Aug.) Meram varietatem *Tr. pratensis* vix constitui potest, nisi etiam et *Tr. major* inter var. *Tr. pratensis* redigendus. Medius inter *Tr. pratensem* et majorem, ab utroque satis differt: variat ut affines foliis apice tortilibus.

273. *Sonchus alpinus*, auct.

H. In M. Grimsula infra Hospitium.

274. *Scabiosa columbaria*, L.

H. In graminosis aridis prope Varen.

Obs. Forma calcarea. Caulis pedalis, sesquipedalis ramosus foliisque canescenti-pubescentibus. Folia caulina tenuissime bipinnatifida vel pinnatifida laciniis linearibus incisus involucrium floribus brevius vel vix æquale capitula parva.

275. *S. lucida*, Vill.

H. In pascuis M. Gemmi supra Schwarrenbach.

276. *Galium lucidum*, All. Ped. ii. p. 77. β . caule inferne foliisque inferioribus pubescentibus, Gaud. Helv. i. p. 419.

H. In apricis inter Inden et Varen.

Obs. Vix a *G. tenuifolio*, All. ! distinguenda. In exempl. meis *G. tenuifolii* ex Herb. All. folia non sunt retrorsum (ut habet Cl. Rchb.) sed autrorsum scabra.

277. *G. helveticum*, Weig. Gaud.

H. In glareosis M. Gemmi supra Schwarrenbach.

278. *Astrantia minor*, L.

H. In umbrosis M. Gemmi supra Kandersteg.

279. *Bupleurum ranunculoides*, L. var. involucrellis octophyllis.

H. In saxosis et graminosis, M. Schwarzseeberg.

Obs. Caulis simplex uncialis—pedalisve. Folia summa amplexicaulia cordata ovato-lanceolata, potius bractea vel involucra dicenda, nam textura et forma omnino cum involucris conveniunt; et saepe in eorum axillis flores abortivos vidi. In exempl. fere omnibus, quae ex alpebus accepi et in Jurasso legi, involucella constanter 5-phylla sunt; involucra autem monophylla usque ad hexaphylla inveni—*B. caricifolium* W. species mihi dubia, et forsitan recte a cl. Koch hæc specie conjuncta.

289. *Athamanta cretensis*, L. α . alpina, dense incano-hirsuta, foliis bipinnatis, pinnis pinnatifidis, laciniis brevibus lineari-ovatis acutis.

H. Ad rupes M. Gemmi supra Schwarrenbach.

Obs. In Jurasso occurrunt var. β and γ .

β . tomentosa, foliis tripinnatis, pinnis pinnatifidis, laciniis lineari-filiformibus elongatis acutis apiculatisve. γ . glabriuscula læte-virens, laciniis pinnarum filiformibus elongatis.

281. *Gaya simplex*. Gaud. Ligusticum, All. *Pachypleurum*—Rchb.

H. In pascuis, M. Gemmi supra Schwarrenbach, supra Zermatt et Täsch.

282. *Imperatoria Ostruthium*, L.

H. In petrosis M. Fünelen.

283. *Laserpitium hirsutum*, Lam., L. Halleri Gaud., Hall. Tab. 19.

Opt.

H. In petrosis alpinis supra Tæsch.

284. *Torilis helvetica*, Gm. Bad. i. 617. β . anthriscoides, DC. Prod. iii. 219.

H. In arvis incultis prope Varen.

Obs. Caulis ramosus bipedalis, ramis suberectis. Pedunculi non longiores quam in *T. Helvetica* α . (ex agris prope Genevam,) fructusque vix major, minus coloratus: differt tantum statura albiori, caulibus ramisque erectioribus. *T. neglecta*, Schult. DC. Prod. l. c. Koch. Syn. p. 313. *T. infesta*, Rchb. Germ. exc. No. 2910, videtur notis nimis lævibus a *T. helvetica* separata; et me iudici auctæ nomine *T. infestæ*, Hoffm. designandæ.

285. *Saxifraga cæsia*, L.

H. Ad fissuras rupium M. Gemmi supra Kandersteg et Schwarrenbach copiose.

Obs. Variat caudiculis elongatis, foliisque multo minus congestis.286. *S. oppositifolia*, L.

H. In rupibus M. Gemmi supra Schwarrenbach et ad moles glaciales summi jugi alpium supra Tæsch.

287.* *S. Hornungii*, mihi.

Saxifraga caulibus prostratis ramosis laxè cæspitosis, ramis ascendentibus, foliis oppositis remotiusculis obovatis spathulatisve apice subincrassatis unipunctatis dorso planis sabcarinatis, superioribus sæpe alternis, laciniisque calycis glanduloso ciliatis, floribus terminalibus 2-3 capitatis, petalis distantibus lanceolatis stamina subæquantibus. *S. biflora*, Gaud. Helv. iii. p. 95. Koch. Deuts. Fl. iii. p. 126. Syn. p. 269. Dub. Bot. Gall. i. p. 207. Dec. Prodr. iv. p. 18. Rchb. Germ. exc. No. 3604, et exsc! Hornung in Bot. Zeit. 1835, p. 470.—*Non All.*

H. In alpibus supra Zermatt, etiam in M. Sylvio Vall. D. Nicolai, et in M. Tzermenonanz (Gathnick!) Alp. Tyrol. prope Zell. (Sauter in Rchb. exsc!)

Obs. Cl. Gaudin, l. c. iconem Allionii molam esse observat; sed certe auctores omnes citati nec descriptionem Allionii intento animo legerunt, neque ejusdem iconem recte examinaverunt. Allionius in Ped. ii. p. 71, No. 1530, de sua planta ita disseruit. "Flos magnus pulchre roseus petalis ovato-acutis duplo et ultra calyce amplioribus;" "Stamina decem embryone vix altiora purpurea," et ita etiam in icone sua Pl. XXI. f. 1. optime depinxit. Hæc descriptio cum *S. biflora*, auct. (nostra *S. Hornungii*) nullomodo

convenit, et, ut etiam icon. ad sequentem plane pertinent. Quod "foliis alternis in ramis floriferis, All. l. c. et ic." attinet, occurrunt in utraque specie, sed ad formam non ad typum pertinent. Hoc pacto manifeste patet (cf. seq.) vera planta, All. auctoribus hucusque ignota, a cl. Kochio et Hornungio l. c. primum distincta ut nova species descripta est.

288. *S. biflora*, All. Ped. ii. p. 71, No. 1530. Tab. xxi. f. 1, (rami floriferi uniflori; sed opt.) nec auct.

Saxifraga caulibus prostratis ramosis laxè cæspitosis, ramis adscendentibus, foliis oppositis laxè imbricatis obovatis spathulatisve apice subincrassatis unipunctatis dorso planis subcarinatis, superioribus interdum alterius laciniisque calycis glanduloso ciliatis, floribus terminalibus solitariis vel 2-3 capitatis breve pedunculatis, petalis oblongis contiguis stamina bis-terve superantibus. *S. Kochii* Hornung, l. c. p. 465, et seq. Koch. Syn. l. c. (Desc. opt.)

H. In glareosis ad moles glaciales Lammerngletscher M. Gemmi. 31 Aug. 1836, cæspites laxos maximosque efficiens.

Obs. Folia infima interdum rosulata, multo congestiora quam in præcedente: rami floriferi sæpe uniflori (et hujus formæ icon, All. citata optima) vel 2-3 flori in eodem individuo. Color in utraque specie diversa in *S. Hornungii* (e sicco) corolla atropurpurea, folia rubro-purpurascens: in *S. biflora* (Planta viva et sicca) corollæ lilacinæ, purpurascens, et folia omnino viridia Species distinctæ, sed in Herb. meo sub nomine *S. bifloræ* intermixtæ adsunt.

289. *S. aspera*, L. Koch. l. c. p. 270. *S. aspera* α . elongata, Gaud.

H. In petrosis alpium supra Tæsch.

290. *S. bryoides*, L. Koch. l. c. *S. aspera* β bryoides, DC. Gaud.

H. In graminosis ad nives perennes M. Gemmi—in M. Fünelen.

291. *S. stellaris* L.

H. In M. Gemmi supra Kandersteg, et in uliginosis supra Schwarrenbach.

292. *S. muscoides*, Wulf. Koch. l. c. α . compacta Koch. l. c. p. 272.

S. muscoides α . microphylla, Gaud. Helv. iv. p. 130. γ . laxa. Koch. l. c.

H. α . in M. Gemmi in rupibus prope "der Wintereck." β . supra Schwarrenbach.

293. *S. exarata*, Vill. Dauph. iii. p. 674. Pl. 45. β . laxa, Koch. l. c. p. 273. *S. intermedia*, Gaud. et Koch. l. c. Thom. exs.!

H. ad moles glaciales summi jube Alpium supra Tæsch.

294. *S. androsacea*, L.

H. In M. Gemmi, supra Schwarrenbach.

295. *Sedum atratum*, L.

H. vulgatissimum in M. Gemmi.

296. *S. annuum*, L. Koch. Rchb. *S. æstivum*, All. Ped. No. 1746.

S. saxatile, Gaud. Helv. iii. p. 222. nec. All.

H. ad muros inter St Nicholas et Zermatt.

297. *S. repens*, Schleich. Gaud. *S. saxatile*, All. Tab. lxx. f. 6.

H. In glareosis ad moles glaciales, M. Fünelen.

298. *Sempervivum arachnoideum*, L.

H. ad rupes inter Stalden et St Nicholas; in pascuis sterilibus inter Täsch et Zermatt, et in M. Fünelen.

299. *Scleranthus annuus*, L.

H. ad viam inter St Nicholas et Zermatt.

300. *S. perennis*, L. β . *erinaceus*, mihi, humilis confertosissimus, caulibus prostratis ramosissimis, floribus numerosissimis in sphaeram densissimam congestissimis.

H. copiose in saxosis M. Grimsulæ, supra Obergestelen.

Obs. Florum sphaera ita congesta, ut nihil aliud conspiciendum. Folia, nisi perpauca ad dichotomias superiores, vix ulla. Calycis segmenta obtusa, late membranacea, fructifera clausa. Habitu a typo et congeneribus valde differt, proxime tamen *Sclerantho neglecto* Rochel affinis. *S. neglectus*, Roch. mihi bona videtur species, sed in exempl. meis a cl. Rochel et Heuffel in cac. M. Muraru Bannatu lectis, calycis fructiferi partitiones potius clausæ quam patentes, cf. Koch. Deuts. Fl. iii. p. 175, 176, et Syn.

301. *Herniaria glabra*, L.

H. in pascuis aridis arenosis ad Vispam inter Täsch et Zermatt.

302. *H. alpina*, Vill.

H. rarius ad moles glaciales supra Täsch.

303. *Epilobium Dodonæi*, Vill. Gaud. erectum, floribus racemosis numerosissimis, foliis obsolete denticulatis. *E. Dodonæi*, Koch. Syn. p. 239. *E. rosmarini folium*, Hænke, Rchb. pl. crit. ic. 522. β . prostratum, Gaud. Helv. iii. p. 9. humile, pauciflorum, foliis evidentius denticulatis. *E. augustissimum*, Rchb. pl. crit. ic. 523. *E. denticulatum*, Wend. Koch. Deuts. Fl. iii. p. 12. *E. Fleischeri*. Hochst. Koch. Syn. p. 239.

H. α . in petrosis inter Inden et Varen. β . in M. Gemmi, supra Kandersteg.

Obs. α et β . variant foliis plus minusve conspicue denticulatis, stylo ad basin vel supra medium sericeo-barbato (interdum et etiam in var. β . omnino glabro), staminibus sublongiori, æquali vel breviori, demum semper deflexo (quod in icon. Rchb. non depictum est.)

Unicum discrimen inter α . et β . videtur caulis prostratus, et petala obtusiora, var. β .

304. *E. organifolium*, Lam. *Rehb.* l. c. ic. 314.

H. Ad rivulos M. Gemmi, supra Schwarrenbach.

Obs. Capsulae longiores, longiusque pedunculatae sunt quam in icon. cit.

305. *Cotoneaster vulgaris*, Lindl. β . prostrata.

H. Ad rupes in Alpinis supra Zermatt.

306. *Rosa Alpina*, L. α . fructu elliptico-pyriformi vel fusiformi.

$\alpha\alpha$. fructu, calycis segmentis pedunculisque glabris, petiolis serraturis nervisque foliolorum glanduloso-pilosis. β . fructu subgloboso. $\beta\alpha$. fructu pedunculisque glabris, calycis segmentis, petiolis, serraturis nervisque foliolorum glanduloso-pilosis. $\beta\beta$. fructu glabro, pedunculis glanduloso-hispidis, calycis segmentis, petiolis, serraturis nervisque foliolorum, glanduloso-pilosis.

H. α . In alpinis supra Zermatt. β . Ad sepes inter St Nicholas et Zermatt.

Obs. Var. $\alpha\alpha$. calycis segmenta eximie foliacea.

307. *R. glandulosa*, Bellardi, Koch. *Deutsl. Fl.* iii. p. 462, *Syn.* p. 225. *Dub. Bot. Gall.* i. 177. *Rosa glandulosa* glauca junior rubicunda, aculeis geminis vix falcatis aut nullis; foliolis 5-9, ovato-rotundis duplicato serratis stipulisque latiusculis acutis margine glandulosus; tubo calycis subgloboso pedunculisque glanduloso-hispidis, sepalis subintegris longe subspathulatis corollam superantibus. α . inermis mihi, foliolis 7-9 ellipticis, floribus solitariis, sepalis integris, et fructu globoso. β . aculeata mihi, foliolis majusculis 5-7 subrotundis quadruplo-serratis, floribus subternis, sepalis 3 pinnatifidis, et fructu ovato. *R. rubrifolia glandulosa* et *R. rubrifolia montana*, Ser. in *Mus. Helv.* p. 12. Tab. ii. f. 3 and 4. (folia pessima.) *R. rubrifolia montana*, Gaud. *Helv.* iii. p. 348. excl. *Syn. plur.* *R. Reyneri*, Hall. fil. ! Ser. ! Schleich !

H. (α . In Jurasso, in collibus vallis Lignières ad pedem M. Chaseral.) β . Ad sepes inter St Nicholas et Zermatt.

Obs. *R. rubrifolia*, β . pinnatifida, Ser. Gaud. l. c. ad *R. rubrifoliam* Vill. pertinet. *R. montana*, Vill. absque dubio diversissima, omnino abhorret. *Rehb.* in *Germ. exc.* No. 3780, hanc speciem hybridam "rubrifoliam-villosam" esse existimat, mihi autem species omnium pulcherrima ab affinibus facillime distinguenda videtur Species rarissima, paucis cognita, hucusque, variationibus supra no-

tatis exceptis, constans, sed cultura nondum subjecta. Ut observat cl. Koch, *R. rubrifoliae* et *alpinæ* affinis, sed affinitas cum *R. canina* mihi perobscura.

308. *R. canina*, L. α . foliolis simplice vel duplicato-serratis glabris, fructu globoso glabro. β . foliolis duplicato-serratis glabris, petiolis, sepalis fructuque ovato-globoso glanduloso-setosis.

H. Ad sepes inter St Nicholas et Zermatt.

309. *R. rubiginosa*, L. Var. fructu ovato-elliptico pedunculisque glabris. *R. rubiginosa*, δ . sepium, Gaud. *R. canina*, δ . sepium, Koch. Syn. p. 227.

H. In collibus inter Varen et Siders.

Obs. Certe ad *R. rubiginosam* non ad *caninam* redigenda. Tomentum ferrugineo-glandulosum, odorque aromaticus.

310. *R. villosa*, L. *R. pomifera*, Herm. Koch.

H. Ad sepes inter St Nicholas et Zermatt, et inter Brieg et Münster.

Obs. Variat floribus solitariis, ternis vel sub corymbosis. Var. γ . *corymbosa*, Gaud. differt solummodo fructu basi tantum hispidulo. Folia forsán maxima generis, fructus globosus, nutans, maximus, interdum in collo brevi, coarctatus.

311. *Geum* (*Sieversia*) *reptans*, L.

H. In saxosis M. Gemmi supra lacum Dauben, rarius.

312. *G.* (*S.*) *montanum*, L.

H. In saxosis M. Gemmi supra Schwarrenbach, et ad lacum Dauben, copiose. In M. Fünelen.

313. *Potentilla* *multifida*, L.

H. Ad moles glaciales summi jugi alpium super Tæsch.

314. *P. argentea*, L. Var. ? β . foliis planis latioribus obtuse inciso-dentatis.

H. In pascuis aridis inter St Nicholas et Zermatt, β . unicum individuum inveni.

Obs. Forma monstrosa vel forsán *P. collina*, Wig. Koch. Syn. p. 214, sed exemplo meo flores carent.

315. *P. aurea*, L. *P. Halleri*, Ser.

H. In M. Fünelen.

316. *P. Salisburgensis*, Hænke: *P. aurea*, Ser. α . *firma*, Koch. Syn. p. 216. *P. aurea*, β . *firma*, Gaud. *P. sabauda*, Thom. exs. ! vix DC. α . β . *Macrantha*, villosior, foliolis discretis, corolla fere duplo majori.

H. In M. Gemmi in graminosis ad nives perennes supra Schwarrenbach.

Obs. Foliola late ovata, obtusissime incisa sese invicem margine tegentia, serraturis rotundatis; stipulis magnis, corolla magna, petalis obcordatis, calycis segmenta valde inæqualia alternatim duplo latiora et longiora, omnia fere obtusa, plus minusve colorata. Planta pygmæa plus minusve hirsuta, vix ultra 2 uncias alta, parum cæspitosa. Bene quadrat cum exempl. *a b.* Gaudino acceptis, sed minus villosa et colorata. *P. sabauda*, DC. (spec. ε Gallia possideo,) vix huc sed potius ad varietatem elatiorem pertinet. *P. alpestris*, Hook. Brit. Fl. ad varietatem β . graciliorem, Koch, l. c. pertinere videtur.

317. *P. verna*, L. Var. *æstiva*, Hall. fil. in Mus. Helv. p. 32. Gaud. ?

H. Inter St Nicholas et Zermatt.

Obs. Maculam croceam ad basim petalorum non vidi: differt a typo, hirsutie, foliisque radicalibus majoribus longe petiolatis et profunde incisis.

318. *P. grandiflora*, L.

H. In pascuis et petrosis M. Fünelen.

319. *P. minima*, Hall. fil. in Mus. Helv. p. 51.

H. Copiose in M. Gemmi prope Schwarrenbach, et ad lacum Dauben, &c.

320. *P. caulescens*, L.

H. In rupibus inter Inden et Varen.

321.* *Sibbaldia procumbens*, L.

H. Zermatt.

322. *Alchemilla vulgaris*, L. β . *subsericea*, Gaud. Koch. A. hybrida, L. et Auct.

H. In M. Gemmi supra Schwarrenbach.

323. *A. pubescens*, M. Bieb. Taur. Cavl. i. p. 114, excl. syn. pl. Koch, Syn. p. 231. *A. pubescens*, Lap. !

H. Ad moles glaciales valleculæ Tæsch.

Obs. Planta a cl. M. Bieb! missa tantum elatior et, nisi foliis minus profunde incisis, potius habitum sequentis refert. Differt a precedenti foliis tantum apice serratis, subtruncatis, nec circumseratis; a sequenti foliis crenato-dentatis, pubescentibus, et panicula multo congestiori: sed opinor cum sequente ut var. β . *pubescens* conjungenda.

324. *A. fissa* Schummel. Koch, Syn. p. 231. Gaud—Rchb. exsic. !

H. cum præcedenti.

Obs. Species distincta nullomodo cum *A. vulgari* conjungenda.

325. *Ononis Columnæ*, All.

H. In arvis et incultis prope Varen et Siders.

326. *O. Natrix*, L.

H. In apricis inter Inden et Varen et prope Siders.

Obs. *O. rotundifolia*, L. Etiam inter Inden et Varen observavi sed non legi.

327. *Anthyllis vulneraria*, L. α . floribus flavis, foliis caulibusque parce villosis aut subglabris, DC. Prod. ii. p. 170. β . purpurascens mihi.

H. α . In M. Gemmi infra Schwarrenbach. β . ad moles glaciales M. Fünelen.

Obs. α .—Forma alpina, prostrata, calyce dense sericeo excepto, glabriuscula; capitula maxima, corollis saturate flavis— β . est varietas insignis forma, glacialis, prostrata, appresse sericea; caulis, petioli, bractei, calyces apicibus et interdum foliorum margines, luride purpurascens. Corollæ ochroleucæ, vexillo dorso purpurascens, carina apice purpurea; foliola lateralia minima, interdum plane nulla.

328. *Medicago falcata*, L. β . *versicolor*, Koch, Syn. p. 160?

H. Ad viam in arenosis prope Varen.

Obs. Procumbens adscendensve, folia quoad firmam magnitudinemque variabilia; bracteæ interdum minimæ; corollæ violaceæ, flavescens; Legumina falcata vel cochleata sub 2-cyclis, plus minusve pubescentia.

329. *Trifolium ochroleucum*, L.

H. In pascuis valleculæ Tæsch.

330. *T. saxatile*, All.

H. Ad moles glaciales summi jugi alpium supra Tæsch.

331. *T. fragiferum*, L.

H. Ad viam inter Stalden et St Nicholas.

332. *T. cæspitosum*, Reyn.

H. In pascuis ad moles glaciales supra Tæsch.

333. *T. badium*, Schreb.

H. Ad moles glaciales supra Tæsch.

334. *Lotus corniculatus*, L. ϵ . *tenuifolius*, DC. ζ . *uniflorus*, Gaud.

H. ϵ . in arenosis prope Leuk. * ζ . Zermatt.

Obs. In var. ϵ . Pedunculi bini in capitulo 4-6-floro congesti. ζ . piliosusculus, glaucescens, folia subrhomboidea.

335. *Tetragonolobus siliquosus*, Roth.

H. In paludosis prope Pfyn inter Siders et Leuk.

336. *Colutea arborescens*, L.

H. In apricis inter Inden et Varen.

337. *Phaca lapponica*, Wahl. Helv. p. 131, in Ann. DC. Prod.

Oxytropis.—Gaud. Koch. Syn. Rehb. Germ. exc. No. 3273^b, in corr. *Astragalus acutifolius* Schleich.!

H. rarissime in M. Schwarzseeberg, et ad moles glaciales summi jugi alpium supra Tæsch. in cons. *Oxytrop. cyanæa*, M. Bieb.

Obs. Caulescens, interdum subcaulis, sericeo-pilosa. Legumina brevissime pubescentia, nigrescentia, ovalia, pendula. Forma subcaulis, florens, ægre ab *Ox. cyanæa* distinguenda.

338. *Oxytropis Uralensis*, DC. β . villososericea, scapis, petiolis, calycibusque dense villososericeis, foliolis latioribus densissime sericeis, junioribus villosis, leguminibus subremotis ovato-oblongis. H. In collibus et pascuis aridis prope Siders.

Obs. Var. γ . appresse-sericea mihi, quam ad rupes M. Bürglen ditone Bernensi (circa 5000's-m.) legi, differt foliolis appresse sericeis, sæpe angustioribus, et leguminibus ovatis brevioribus confertis. Planta Scotica variat leguminibus ovatis vel ovato-oblongis, sed sæpius minus sericea quam var. γ .: differt ab *O. sordida*, Pers. (quacum conjuncta est in Syn. pl. suâ,) specie mihi valde dubia, capitulis erectis nec cernuis. Bracteæ in utraque var. variant calyce breviores vel sublongiores. *O. sordida*, Gaud. ! Helv. vi. p. 360, in vallecula glaciali, Roththal, ab. am. Roth lecta et mecum communicata, est forma pusilla *O. campestris*: capituli certe cernua, sed secundum asseverationem repertoris amici ipsius, ex exemplaribus marcidis et male exsiccatis orti sunt.

339. *O. campestris*, DC. Variat α . scapis decumbentibus, folia æquantibus, foliolis oblongis. β . scapis ascendentibus, folia superantibus, foliolis oblongis. γ . scapis elatioribus suberectis, folia superantibus, foliolis lanceolatis acuminatis.

H. α . In pascuis M. Gemmi prope "die Wintereck," et supra Schwarrenbach. β . prope Zermatt. et in M. Schwarzseeberg et Fünelen. γ . prope pagum Zermatt.

Obs. sæpe fere pedalis evadit.

340.* *O. fœtida*, DC.

H. In alpihus supra Zermatt.

Obs. Scapi superne lana sæpe nigra tecti, foliola glanduloso-viscosa. Legumina pubescentia majuscula, subarcuata.

341. *O. pilosa*, DC.

H. In apricis prope Siders.

342. *O. montana*, DC.

H. In M. Gemmi supra Schwarrenbach.

Obs. Minute pubescens, legumina longe stipitata brevissime pubescentia, duplo latiora quam in sequenti.

343. *O. cyanæa*, M. Bieb. Taur. Cauc. iii. p. 503.

H. In M. Schwarzseeberg et ad moles glaciales supra Tæsch.

Obs. Molle sericea, legumina brevissime stipitata, dense sericeo-villosa, suberecta, ovato-cylindrica. c. M. Bieb. l. c. est var. sua β -albana. Non intelligo quomodo *O. triflora* Hoppe Koch, Syn. p. 182, a nostra cyanæa differt: In *O. cyanæa* racemi sæpe triflori sunt.

344. *Astragalus alpinus*, L. Phaca, DC.

H. In M. Gemmi supra Schwarrenbach, in M. Schwarzseeberg.

345. *A. leontinus*, Wulf.

H. In pascuis alpinis et in petrosis supra et prope Zermatt.

346. *A. onotrychis*, L.

H. In pascuis arenosis prope Sidens et ad viam prope Leuk.

347*. *A. aristatus*, L'Herit.

H. Zermatt.

348*. *A. leiocarpus* mihi.

Astragalus acaulis, foliolis ovatis obtusis numerosis (circa 35,) glaucescentibus brevissime mucronatis, petiolisque parce pilosis; corollis calycibusque glabris, dentibus calycis longe subulatis; leguminibus trigono-compressis dorso applanatis ovatis mucronatis, etiam junioribus glaberrimis, brevissime stipitatis.

Obs. Imprimis pro *A. fabaceum*, M. Bieb. et DC. Prod. habui, sed differt a desc. DC. scapis brevissimis foliis multo brevioribus, et dentibus calycinis longe subulatis: et Cl. M. Bieb. in Ann. in Fl. Taur. Cauc. iii. p. 496, observat legumen plantæ suæ ab *A. Bætica* legumine haud absimile, quocum nostra planta nullam affinitatem habet.

Legumina minora et magis compressa quam in *A. exscapo*, perfecte bilocularia, erecta vel pendula. In spec. meis male exsiccatis corollam examinare non potui. Maxima cum *A. exscapo* L. affinitas, sed ab eo, præsertim leguminibus minoribus intra calycem breve stipitatis, glaberrimis, et ad suturam magis incrassatis, et ab omnibus *Astragalis* Tauricis vel Rosicis mihi cognitis omnino distinctus.

A. utrigerum et *longiflorum*, Pall. possideo sed tantum florentes.

Hujus plantæ exemplaria nonnulla cum multis *A. exscapi*, L. mixta, et cum multis aliis, vallis D. Nicolai indigenis a pastori Valesiaco emi: sed certe procul dubio est, *Alpium vallis Zermatt*, ubi *A. exscapus* copiose viget, hæc pulchra planta incola et indigena.

349.* *A. exscapus*, L.

Astragalus acaulis, ubique, calycis tubo corollesque exceptis, dense molliterque hirsutus; foliolis ovatis vel subrotundis, interdum retusis, plerumque muticis; scapo nullo; calycis dentibus subula-

tis, leguminibus sessilibus subtrigono-compressis acuminato-mucronatis, junioribusque dense-hirsutis erectis.

H. Zermatt.

350. *Coronilla vaginata*, Lam. Koch., Syn. p. 187.

H. In arvis incultis et in apricis prope Varen.

Obs. Frutescens, prostrata, foliolis ovatis obtusis interdum subretusis apiculatis, infimis, nisi foliorum superiorum, a caule remotis.

351. *C. coronata*, DC. Koch., Syn. p. 188.

H. In apricis ad viam inter Inden et Varen.

Obs. Fruticosa, diffusa ramosissima, ramis adscendentibus, foliolis glaucis retusis mucronatis, infimis caule approximatis. Planta rarissima.

352. *Onobrychis arenaria*, DC. Hedysarum arenarium Viet! Hedysarum carneum, Schleich! *H. angustifolium*, Thom.!

H. In pascuis aridis prope Varen et Siders.

Obs. Rarissime occurrit, et mihi nondum satis cognita.

353. *Lathyrus heterophyllus*, L.

H. In vineis et ad sepes prope Varen.

Obs. *L. latifolii* var. foliolis bijugis, Rchb. Germ. exc. No. 3458, "Tyro"—et species distincta in corrigendis, No. 3458^b.—Rchb. peritus.!

354. *Rhamnus pumila*, L.

H. In rupibus, M. Gemmi supra Schwarrenbach.

355. *Geranium lividum*, L'Herit. *G. phæum* β. Koch.

H. In saxosis, M. Gemmi supra Kandersteg, 29 Aug. 1836, ad sepes infra Thermas Leucenses.

Obs. Species distincta non tantum corollæ colore, sed etiam foliis 5-7 fidis tenuiterque inciso-dentatis.

356. *G. sylvaticum*, L.

H. In M. Gemmi supra Schwarrenbach, et Thermas Leucenses: In M. Fünelen et in alpinis supra Tæsch.

357. *G. aconitifolium*, L. Herit.

H. In alpinis supra Tæsch.

Obs. Semina, ut et præcedentis, subtilissime punctulata.

358.* *Hypericum perforatum*, L.

H. Zermatt.

359. *H. dubium*, Leers. Gaud. *H. quadrangulare*, L. ex Fries, Rchb. et Koch, non Sm. vel auct.

H. copiose in M. Gemmi supra Kandersteg.

360. *Linum tenuifolium*, L.

H. In pascuis aridis prope Siders.

361. *Gypsophila Saxifraga*, L. et auct. *G. rigida* Rchb. ! germ. exc. et exsic. *Tunica Saxifraga*, Scop. Koch, Syn. p. 94.

H. In apricis et arenosis inter Inden et Varen.

Obs. Cl. Smith et Rchb. nostram plantam a Linnæana diversam esse habent; sed vix recte: nam in Lin. Spec. Plant. ed. 3^{ta} *Gypsophilæ* et *saxifraga* et *rigida* perennes notantur. Descriptio Bauhini "Betonica coronaria sive *Tunica minima*," Hist. iii. p. 337, certe ad plantam nostram pertinet. et ϵ loco Bauhiniano, "Genevæ in muris, &c. et au Plain palais," specimina multa legi, qua omnino ζ . *saxifraga* nostra sunt. Icon Bauch. l. c. certe malam.

In *Caryophyllarum* speciebus bracteatis fere omnibus, numerus et situs Bractearum valde inconstantes. *G. scabra* Schult ! huc a Rchb. recte allata, est planta tenuior scabriuscula, bracteis inæqualibus 2-3-4, videtur culta.

362. *G. repens* L. α prostrata alpina, floribus roseis; ascendens, campestris erectiuscula, floribus pallide carneis.

H. α . In saxosis M. Gemmi supra Schwarrenbach. β . In arenosis ad viam inter Visp et Brieg.

363. *Dianthus atrorubens*, All. *D. vaginatus alpinus*, Rchb. exs. !

H. In M. Gemmi supra Thermas Leucenses; prope Inden, in collibus inter St Nicholas et Zermatt, et in alpinis supra Tæschi.

Obs. 1^{ma}. Species intricatissima et forsitan mere varietas *D. carthusianorum*, L. quo videtur colore atro rubente petalorum, et petalis minoribus solummodo differere. In alp. capitulum semper pauciflorum, sæpius 1—6 florum, et caules vix semipedales. cf. Koch, Syn.

Obs. II^{da}. *D. atrorubens*, Rchb. Pl. Crit. vi. ic. 735, certe non est pl. Allionii sed Biebersteinii (*D. capitatus*, DC.)

D. diutinus, Rchb. l. c. ic. 729, quoad incisionem petalorum et dentes calycinas cum *D. polymorpho* MB. a cl. Fischer Goriusk: et Schott misso omnino convenit: calyx in exempl. meis occurrit dentibus obtusiusculis et subacutis, sed nunquam "rotundato-obtusos" observavi.

D. vaginatus, Rchb. Pl. Crit. l. c. ic. 731, et exsic ! nullomodo a *D. carthusianorum* campestri differt: nervi validi bractearum in icon. cit. depicti, in exempl. Rchb. ! non occurrunt; Bracteæ in *D. vaginato* et *carthusianorum* omnino similes sunt.

364. *D. sylvestris*, Wulf. Koch, Syn. p. 97. β . humilior, Koch, l. c.

caule plerumque unifloro, rarius bifloro, foliis rigidis. γ . alpinus, caule unifloro, vix ultra 4-5" alto, calyce colorato, corolla saturate rosea, et foliis tenuioribus. *D. sylvestris*, Rehb. exs!

H. β . inter Thermas Leucenses et Inden et prope Siders. γ . In alpinis supra Tæsch, copiose.

Obs. In Jurasso occurret frequenter var. α . Koch. l. c. caule elatiori facile bipedali et ultra, corolla rosea vel pallide carnea, et foliis linearibus angustissimis (cf. Wulf. in Jacq. Coll. i. p. 237,) arcuatim patentibus. Ad hanc varietatem pertinet. *D. Scheuchzeri* Rehb. forsan etiam *D. caryophylloides*, Rehb. et *D. virgineus*, Rehb. et auct. *D. sylvestris*. γ . imbricatus, Gaud. (a Rehb. ad *D. virgineum* citatus) est potius forma monstruosa vars. α : exemplaria a cl. Chaillet prope Neocomum lecta caule pedali et ultra non ut apud Rehb. "humili palmari-spathameo" gaudent.

365. *Silene otites*, L.

H. In apricis ad viam inter Varen et Siders, in valle D. Nicolai.

366. *S. quadrifida*, L.

H. In saxosis humidis, M. Gemmi supra Kandersteg.

367. *S. rupestris*, L.

H. In saxosis M. Gemmi supra Schwarrenbach; et inter St Nicholas et Zermatt.

368. *Lychnis Flos-jovis*, Lam.

H. In apricis ad viam inter Stalden et St Nicholas.

Spergula Bartl. Ord. Nat. p. 302.

Calix 5 sepalus. Petala 5 integra. Stamina 5-10. Styli 3-5. Capsula 3-5 valvis, polysperma. Semina exarillata. Folia stipulata, stipulatæ scariosæ. *Spergula*, L. excl. sp. exstipulatis. *Arenariæ*, L. sp. stipulatæ. *Arenaria* Sect. *Spergularia*, Pers. DC. *Alsine* Rehb. *Alsine* auct. sp. stipulatæ. *Alsine* sect. *Spergularia*, Koch.

Obs. Numerus partium fructificationis *Alsinearum* in uno et eodem individuo valde variabiles est, et sicut genera hodie constituta sunt, nisi numerum styliorum et capsulæ valvarum, nullum discrimen habitu vel notis inter *Saginatam*, *Spergulam*, *Arenariam* et *Alsinem*, L. et auct. invenire potui. Capsula 5 locularis *Spergularum* in Hook. Brit. Fl. ed. 2^{da} et 3^{ta} p. 191, certe ex errore typographica orta. Capsula 6-valvis *Spergularum* in Lind. Syn. ed. 2^{da} p. 48, et DC. Prodr. i. p. 394, vix in *Spergulis* veris stipulatis, et tantum rarissime in *Spergulis* exstipulatis occurrit. Genus forsan melius inter *Paronychias* locandum, cf. Bartl. l. c.

369. *Spergula rubra* mihi. *Arenaria*, L. *Alsine*, Wahl.

H. Ad viam inter Stalden et St Nicholas.

Arenaria.

Calyx, 4-5 sepalus. Stamina, 4-10. Styli, 3-5.

Capsula, 3-6 valvis, polysperma. Semina exarillata. Folia exstipulata.

Arenaria sp. exstipulatæ, Auct. *Alsine* sp. exstipulatæ, Auct. *Sagina*, L. *Spergula* sp. exstipulatæ, Auct. *Sagina*, *Alsine* et *Arenaria*, Bart. l. c. p. 305. *Sabulina*, *Arenaria*, *Sagina* et *Spergella*, Rchb. germ. exc.

Obs. Plurima genera etiamnum huc forsan referenda. *Holosteum*-petalis dentatis differt. *Mœhringia*-seminibus arillato-appendiculatis. *Stellaria*-petalis bifidis vel bipartitis. *Cerastium*-capsula apice 8-10 dentata (*Mœnchia* et *Malachium* videnter vix a *Cerastio* distincta.) *Cherleria* mihi nondum satis cognita est, pro charact. vide Koch, Syn. et etiam cf. *Griesselich* kleine Bot. Schriften, I. Theil p. 332., ubi genera, habitu et notis satis distincta immerito conjuncta sunt.

Genus ita constitutum in sectiones constantes dividere haud facile est. *Arenaria rubella*, Hook. occurrit capsula 3-4-5 valvi: in exempl. meis Scotiis 5 valvi, in Norvegicis " *Alsine rubella*, Wahl!" 3 valvi. In *Arenaria saginoidi* (*Spergula*, L.) β . glaciali mihi, capsulæ occurrunt 4-5-6 valves.

Sect. I^{ma}. Sabulina, (Rchb.)

Capsula plerumque 3 valvis.

370. *Arenaria laricifolia*, L.

H. In umbrosis ad viam inter St Nicholas et Zermatt.

371. *A. verna*, L. β . diffusa, Gaud.

H. In M. Gemmi supra Kandersteg.

372. *A. recurva*, All. β ? viscosa mihi, minor, ubique viscoso-pubescentis, floribus duplo minoribus, foliis minus arcuatis.

H. Ad moles glaciales M. Schwarzseeberg. β . supra Tæsch.

Obs. Radix lignosa, longissima. Icon. All. Ped. Tab. lxxxix. f. 3. Nimis rudis habitum male refert. Icon. Jacq. Coll. i. Tab. xvi. f. 1. melior, sed corollæ forsan majores.

373. *A. mucronata*, DC. Gaud. *Alsine* rostrata, Koch, Syn. p. 114.

H. In arvis et incultis saxosis ad moles glaciales supra Zermatt.

Obs. Planta speciosa omnino a sequenti diversa. Caules e basi ramosissimi, prostrato-ascendentes; folia tenuissima setacea; flores speciosæ sequentis vix minores; sepala acutissima æqualia, marginibus late-scariosis, et nerva dorsali viridi tenui, tertia vix parte corollam superantia, in planta florenti patentia. Flores, e sepalorum marginibus scariosis, pulcherrime eburnei. Semina rugoso-

dentata duplo majora quam in sequenti. Omnino accedunt nostra specimina ad sp. Gallica. Huc forsā pertinet *A. fastigiata*, Sm. Eng. Fl. ed. 2da, p. 310, sed “*Alsine*, No. 870, Hall. Hist. tab. xvii. f. 2.” omnino ad sequentem pertinet, ut e descriptione, icone (planta laxa) et præsertim localitate patet; sed *Spec. Scotica* nondum vidi, et e descr. Smithii recedunt “*stems erect, straight, densely corymbose; petals very short.*” Quoad plantam Gouani, dubitanter hæreo, quoniam illustrationes suas nondum vidi cl. Koch, in Syn. p. 114. Floram Britannicam Hookeri, confusione inextricabile, citavit.

374. *A. Jacquini*. (*Alsine Jacquini*, Koch, Syn. p. 115,) *A. fasciculata*, Jacq. (ex Koch, l. c.) Gaud. *Alsine fasciculata*, Koch, Deuts. cl. Fl. iii. p. 288. Hall. Helv. No. 870, tab. xvii. f. 2.

H. In incultis vineisque prope Varen; in arenosis inter Siders et Leuk. (etiam occurrit in arenosis Jurassi.)

Obs. Caules e basi ramosi, rigide erecti, crassi; folia caulina basi lato-scarioso connata, rigida; flores axillares, corymbosique plerumque congesti, sepala anguste acuminato-pungentia, marginibus scariosis tenuioribus apicem non attingentibus, inter se inæqualia, etiam in planta florenti, erecto-clausa. Petala calyce triplo breviora, semina ut in præcedenti sed duplo minora.

Specimina omnino similia in Bavaria Rhenana prope Dürkheim legi, et etiam e Germania var. β . pubescentem ab am Wissmann accepi. Huc forsā pertinet *A. fasciculata*, Gouan, sed nomen Gouani valde confusum vix restituendum.

Sect. II^d.—Sagina. (*Sagina*, L. et *Spergela*, Rchb.)

Capsula plerumque 4–5 valvis.

375. *A. saginoides*, mihi. *Spergula*, L. *Spergela*, Rchb. α . diffusa, laxa segmentis calycinis obtuso rotundatis, foliis longioribus. β .? glacialis, congesta dense cæspitosa, caulibus abbreviatis erectiusculis, foliis brevioribus et segmentis calycinis lanceolatis obtusis.

H. α . In graminosis humidis M. Gemmi supra Schwarrenbach.

β . In glareosis ad moles glaciales M. Fünelen.

Obs. In uno et eodem individuo var. β ., capsulas multos 4 valves, plurimas 5 valves, et unicam 6 valvem inveni. Habitus a var. α . valde absimilis, et forsā species distincta. In utraque varietate folia nondum mutica observavi.

Sect. III^a.—Arenaria. (*Arenaria*, Koch. Rchb. excl. sp. pl.)

Capsula plerumque 6 valvis.

376. *A. ciliata*, L. Koch. Wulf. α . Koch. *A. ciliata* β . multicaulis, Gaud. Wahl. excl. Syn. *A. multicaulis*, Wulf. L.
 H. In M. Gemmi supra Kandersteg et Schwarrenbach.
 Obs. Caules 7-flori et ultra ; petala calycem vix æquantia. Habitus *A. serpyllifoliae*.

377. *Cherleria sedoides*, L. φ . *brevifolia* mihi.

H. Ad moles glaciales, M. Fünelen.

Obs. Folia vix lineam unam longa, dense rosulata, rigida stricta ; caulis subterraneus ramosissimus lignosus, salicem herbaceam æmulans. Flores breve pedunculato, capsulæ calycibus subduplo longiores. Florentem non inveni.

378. *Moehringia polygonoides*, M. et Koch. Deuts. Fl. iii. p. 272. Syn. p. 116. *Arenaria polygonoides*, Wulf ! in Jacq. Coll. i. p. 241. tab. xv.

H. In saxosis et glareosis ad nives perennes M. Gemmi, supra lacum Dauben, 31 Aug. 1836.

Obs. Semina nitidissima reniformia arillato-appendiculata omnino ut in *M. muscosa*, L.

379. *Stellaria cerastoides*, L.

H. In M. Gemmi supra Schwarrenbach, et ad moles glaciales M. Fünelen.

380. *S. Nemorum*, L.

H. In umbrosis saxorum in accensu M. Gemmi supra Kandersteg. 29 Aug. 1836.

Obs. Sterilis, caules prostrati valde stoloniferi.

381. *Cerastium latifolium*, L. Gaud. Koch, Syn. p. 123. Bentham, Cat. Pyr. p. 69. δ . subcaule, Gaud. Helv. iii. p. 250. *C. latifolium*, δ . glaciale, Koch, Syn. p. 123. *C. glaciale*, Gaud. Thomas exs. ! ε . ? pedunculatum, Koch. l. c. *C. pedunculatum*, Gaud. l. c.

H. In saxosis et glareosis humidis, M. Gemmi supra Schwarrenbach. δ . and ε . in glareosis ad moles glaciales M. Fünelen.

Obs. Ubique breve-glanduloso-pubescentis : capsulas maturas formæ vulgaris non inveni. *C. latifolium*, Light. Hook. &c. et Britanorum certe ad *C. alpinum* et præsertim ad varietatem *C. lanatum*, auct. pertinet. In omnibus exempl. meis ex Alp. Clova, &c. Scotiæ. ab. am. Campbell, Barry, Brand, Greville, &c. communicatis, pili omnes eglandulosi sunt, sed pedunculi uniflori solitarii, ebracteati. Var. ε . habitu omnino a parietatibus præcedentibus recedit, et forsan vera diversa species, sed notas constantes non inveni. Folia lineari-oblonga, interdum 10 lineas et ultra longa ; pedunculi

solitarii, axillares terminalesque 1-2 unciales; petala calycem vix superantia angusta, bifida segmentis sabacutis; capsulæ subcylindricæ vix curvatæ calycem duplo et ultra longiores, vel interdum etiam breviores. Caules interdum abbreviati, interdum filiformes valde elongati.

382. *C. arvense* L. ? var. glaciale mihi, ubique cano-pilosum, foliis lineari-lanceolatis, ovato-lanceolatisve infimis minoribus.

H. copiose in graminosis ad rivulum glaciale valleculæ Tæsch.

Obs. Planta gracilis; caules pauciflores (2-5.) Pili longi eglandulosi patentes. Bracteæ marginibus late membranaceæ, pilisque longioribus ciliatæ. Habitu et primo aspectu, a *C. arvensis* forma vulgari facillime distinguendum.

383. *Polygala vulgaris*, L. Rchb.

H. Ad viam inter Sidens et Leuk.

384.* *Viola pinnata*, L.

H. Zermatt.

385.* *V. arenaria*, DC.

H. Zermatt.

386. *V. biflora*, L. α . innotata, petalis inferne saturatius luteis, nervis concoloribus percursis. β . notata, petalis inferne lineolis fuscis pulcherrime notatis, floribus minoribus.

H. α . ad nives deliquescentes, M. Gemmi. β . In fossis ad viam prope Randaa.

387. *V. tricolor*, L. γ . alpestris, DC. Prod. i. p. 303. *V. tricolor*, γ . saxatilis, Koch. *V. tricolor* subalpina, Gaud.

H. In pascuis alpinis prope pagum Fünelen supra Zermatt.

388. *V. calcarata*, L. α . vulgaris, foliis subrotundo-ovatis, vel oblongo-lanceolatis, crenatis vel integriusculis, utrinque glabris margine ciliatis. β . lancifolia, Roem! in Herb. meo. *V. Villarsiana* Roem et Sch. ! foliis lineari-lanceolatis, lanceolatisve sinuato-crenatis utrinque minute pubescentibus ciliatisque.

H. α . In glareosis et graminosis, M. Gemmi supra Schwarrenbach. β . supra Zermatt.

Obs. α . variat magnitudine coloreque corollæ, et longitudine nectarii, caulescens vel subcaulis. β . variat ut præcedens caulescens vel subcaulis; corolla sæpius pallide cærulea.

389. *V. cenisia*, L. All. Ped. Tab. xxii. f. 6.

H. In saxosis et glareosis, M. Gemmi ad moles glaciales Lammerngletscher, 31 Aug. 1836.

Obs. *Viola valderia*, All. Tab. xxiv. f. 3. mihi diversa videtur.

Specs. in Herb. Roem. conservata majorem affinitatem cum *V. heterophylla* Bertol. quam cum *V. cenisia* habent cf. Koch, Syn. p. 88, et Rchb. germ. exc. No. 4512 et 4513.

390. *Helianthemum* Fumana, Desf.

H. In aridis inter St Nicholas et Zermatt.

391. *H. alpestre*, Rchb. Pl. Crit. i. ic. 2. *H. ælandicum* β . Koch.

H. In M. Gemmi supra Schwarrenbach.

392. *H. vulgare*, Gärtn. β . concolor. Rchb. Germ. exc. No. 4547.

H. In arenosis inter St Nicholas et Zermatt.

Obs. *H. obscurum*, Pers. huc a cl. Koch. altatum mihi videtur potius ad *H. grandiflorum* DC. referendum.

393. *Arabis* perfoliata, Lam. *Turritis* glabra, L.

H. ad viam inter St Nicholas et Zermatt et inter Briegget Münster.

394. *A. alpina*, L.

H. In M. Gemmi supra Schwarrenbach ; et supra Zermatt.

Obs. Caules interdum unciales vix ultra, et subuniflori occurrunt.

395. *A. arcuata* mihi.

Arabis caule simplici pilis simplicibus hirsuto; foliis radicalibus obovato-oblongis sessilibus vel in petiolum attenuatis, caulinisque sessilibus lineari-oblongis integriusculis, pilis ramosis hirsutis; racemo erecto, abbreviato, pedicellis calyce (demum) vix longioribus; siliquis nervo prominulo tetragono-compressis anguste linearibus confertis arcuato-patentibus rigidis; seminibus apteris impunctatis. *A. ciliata* β . hirsuta, Koch. Syn. p. 29. (excl. syn plur.?) *A. hirsuta* incana, Gaud. Helv. iv. p. 315.

H. In glareosis, M. Gemmi ad nives perennes supra Schwarrenbach.

Obs. Caules sæpe numerosi, semipedales vix ultra, superne interdum glabri. Folia radicalia eximie rosulata pilis ramosis hirsuta et ciliata obscure dentata vel sinuata, caulina pauca remota integriuscula, superiora glabriuscula.

Racemus per maturitatem caulis partem vix quartam obtinens. Siliquæ nervosæ nitidæ lividæ arcuato-patentes et sæpius fere secundæ.

Syn. fere omnia dubia, dum auctoribus siliquæ erectæ strictæ semper descriptæ sunt, sed huc referendæ videntur, *A. hirsuta* sessilifolia β . alpestris. Gaud. l. c. *Turritis* alpestris, Schleich. *A. incana*, Rchb. germ. exc. No. 4341. Et forsitan *A. ciliata*, auct. Helv. et germ. et Koch, l. c. ad formam glabram plantæ nostræ

etiam referenda ; sed hucusque exemplaria per pauca hujus plantæ examinare mihi licuit.

A. incana, Roth. Catal. Bot. i. p. 79, planta distinctissima potius ad *A. auriculatam*, Lam. vel ad *A. saxatilem*, All. referenda est : sub hoc nomine species diversissimas ex. gr. *A. alpina*, *A. hirsutam*, &c. accepi.

Proxime sane accedit nostra planta ad *A. ciliatam*, R. Br. (e loco ab. auct. Brit. citato “ Hibernia, in arenosis maritimis prope Renvyle Cunnamara, exempl. permulta lege et examinavi) ; sed *A. ciliata* e toto glabra est, folia nempe tantum ciliata, subcarnosa ; caulis valde foliosus pedalis et ultra, foliis plerumque confertis, rarissime remotis. Racemus valde multiflorus, caulis partem dimidiam et ultra obtinens. Siliquæ erectæ latiores, longioresque strictæ, ad caulem plerumque appressæ ; pedunculi inferiores forsán longiores.

A. stricta, Huds. *A. collina*, Ten. ! et *A. muralis*, Bertol. ! omnino diversæ sunt.

A. arcuatæ exempl. permulta examinavi : imprimis legi : in Jurasso, in saxosis sterilibus summis, M. Tête de Rang, com. Neocomensi. In saxosis glareosisque ad nives perennes, M. Faulhorn, et in M. Gemmi, et accepi ab am. Guthnick e M. Steinberg, Vall. Lauterbrunn.

396. *A. serpyllifolia*, Vill ? Gaud. Helv. iv. p. 310. Koch. Syn. p. 40.

H. In saxosis umbrosis prope Kandersteg.

Obs. Florentem non inveni, sed bene convenit cum exempl. a. b. Demarat e ditione Friburgensi missis ; paululum a descriptione Gaudini recedit, racemo magis conferto, et siliquis evidenter in stylo brevi attenuatis. Icon. Vill. Dauph. iii. p. 318. Tab. 37, certe plantam dissimilem refert, sed cl. Villarsius plantas suas sæpius mole depinxit. Sub nomine, *A. auriculatæ* plantam e Pedemontio accepi, quæ caulibus prostrates ramosissimis valde foliosis, siliquis brevibus crassioribus et magis patentibus melius ad diagnosim et iconem Villarsii accedit.

Nostra planta caulibus ad singula folia flexuosa-fractis debilibus, rosulis laxis, foliis ovalibus in petiolum attenuatis parvis plerumque integerrimis et seminibus apteris gaudet : et his notis, siliquisque multo angustioribus ab *A. pumila*, Wulf. qua non absimilis, satis differt.

397. *A. pumila*, Wulf.

H. In M. Gemmi in saxosis et ad rupes supra Kandersteg, et supra Schwarrenbach et lacum Dauben.

Obs. Siliquæ obscure carinatae, semina pallide fulva ala pellucida pallidiori ferè albida cincta.

398. *A. bellidifolia*, Jacq.

H. In uliginosis, M. Gemmi supra Schwarrenbach, 31 Aug. 1836.

Obs. Glaberrima, siliquæ evidentur carinatae, semina fusca ala concolori vel paulo dilutius colorata.

399. *A. cærulea*, Wulf.

H. In M. Gemmi ad nives perennes.

Obs. Siliquæ evidenter carinatae coloratae, semina fulva ala paulo dilutius colorata.

400. *Cardamine bellidifolia*, L. β . alpina, DC. Gaud. c. alpina, Willd., Koch.

H. Ad nives deliquescentes, M. Gemmi.

Obs. Petioli in exempl. meis limbo interdum duplo longiores. Plantam lapponicam nondum vidi.

401. *C. resedifolia*, L.

H. ad moles glaciales, M. Fünelen.

402. *Sisymbrium Sophia*, L.

H. Ad viam inter St Nicholas et Zermatt.

403. *Erysimum helveticum*, DC. Fl. fr Syst. Veg. ii. p. 501, Gaud. Rchb. et Germ. exc. No. 4395. E. palleus, α . foliis integerrimis, Koch, Syn. p. 53.

H. In Valesia vulgaris: ad viam in apricis inter Inden et Varen, et inter St Nicholas et Zermatt.

Obs. Ab hac specie abunde differt, *Erysimum ochroleucum*, DC. Fl. fi. Dub. Bot. Gall. i. p. 46.; Gaud. Helv. iv. p. 366.; Rchb. l. c. No. 4396. *Cheiranthus ochroleucus*, Hall. Dec. Syst. et Prod. Ch. decumbens, Schleich! Caules decumbentes, ramosi, folia dentata, denticulata, caulina latiora petiolata glabriuscula. Flores facile duplo majores odoratissimi, petalis citrinis, ochroleucisve longe stipitatis; siliquæ duplo longiores latioresque, subtorulosæ in stylum augustum ad duas lineas longum attenuatæ. Non intelligo qua ratione cl. Koch in Deutsl. Fl. iv. p. 694, et nuperrime in Syn. p. 53. has species sub nomine "E. palleus," Hall. fil. conjunxit. *E. ochroleucum* tantum in saxosis Jurassi, ex. gr. in M. Creux du Van! Chasseral! occurrit: *E. pumilum*, Gaud. Helv. l. c. *Cheiranthus alpinus*, Schleich! vix ab *E. helveticum*, DC. differt; stylos semper evidenter et vix breviores inveni, et, me judici, mere forma nana alpina est.

Brassica, L.

Obs. *Erucastrum* Schimp. et Spenn: Koch, Deutsl. Fl. iv. p.

702, Syn. p. 56. Seminibus oblongis, vel ovatis compressis tantum α . Brassica, L. differt, quo genere semina globosa sunt: notæ certe nimis leves. Denominationes cl. Soyer-Willemet in Ann. des Sc. Nat. 2de Serie ii. p. 115 et seq. non retinui, quoniam Brassica erucastrum, Linnæi e sententia cl. Dec., Koch, Gaud., &c. inextricabilis est. Species ambæ a. cl. Koch, Rehb., &c. bene descriptæ sunt, et nomina trivialia ab iisdem proposita accepi.

Brassica Pollichii, mihi.

Br. foliis profunde pinnatifidis, laciniis oblongis inæqualiter obtuse dentatis sinu rotundato, sepalis petalisque (ochroleucis) erectiusculis, siliquis patentibus rostro conico aspermo. *Br. ochroleuca*, Soyer. l. c. *Br. erucastrum*, β . *ochroleuca*, Gaud. Helv. iv. p. 301, *Erucastrum Pollichii*, Schimp. et Spen. Fl. Frib. iii. p. 946, Koch, l. c. *E. inodorum*, Rehb. germ. exc. No. 4428. *Sisymbrium erucastrum*, Poll. Pal. ii. p. 224, e. Koch. l. c.

H. In arenosis ad lacum Biennensem! Muratensem! Neocomensem! in insulis et in arenosis Arolæ prope Solothuru! et ad Rhenum prope Basileam. (Fischer!)

Obs. Valde variat forma foliorum. In exempl. fere omnibus (et ultra 200 examinavi) pedunculi infimi folio pinnatifido stipati sunt, sed etiam in exempl. sequentis "ad muros antiquos Huningue" lectes (Fischer!) bracteæ similes occurrunt. Petala videntur angustiora quam in sequenti, sed certe non "dimidio minores." Siliquæ magis distantes ac crassiores.

404. *Br. obtusangula*, mihi.

B. foliis profunde pinnatifidis, laciniis oblongis inæqualiter angulato-dentatis sinu rotundato; sepalis petalisque (citrinis) patentissimis, siliquis patentibus rostro toruloso plerumque monospermo.

B. erucastrum, Soyer. l. c. *B. erucastrum* α , Gaud. l. c. cum icone mala. *Erucastrum obtusangulam*, Rehb. germ. exc. No. 4429. Koch, l. c. *Sisymbrium obtusangulam*, Schleich! Dec. Syst. ii. 465. Prod. Dub. Bot. Gall. i. p. 44.

H. In arenosis ad viam prope Leuk, et inter St Nicholas et Zermatt.

Obs. Etiam quoad foliorum formam et lorum directionem variabilis; differt a præcedente etiam siliquis tenuioribus confertioribus ac magis numerosis. In exempl. meis pedunculi omnes aphylli. Rostra plerumque monosperma, interdum asperma.

405. *Eruca sativa*, Lam. Brassica *Eruca*, L.

H. In arvis incultis et ad viam prope Varen.

Obs. Siliquæ pilis paucis retrorsum hispida, interdum glabriusculæ, rostro scabro triplo longiores. Semina in exempl. meis, uni-

serialia, Petala citrina vel flava, venis fuscis picta, interdum purpurescentia, demum albescentia.

406. *Alyssum calycinum*, L.

H. In arvis ad moles glaciales supra Zermatt.

407. *Draba aizoides*, L.

H. (*α.*) in fissuris rupium, M. Gemmi, supra Schwarrenbach, (*β.*) ad moles glaciales summi jugi alpium supra Tæsch in fissuris rupium. In M. Fünelen ad rupes M. Gemmi ad lacum Dauben, 31. Aug. 1836.

Obs. Planta valde variabilis (ut species fere omnes generis intricatissimi) et *ε.* varietatibus species plures ab auctoribus forsitan male institutæ sunt. Formas sequentes distinguo.

α. microcarpa; siliculæ ovales vel suborbiculares $1\frac{1}{2}$ ad longæ 2 lineas longæ, pedicellis subsæquantes; racemus abbreviatus pauciflorus floribus parvis; folia lineari lanceolata brevissima.

Variat siliculis lævibus et ciliatis, foliorumque latitudine et longitudine; semina perpauca, forsitan abortione sæpissime uniserialia. *Draba Sauteri* Hoppe Koch, Syn. p. 62. Reich. pl. crit. iv. ic. 564-566 et exsic! (specimen immaturum) hæc varietate proxima, differt siliculis suborbicularibus, stylo per brevi, caulibus prostratis ramosis elongatis laxè cæspitosis, sterilibus remote foliosis; sed denuo indaganda, annon transitio occurrit.

β. intermedia; siliculæ lanceolate-ellipticæ, ad 3 lineas longæ, pedicellis æquales vel longiores; racemus congestus, floribus numerosioribus.

Variat ut var *α.*; et in uno et eodem individuo stylos vix dimidiam lineam et ultra lineam unam longos inveni. Ad formam microstylam sine dubio referenda est *Dr. Zahlbruckneri*, Host. Koch, l. c. Rchb. exsic!—*γ.* macrocarpa; siliculæ lineari-lanceolatæ, lanceolatæve, 4-6 lineas longæ, pedicellis elongatis, breviores. Racemus multiflorus, demum valde elongatus, floribus magnis; folia linearialia et sæpe ultra.

Hæc forma copiose ad rupes calcareas Jurassi ubique occurrit et cæspites maximos, interdum laxos efficit; variat etiam ut formæ præcedentes. Ab hæc varietate omnino differt *Draba Aizoon* Wahl! *Dr. lasiocarpa* Rochel! (omnino eadem species contra Koch, l. c.) foliis duplo triplove latoribus, pedicellis divaricato-patulis, stylo brevioribus, floribus duplo minoribus ochroleucis, calyibusque atroviridibus (in *Dr. aizoidi* flavescens) sed forsitan calycis color variabilis. Var. *α.* facile in *β.* transit, et formæ intermedie inter *β.* et *γ.* in Jurasso non desunt: pedicelli longitudo in uno et eodem individuo variabilis.

408. *D. tomentosa*, Wahl. Helv. p. 123, Tab. iii. Koch. Rchb. pl. crit. viii. ic. 1011–1014. exsic! Gaud.

H. In M. Gemmi in fissuris rupium supra Schwarrenbach.

409. *D. frigida*, Sauter. Koch, Gaud. Rchb. l. c. iii. ic. 359, et exsic! α . siliculis glabris. β . siliculis scabriusculis.

H. α . In M. Gemmi supra Schwarrenbach.* Zermatt. β . ad moles glaciales summi jugi alpium supra Täsch.

410. *D. Johannis*, Host. Koch, Deutsl. Fl. iv. p. 553. Syn. p. 63.

D. Carinthiaca, Hoppe. Rchb. pl. crit. iv. ic. 567–569, et exsic! (differt tantum a suo nivali! floribus paulo minoribus, et siliculis forsitan longioribus, sed planta junior est.) *D. nivalis* Lapeyr! Gaud. Helv. iv. p. 256. Rchb. l. c. viii. ic. 1045–1047, ex Germ. exc. No. 4238 et exsic!

H. Ad moles glaciales summi jugi alpium supra Täsch cum præcedente.

Obs. *D. muricella*, Rchb. pl. crit. viii. ic. 1023–1025, a cl. Koch in Deutsl. Fl. l. c. ad *D. Traunfellneri* citata (in Syn. l. c. iconem Rchb. non citavit, sed *D. Traunfellneri* ad *D. Johannis* ducit) videtur omnino diversa. Sub nomine *D. rivularis* Berut plantam omnino similem ab Opitz accepi. Huc etiam de *hirta* Gaud. l. c. pertinere opinor, sed plantam Gaud. nondum vidi. *D. hirta*, Wahl! (c. Laponnica) diversissima est species, et icon. Rchb. bona. In Herb. meo spec. vallesiaca “*Drabæ alpinæ*, Lilibl.” pössideo qua satis bene ad iconem Rchb. *D. muricellæ* accedunt. *D. muricella*, Wahl! videtur planta tantum minor, caulibus simplicibus. *Draba rupestris* R. Br. (Ben Lawers, Watson! Campbell!) species mihi non satis cognita est. Inter specimina mea exempl. occurrunt stigmatate sessili, et etiam stylo evidenter sed brevi: siliculæ tamen semper pilis stellatis furcatisque tectæ sunt.

411. *D. lapponica*, Willd.? Rchb. pl. crit. viii. ic. 1019–1022. Koch, Syn. p. 64. *D. fladnizensis*, Gaud. l. c.?

H. Ad moles glaciales summi jugi alpium supra Täsch.

Obs. Forma silicularum paululo variat, sed quoad habitam et siliculas icon Rchb. optima est. In exempl. meis, folio sunt lanceolata, integra vel, et præsertim caulina, dentata, pilis stellatis ubique tecta, interdum longioribus simplicibus ciliata. Scapi 3–5 unciales unifoliati, inferne pilis stellatis adspersi, superne siliculisque glaberrimi. Siliculæ ovato-lanceolatæ vel ovatæ minimæ, stylo brevi sed evidenti terminatæ.

D. fladnizensis, Wulf. Rchb. pl. crit. viii. ic. 1016–1018. *D. sclerophylla*, Gaud. l. c. hæc proxima, differt habitu humiliori et crassiori, foliis lineari-lanceolatis glabris pilis rigidis simplicibus

subremotisque ciliatis, stigmatе subsessili. Hanc plantam in M. Faulhorn copiose viget, et ibidem 1835-36 legi.

412. *D. fladnizensis*, Wulf. β ? pubescens mihi. *D. ramosissima*, scapis nudis pubescentibus, foliis ovato-vel lanceolato-linearibus obtusiusculis, dorso exstante carinatis, pilis rigidis ciliatis, utrinque glabris: siliculis ovato-lanceolatis pedicellis longioribus, pilis simplicibus longiusculis tenuissimis pubescentibus, stylo brevissimo subnullo.

H. In fissuris rupium ad nives perennes M. Gemmi supra Schwarrenbach., (exemplaria 5 pro *D. aizoides* formam pusillam legi.)

Obs. Cæspites congestis parvos efficit; scapi vix semiunciales, interdum unifoliati, 2-5 flori: Florentem non inveni, ut dubitor annon potius ad *D. Sauteri* β . Spitzelii Koch l. c. referenda. Huc etiam referenda mihi videtur *D. rupestris* Rchb. germ. exc. No. 4245, (cf. ann.)

413.* *D. confusa* Ehrh. Koch. l. c. Gaud. l. c. Rchb. l. c. ic. 1033, opt. *D. stylosa*, Gaud! in Herb. meo.

H. in alpihus supra Zermatt.

Obs. *D. lævigata*, Hoppe, *D. ciliata*, Scop. Koch., l. c. mihi incognitæ.

414. *Biscutella lævigata*, L. Koch, Syn. p. 71.

α . siliculis glabris, lævibus. *B. lævigata* Gaud. DC. β . siliculis lepidoto-scabris. *B. saxatilis*, Schleich. Gaud. Dec. Rchb. pl. crit. vii. ic. 840.

H. α . inter Thermas Leucenses et Inden. β . ad viam inter Randa et Zermatt, et in alpihus supra Täsch.

Obs. *B. lævigata*, Rchb. l. c. ic. 837 et *B. obcordata* ejusdem ic. 836, siliculis superne non excisis differunt, sed in exempl. Rchb. et in meis omnibus siliculas excisas inveni. In M. Bürglen dit. Bernensi plantam legi *B. obcordatæ* omnino simillimam, nisi siliculis superne excisis fere ut in icone Rchb. *B. saxatilis*, Schleich. In uno et eodem individuo siliculas valvulis superne stylo appressis (ic. Rchb. *B. saxatilis*, 840), vel a stylo remotis (ic. Rchb. *B. obcordatæ*, 836), observavi. In utraque var. semina omnino similia sunt et tenuissime punctato-rugosa. Variant foliis obovato-lanceolatis, lanceolatis vel lineari-lanceolatis remote inciso-serratis, sinuatis, vel sub integris, plus minusve hispidis.

415. *Hutchinsia alpina*, R. Br. α . major, diffusa caulibus elongatis ramosis foliosis, siliculis pedicello multo brevioribus, utrinque attenuatis, stylo conspicuo. β . brevicaulis, minor congesta, cauli-

bus abbreviatis erectiusculis, siliculis pedicello sæpe longioribus, obovato-obtusis, stylo brevissimo subnullo.

H. α . ubique frequens. In M. Gemmi; supra Zermatt. β . ad moles glaciales M. Fünelen.—

Obs. In Herb. normali, Rchb. exs. ! plantam sub nomine. H. brevicaulis Hoppe possideo, sed specimen tantum florens pessimum (talio per sæpe in Herb. norm. Rchb. occurrunt) et admodum compressum ut non examinandum est; sed vix dubitor. H. brevicaulis, Hoppe Koch. Syn. mere forma glacialis H. alpinæ est.

416. *H. rotundifolia*, R. Br. Thlaspi—Gaud. Koch.

H. In glareosis M. Gemmi ad moles glaciales Lammerngletscher, 31 Aug. 1836.

Obs. Siliculæ apteræ leviter emarginatæ, semina matura non habeo sed cotyledones videntur accumbentes.

417. *Thalictrum fœtidum*, L.

H. In saxosis inter Inden et Varen; inter St Nicholas et Zermatt.

418. * *Anemone vernalis*, L.

H. Zermatt.

419. *A. Halleri*, All.

H. In graminosis, M. Fünelen.

420. *A. alpina*, L. β . sulphurea, Gaud. Koch.

H. In graminosis alpinis supra Tæsch.

Obs. Var. elatior pedalis macrantha, foliis profunde incisus hirsutioribus et humilioribus vix digitalis micrantha, foliis minus incisus hirsutisque.

421. *Ranunculus glacialis*, L. (γ . crithmifolius, Rchb.)

H. Ad moles glaciales in glareosis M. Fünelen:—rarissime in M. Gemmi ad nives perennes supra lacum Dauben, 31 Aug. 1836.

422. *R. alpestris*, L.

H. Ad nives deliquescentes, M. Gemmi.

Obs. Variat folio caulino trifido laciniis linearibus, et lineari-spaululato indiviso. Forma foliorum radicalium etiam variabilis, et non semper cæspitosa crescit, et, me judici, R. Tranufellueri Hoppe. Koch, Syn. p. 13, vix species diversa est.

423. *R. parnassifolius*, L.

H. Copiose in glareosis M. Gemmi: ad pedem rupium, M. Schalmette;—et ad lacum Dauben.

Obs. Carpella ut in *R. pyrenæo*. Hæc est forsitan var. parviflorus

sed florentem non inveni. Folia omnia supra ad nervos et margines plus minusve dense lanuginosa sunt.

424. **R. pyrenæus*, L. *α. vulgaris*, DC. Gaud.

H. Supra Zermatt.

Obs. Variat etiam foliis latioribus, cauleque bifloro—Transitus in var. *γ. plantagineum*, DC.

R. lacerus, Bell (ε. Vallesia et etiam ε. Pedemontio a cl. Balbis missa) omnino forma *R. pyrenæi γ. plantaginei* est, cui folia apice leviter vel profunde incisa sunt, et nullo modo proles hybrida, *R. pyrenæi* et *aconitifolii*.

425. *Aconitum napellus*, L.

Var. I. Hians, nectariis exsertis. A. *Schleicheri*, Rchb. *Illust. Ac. Tab. I. f. 1.*

H. In ascensu M. Gemmi supra Kandersteg, 29 Aug. 1836.

Obs. Flores purpurascens.

Var. II. Compactum, caule valde crasso, spica densa foliosa. A. *Napellus compactum*, Rchb. l. c. *Tab. ii. f. 1.* A. *Napellus γ. bracteosum*, Ser!

H. In M. Gemmi in glareosis humidis prope et supra Schwarrenbach copiose.

Obs. Variat foliorum partitionibus latioribus et angustioribus.

Var. III. Glaciale, pygmæum, foliis parvis tenuiter dissectis, inferioribus longe pedunculatis, spica pauciflora, nectariis inclusis. A. *Napellus δ. pygmæum*, Ser!

H. In glareosis M. Gemmi supra Schwarrenbach, copiose.

Obs. Videtur medium inter A. *Schleicheri* et *Napellus compactum*. Folia A. *Schleicheri*, Rchb. l. c. et spica fere A. *Taurici*, Rchb. l. c. *Tab. lxlii.* Hæc forma est forsitan A. *Tauricum* Auct.

426. *A. multifidum*, Koch, Rchb. *Ill. Ac. Tab. lxx. f. α. et h. opt.*

A. *Napellus* var. Koch, Syn.

H. In ascensu M. Gemmi supra Kandersteg, copiose in umbrosis. 29 Aug. 1836.

Obs. Caulis 4–5-pedalis, panicula laxa ramosissima floribus magnis speciosis.

427. *A. acuminatum*, Rchb.?

H. In ascensu M. Gemmi supra Kandersteg. 29 Aug. 1836. rarius.

Obs. Flores speciosi, purpureo violacei, pedicelli erecto-patentes pubescentes, panicula simplex; folia ut in A. *cernuo* sed profundius et tenuiter dissecta, laciniis longioribus. Panicula et flores fere ut in A. *multifido*, Rchb. l. c. sed pedicelli longiores, et rostrum magis productum. Omnino medium inter *Napelloidea* et *Cammaroidea*.

In icone *Rehb.* *A. acuminati*, Tab. lxxviii. (flos unicus) cassis multo angustior est quam in nostris : sed cassis forma et præsertim rostri præ ætate variabilis est.

428. *A. rostratum*, Bernh.

H. In locis humidis umbrosis prope Kandersteg. 1 Sept. 1836.

Obs. Cassis minus curvata quam in icone, *Rehb.* Tab. xi. sed eandem formam et plantam iconi *Rehb.* omnino similem copiose in *M. Stockhorn* legi. Nectaria erectiuscula vel modice inclinata.

429. *A. cernuum*, Wulf. *Rehb.* l. c. Tab. xxxiii. et exsic. !

α. flexicaule, panicula laxa ramosa, ramis pedunculisque flexuosis.

H. In locis humidis umbrosis prope Kandersteg copiose, et in ascensu *M. Gemmi* supra Kandersteg. 29 Aug. 1836.

Obs. Occurrit carpellis et quinis, glabris et etiam maturis pubescentibus ad formam carpellis pubescentibus pertinet *A. hebegynum*, auct. et etiam ad formam carp. pub. *A. paniculati*. Nectaria arcuato-cernuo.

β. pyramidatum.

H. In ascensu *M. Gemmi* supra Kandersteg. 1836.

Obs. Panicula ramosa magis coarctata ramis rigide erecto-patulis. *A. paniculatum*, Lam. *Rehb.* Ill. Ac. Tab. xxxii. videtur species distincta ; hujus formam hebygenam in *M. Gemmi* a cl. *Seringe* lectum possideo.

430. *A. Lycoctonum*, L. Var. *Cynoctonum*. *A. Vulparia β. Cynoctonum*, *Rehb.* Ill. Ac. Tab. lvii. opt.

H. In sylvis in ascensu *M. Gemmi* supra Kandersteg. 29 Aug. 1836.

Obs. In petrosis calcareis umbrosis *Jurassi*, *A. Vulparia γ. Tra-goctonum*, *Rehb.* l. c. Tab. lviii. copiose viget.

III.—*An Attempt to ascertain the Fauna of Shropshire and North Wales.* By THOMAS C. EYTON, F. Z. S.

THE following attempt towards perfecting a Catalogue of the animals indigenous to Shropshire and North Wales was originally read before the Natural History and Antiquarian Society called after that district, the museum and meetings of which are at Shrewsbury. A few additions have, however, since been made. One of the principal objects for which this society was formed was to complete a list of the Fauna of the above-named district. Any steps towards its accomplishment, therefore, is so much gained. It is with this view

alone that I have offered the following Catalogue, however imperfect, as a sort of foundation to work upon, and have accompanied it with notes, where anything interesting, and not before recorded with regard to the habits or peculiarities of the species, presents itself, thus breaking in some measure the monotony of a mere list. It is my intention, also, to subjoin at the end of each class a notice of the extinct species, where there is good authority that they formerly did exist; fossil ones, however, will not be included. Introduced species will not be noticed, except in cases where they have, as it were, almost become indigenous.

Before commencing the catalogue of animals contained in the above-mentioned district, it will be perhaps interesting to many of my readers who live at a distance, to give some slight account of the face and general appearance of the country. As however, wherever soil, the geological formation or elevation appear to influence the distribution of a species, I shall particularly mention it when giving an account of that species, it will therefore be unnecessary to occupy much space here.

The surface of Shropshire is chiefly covered by the old and new red sandstone formation, traversed in a north-westerly direction by an eruption of trap or igneous rock, forming hills, the principal of which are the Wrekin, Ercal, Lileshall, Stretton hills, Longmynd, Stiferstone. There are also other hills in Shropshire of sandstone, which, although the trap does not make its appearance, are doubtless elevated by it. The principal of these are Grinshill, Timhill, Hawkstone, Nessoliss, and the hills in its neighbourhood. On the sides of the trap hills the rocks belonging to the silurian system of Mr Murchison are generally exposed to view; for a further account of which I must refer my readers to a series of papers read by him before the Geological Society, and to his forthcoming work on the geology of Shropshire. An extensive coal-field is found with the carboniferous series belonging to it, between Wellington and Shifnall, but the district occupied by it is far too thickly populated to be very interesting to the zoologist. Extensive peat bogs exist, particularly those of the Wild or Weald moors, running from Newport to the river Tearne at Crudington, the greatest breadth of which may be estimated at four miles, and Baggymoor or Boggymoor, traversed for its whole length by the river Perry, and extending from Halston to Ruyton. Of the eleven towns I have never been able to find any authentic account of animal remains having been found in either of them. Lakes or meres, as they are called, occur in consi-

derable abundance on the Welsh border, in the neighbourhood of Ellesmere. The far-famed river Severn traverses the county, to which most of its brooks and rivers are tributary.

The most extensive woodlands are those situated in the neighbourhood of the Wrekin and Ercal, a part of Bewdly forest, and the woods adjoining. The county would, indeed, altogether be called a wooded one, abounding with oak timber, and underwood.

Those parts of North Wales which bound Shropshire are chiefly composed of limestone hills, running far up into the principality, and of the Cambrian system of rocks of Professor Sedgewick. Various slates also occur, but no granite has as yet been discovered. A dike of trap has, however, lately been mentioned by Mr Wyatt to the Geological Society, discovered in the Penrhyn slate quarries. A large coal-field is found at Ruabon, and another smaller one at Chirk.

The whole of North Wales is thickly interspersed with lakes. From the summit of Snowdon alone, above thirty may be counted, and nearly every valley has its river. Many of the hills are partially clothed with oak and birch underwood, arising from stumps of ancient date, in many instances probably the remains of Druidical groves; in many also extensive plantations of the different sorts of fir have been made. The sea coast is extensive, and consequently a large proportion of marine animals are found.

On the gravel deposits of Shropshire and Wales, which being the uppermost, would probably in the greatest degree influence the distribution of species, a very interesting paper was read by Mr Murchison to the Geological Section of the British Association, to which, as the detail of it would far exceed my proposed limits, I must refer those who are interested with the subject.

The Brown Ace is the highest hill in Shropshire, (1805 feet above the sea.) There are others, however, which nearly approach it. The general level of the county may be said to be about 1000 feet lower. The summit of Snowdon is the most elevated point in North Wales, (3571 feet above the sea,) from which we find points of all heights to the actual coast.

MAMMALIA.

VESPERTILIO NOCTULA, *Desm.* (Great Bat.) A specimen is in my collection, killed near the castle, Shrewsbury.

VESPERTILIO PIPISTRELLA, *Geoff.* (Common Bat.) Frequently occurs. I once found upwards of twenty congregated together in a hole, by the side of a door-post, in the month of May.

PLECOTUS AURITUS, *Geoff.* (Long-Eared Bat.) In Shropshire this bat is decidedly more common than the preceding.

ERINACEUS EUROPEUS, *Linn.* (Hedgehog.) Common. It has been said that this animal feeds on eggs. Although I confined one for some time, and deprived it of other meat, I was unable to persuade it to touch one.

TALPA EUROPEA, *Linn.* (Mole.) Common. Albinos have several times occurred.

SOREX ARANEUS, *Linn.* (Common Shrew.) Common.

SOREX FODIENS, *Pall.* (Water Shrew.) An albino of this species is in my collection, captured near Shrewsbury; and a paper will be found in Vol. ii. p. 219, of Loudon's Magazine of Nat. Hist., entitled, "Some account of the Water Shrew, a mouse supposed to have been lost for about a century, by John F. M. Doveston, Esq. A. M. Oxon of West Felton, near Shrewsbury," which gives the best account we have of its habits, and of its occurrence near that place.

MELES TAXUS, *Flem.* (Badger.) Formerly common in this county, but becoming more scarce every year. In North Wales, however, there are still plenty.

MUSTELA PUTORIUS, *Linn.* (Polecat.) Common.

MUSTELA ERMINEA, *Linn.* (Stoat.) Common. Stoats will occasionally pursue moles in their burrows. A mole-catcher once informed me, that he had caught a mole and stoat in the same mole-trap.

MUSTELA VULGARIS, *Linn.* (Weasel.) Common.

MUSTELA. (*Martes*, *Ray.*) *FOINA*, *Linn.* (Common Marten.) North Wales. Not uncommon; but I have never seen a Shropshire specimen.

MARTES ABIETUM, *Ray.* (Pine Marten.) Two specimens have been taken in Shropshire at Stapleton, near Shrewsbury. It also occurs in the neighbourhood of Snowdon, and near Barmouth, North Wales. That this and the foregoing species are not really distinct, I have scarcely any doubt. A specimen is now in my collection, which appears to be intermediate between the two. The test of anatomical character is, however, the only mode in which this can be determined.

LUTRA VULGARIS, *Desm.* (Otter.) A common animal on the rivers both of Wales and Shropshire. I once shot one with a ball near Holyhead at sea. He rose in the act of struggling with a large conger eel, no doubt with the intention of making a meal upon him. He appeared, however, to have quite as much as he could manage, the conger being coiled round him. The ball passed through the

heart of the otter, and head of the conger. The former I procured, but the latter, slipping through one of the boatmen's fingers, was carried off with the tide.

CANIS VULPES, *Linn.* (Fox.) Common. A female in the possession of Edward Gataene, Esq. of Gataene, bred in confinement, having made an earth by scratching up a large flag-stone, her young, however, having been looked at, she destroyed them when two or three days old.

PHOCA VITULINA, *Linn.* (Common Seal.) Pennant, in his *British Zoology*, mentions the occurrence of this species on the coasts of Caernavonshire and Anglesea. The fishermen also have several times informed of its occurrence. I have never, however, succeeded in obtaining or seeing one. Mr Bell, in his "History of British Quadrupeds," page 263, mentions, on the authority of Professor Nilsson, that the oblique position of the teeth is a constant character in this species. It is, however, one which appears to vary with the age of the animal. In the cranium of a specimen in my collection obtained in Scotland, and of whose habits while alive some account was published in the first number of this Magazine, the two posterior molars are not oblique, and the third only slightly so. The fourth and fifth are, however, as represented in Mr Bell's work, page 268. The teeth in the lower jaw correspond with those of the upper, although a young one, which appears from the state of the ossification, and the total length being only 3 feet 4 in. It has no remains of milk teeth. The following particulars with regard to the skeleton may perhaps contribute towards the elucidation of the genus. The palatine bones are as figured by Mr Bell. Vertebrae, cer. 7; dor. 15; lum. 5; sac. 6; caud. 8; the tip of the tail was slightly injured, but I believe the enumeration to be correct. Ribs, 15.

SCIURUS VULGARIS, *Linn.* (Squirrel.) Common.

MYOXUS AVELLANARIUS, *Desm.* (Dormouse.) In woods near the Wrekin, consisting chiefly of oak and hazel underwood, growing from old stumps, in which they make their winter quarters. The strokes of the wood-cutter's axe awake them, when, in their endeavour to escape, they are frequently captured. My specimens were obtained in this manner.

MUS MESSORIUS, *Shaw*, (Harvest Mouse.) A specimen is in my collection taken near Eyton.

MUS SYLVATICUS, *Linn.* (Long-tailed Fieldmouse.) Common during a late flood on the wild moors. I could have captured any number of these mice, every little tuft of grass that was tolerably

dry being full of them. When pursued they occasionally dived; they also ascended trees with the greatest facility.

MUS DECUMANUS, *Pall.* (Norway Rat.) Common. An introduced species.

ARVICOLA AMPHIBIUS, *Desm.* (Water Rat.) Common. This animal, like others of its genus, hibernates. There are numbers in the banks of the drains on the wild moors in summer, while in winter not one is to be seen.

ARVICOLA ARVALIS, *Flem.* (Field Vole.) In this neighbourhood, (Eyton,) this species frequents the banks of drains, and both swims and dives well. I have not yet met with *A. pratensis*, *Baill.* within the district.

LEPUS TIMIDUS, *Linn.* (Hare.) Common. Several specimens of a whitish variety have also occurred.

LEPUS CUNICULUS, *Linn.* (Rabbit.) Common. Black specimens are found occasionally on Rudge Heath, and in the neighbourhood of Eyton. A buff or yellowish variety is common near Longford Newport.

PHOCÆNA DELPHINUS, *Cuv.* (Porpoise.) Common on the Welsh coast in summer. The time of migration of this species would be worth the investigation of any one who had the opportunity.

EXTINCT SPECIES.

CANIS LUPUS, *Linn.* (Wolf.) The former existence of this animal is sufficiently proved by a mandate of Edward the First (quoted by Pennant) to Peter Corbet, to superintend and assist in the destruction of them through the several counties of Gloucester, Worcester, Hereford, Salop, and Stafford.

CASTOR FIBER, *Linn.* (Beaver.) Pennant quotes Geraldus Cambrensis for the former existence of this species, who travelled through Wales in 1188, and states that in his time they were found in the river Teivi. Two or three waters in the principality still bear the name *Lyn-yr-afange*, or beaver lake.—*Ray.*

MUS RATTUS, *Linn.* (Black Rat.) Although I have not been able to find any notice of the present or former existence of this animal within the district, I have here inserted it, as it is most probable that it was an inhabitant before the introduction of its destroyer, the Norway rat.

IV.—Observations on some New or Obscure Species of Plants.

No. II. By G. A. WALKER ARNOTT, LL. D. F. L. S., &c.

(Continued from page 247.)

PENTALOBA, Lour. (Violaceæ.)

DR BROWN has long since demonstrated that Loureiro's genus and *Alsodeia* of Petit Thouars, were the same in every respect except the fruit, which Loureiro says is a five-seeded berry, but probably erroneously, as he had made another mistake regarding the ovary, to which he attributed five parietal placenta, while Dr Brown finds only three in a specimen from himself. The description of the fleshy fruit may have arisen from its having been immature, in which state it is coriaceous and slightly fleshy in some, if not in all the species. I prefer, therefore, restoring the name given by Loureiro, to adopting that of *Alsodeia*.

All the East Indian species have a simple disk, as in De Candolle's first section of the genus, and the anthers destitute of bristles or hairs at the apex. I shall here add a short description of a new one from Ceylon, found there in spring 1836, by Dr Wight, and abridged specific characters of the others from India, which have been hitherto noticed by authors.

Sect. 1. Discus subcarnosus, dentatus vel subcrenatus, extus haud cingulatus.

Filamenta inclusa, latiuscula, glabra. Antheræ apice imberbes.

1. *P. Ceylanica*, (Arn. ;) foliis obsolete denticulatis axillis nervorum subtus eporosis, floribus fasciculatis, ovario styloque glabris. — *Wight. Cat. n.* 268.

HAB.—In insula Ceylano.

Fruticosa, glaberrima. Folia petiolata, petiolo $2\frac{1}{2}$ -4 lineas longo, oblongo-lanceolata, obsolete denticulata, basi obtusa, apice attenuata, subtus eporosa. Flores fasciculati, axillares, brevissime pedicellati. Sepala ovato-lanceolata, acuta, ciliolata. Discus cupuliformis, simplex, 5-dentatus. Stamina 5, glabra, petalis breviora. Filamenta distantia, brevissima, anthera breviora, carnosae, e basi lata acuminata, intus ad disci dentes et paullo infra apices inserta ac illis opposita. Antheræ oblongæ, dorso in ligulam membranaceam erectam ovatam acuminatam loculos fere duplo superantem productæ; connectivum apice cuspidulatum. Ovarium glabrum, ovato-globosum, discum paullo superans, uniloculare, ovulis tribus parietalibus appensis. Stylus erectus, conico-acuminatus, crassus, carnosus, glaber, staminibus paullo longior, petalis brevior. Stigma 3-lobum. Capsula coriacea, globoso-trigona, glabra, 3-sperma, styli basi mucronata. Semina globosa.

2. *P. Bengalensis*, (Wall.) foliis argute serrulatis subtus ad axillas nervorum excavato-ciliatis, floribus fasciculatis, ovario styloque glabris.—*Wall. Cat. n.* 4896.—*Alsodeia Bengalensis*, *Wall. in Act. Med. and Phys. Soc. Calcut. vii.* p. 224, (cum descriptione locupletissima.)

HAB.—In Bengala.

3. *P. lanceolata*, (Wall.) foliis lanceolatis longe attenuatis obsolete denticulatis subtus ad axillas nervorum eporosis, floribus congestim racemosis, sepalis late ovatis obtusis glabriusculis, disco 10-15-crenato, ovario styloque hirsutis.—*Wall. Cat. n.* 4023.—*Vareca lanceolata*, *Roxb. fl. Ind. i.* p. 648 ; (*ed. Wall.*) ii. p. 246.

HAB.—In Sincapore.

Folia 6-9 poll. longa, $1\frac{1}{2}$ -2 lata, breve petiolata, petiolo vix duas lineas longo. Pedunculus communis petiolo brevior ; pedicelli breves, erectiusculi. Sepala dorso glabra vel minutissime pubescentia, margine ciliolata. Discus cupulatus, brevis, truncatus, 10-15 crenatus. Stamina inclusa : filamenta linearia, planiuscula, lata, anthera sublongiora, glabra : antherarum appendix membranacea, ovata, acuminata, loculis dimidio longior.

4. *P. sessilis* (Lour.) foliis lanceolatis leviter serratis, floribus fasciculatis, sepalis lanceolatis pilosis, disco 5-dentato, filamentis corollam fere æquantibus, ovario styloque pilosis.—*Lour. Coch. (ed. Willd.)* p. 191.

HAB.—In montibus Cochin China ; *Loureiro*.

This species is obviously very closely allied to the last, but appears to differ by the hairy lanceolate sepals, and the disk. The above diagnosis is derived entirely from Loureiro's description.

5. *P. macrophylla* (Wall.) foliis oblongis vel oblongo-lanceolatis utrinque subacuminatis obsolete dentatis subtus eporosis, petiolis ramulisque hispidulis, floribus congestim racemosis, sepalis lanceolatis acutis extrorsum hispidis, disco subintegerrimo, ovario hispido, stylo glabro.—*Wall. Cat. n.* 4024 ?—*Alsodeia macrophylla*, *De Caisn. herb. Timor.* p. 100, t. 19.

HAB.—In insula Timor.—Penang ? ; *Porter* ?

Filamenta brevissima ; appendix antheram suam fere duplo superans, cordato-ovata, acuminata.

De Caisne does not quote *P. macrophylla*, Wall., nor am I acquainted with it ; perhaps the two plants are quite different.

Sect. 2. Discus submembranaceus 5-partitus. Filamenta exserta, capillaria, ad antheræ basin villosa. Antheræ apice imberbes.

6. *P. Roxburghii* (Wall.) foliis subsessilibus oblongo-lanceolatis crenatis basi cuneatis subtus ad axillas nervorum excavatis, floribus

fasciculatis, disci laciniis apice incurvo-bifidis filamento in incisura inserto, ovario glabro, stylo hirsuto.—*Wall. Cat. n. 7189.*—*Vareca heteroclita, Roxb. Fl. Ind. i. p. 648; (ed. Wall.) ii. p. 246.*

HAB.—In Hindustania; *Martin.*

Folia (in exemplo meo) 1-1 $\frac{1}{4}$ poll. longa, basi cuneata, subsessilia. Antherarum appendix lata, loculos parum superans, truncata.

Roxburgh says of the base of the filaments, that “each side is enlarged with one or more adjoined hornlets, which are bearded at the base.” These hornlets are what I consider the lobes of the segments of the disk, and in the only flower, in a sufficiently advanced state, that I found on my specimen, they were quite glabrous, but the base of the anthers, or very apex of the filaments was woolly. I am not quite satisfied whether the disk is, as I have called it, only 5-partite, or whether it be not composed of 5 scales distinct at the base; they appeared slightly connected there, but separated with great facility.

In all the species which I have examined, there are only three ovules in each ovarium, one to each parietal placenta. I hesitate, therefore, in placing in the same genus *Vareca moluccana*, Roxb., of which the ovary is said to contain “many ovules attached to two or three parietal receptacles;” but that plant, as described, differs also from *Pentaloba* in several other important particulars, as in the want of stipules, villous peduncles, young shoots clothed with ferruginous pubescence, calyx 5-toothed, villous and caducous, and apparently no disk. Can it be a species of *Prothesia* of Blume? a genus as already pointed out by Meisner (*Plant. vasc. gen. Comm. p. 18.*) very closely allied to *Pentaloba*, but differing by the numerous ovules. If so, Roxburgh’s description must be considered as erroneous in several particulars. I feel, however, more disposed to refer it to *Pittosporum*, to which genus *Itea umbellata* Roxb., and *Celastrus verticillatus*, Roxb. appear also to belong.

HORTONIA, *Wight MSS.*

Flores hermaphroditi? *Perianthium* seu *involucrum* e foliolis numerosis concavis imbricatis, exterioribus orbiculatis subcoriaceis persistentibus, interioribus subpetaloideis angustioribus tarde deciduis. *Stamina* circiter 7, perigyna. *Filamenta* brevia, basi utrinque glandula pedicellata cucullata truncata submembranacea stipata. *Antheræ* magnæ, suborbiculares, biloculares, adnatæ, extrorsum versæ, longitudinaliter? dehiscentes. *Ovaria* plurima in receptaculi plano parce piloso inserta, trigono-subulata, basi uniloculares. *Ovulum* solitarium, pendulum. *Stylus* nullus. *Stigma* obliquum, dilatatum,

compressum, membranaceum, sublacerum. *Carpella* (ovariis plurimis abortientibus) sicco-drupacea, breviter stipitata, ovoidea, compressiuscula, apice obliqua, unilocularia. *Semen* unicum, pendulum. “*Albumen* magnum, carnosum, haud ruminatum. Embryo minutus, in regione hili situs.” (*Wight*.)

Frutex magnus, glaber, Ceylanicus. Folia apposita, exstipulata, petiolata, oblongo-lanceolata, utrinque acuminata, integerrima, penninervia, subtus reticulata, epunctata. Cymæ pedunculati, axillares, oppositi, petiolo longiores. Involucri foliola exteriora, atque pedicelli ramulique juniores minutim ac sparsim stellato-puberuli. Flores pallide flavi.

1. *H. floribunda*; *Wight, Cat. n. 2467*.

HAB.—In sylvis editioribus insulæ Ceylani, prope Newere Ellia, *Wight*.

“I dedicate this genus to Lady Horton, on account of the lively interest she takes in botany, and her extensive knowledge of Ceylon plants. It appears to hold a place intermediate between Magnoliaceæ and Anonaceæ,* having the numerous petals and large albumen, with minute embryo of the former, and extrorse anthers and distinct carpels of the latter, differing from both in its opposite and axillary inflorescence.” (*Wight in litt.*) Dr *Wight* remarks, that there are 8–10 stamens, and numerous petals in several rows, 8–10 in each. I have, however, in no instance, observed more than seven stamens, and as for the petals or leaves of the perianth, there are not two situated in the same plane, all forming a dense spiral of several rows at the apex of the pedicel. I therefore consider the supposed floral covering more in the light of an involucre, and in this way *Hortonia* will obviously approach the Monimiaceæ. From these it differs principally by the imbricated æstivation, and definite stamens placed in a single series around the ovaria, and neither inserted into the tube of the involucre, but upon a flat receptacle or dilated apex of the pedicel. All the anthers which I have examined

* Belonging to the natural order Schizandraceæ, which does hold this intermediate place, I have received from Dr *Wight*, collected in Ceylon and Malabar (in 1836,) a species of *Kadsura*, differing only from the character of that genus, as limited by *Blume*, by having three ovules in each ovarium: it is *K. Wightiana* (*Arn.*) dioica, foliis obliquis ovalibus obtuse acuminatis supra medium denticulatis, pedunculis axillaribus femineis petiolo longioribus calyce (seu perianthio) 12-phylo sub 4-seriali, filamentis discretis, ovarii 3-ovulatis, stigmatibus obliquo planiusculo ovato subpeltato, carpellis suborbicularibus obtusis mucronulatis.—*Wight, Cat. n. 2478*.—*Pauslowia, Wight in litt.*

Differt a *K. Roxburghiana* (quæ *K. Japonica*, *Wall.*, *K. altera* species a *Dunalis* memorata, et *Uvaria heteroclita*, *Roxb.*) antheris haud immersis et ovario; a *K. Japonica*, *Kæmpf.*, si fidem descriptioni *Thunbergiano* ponas, plurimis notis.

had each cell marked along the middle with a longitudinal furrow, and contained pollen; hence I infer that they are fertile, and open by slits (not by valves,) but I have seen none after dehiscence, and as at the same time they bear the closest resemblance to the stamnodia of many genera of Laurineæ, so it is not improbable that they may be sterile, and that the fertile ones (on a different plant) do open by valves. If this view were to be adopted, *Hortonia* would be more allied to Atherospermeæ, particularly to *Laurelia* (the filaments of which are likewise furnished with a couple of glands at their base, as in Laurineæ,) but in all the Atherospermeæ the ovule is described as erect, not pendulous, and the style is long, persistent, and plumose. At present, *Hortonia* ought perhaps to be considered as a connecting link between Monimiaceæ and Atherospermeæ, agreeing with, but at the same time differing from both, in several of their peculiar characters. The flower buds, if they may be so called, resemble those of a double flowering myrtle, and are very frequently injured and internally deformed from having been attacked by the larvæ of insects.

In Lindley's Introduction to the Natural System, all the species of Monimiaceæ are said to be natives of America; this is surely a mere inadvertency; a very few only are found in the New World.

ACROCARPUS, *Wight MSS.* (Leguminosæ.)

Calyx subcoriaceus, ebracteolatus, campanulatus, 5-fidus, laciniis erectis, superioribus et inferiori cæteris paullo majoribus. *Torus* tubum tegens. *Petala* oblonga, subcoriacea, subæqualia, sessilia, d'u persistentia, in ore calycis inserta ac ejus lobis alterna et paullo longiora; æstivatio subimbricata, carinalis. *Stamina* 5, ibidem inserta, petalis alternantia: *filamenta* e basi lata subulata, petala 2-3-plo superantia, libera, recta: *antheræ* oscillatoriæ. *Ovarium* longe stipitatum, stipite libero, oblongo-lineare, falcatum, *stylo* brevi incurvo acuto mucronatum, multi (sub-15,) ovulatum. *Fructus*. . .

Arbor magna, speciosa, glabra. Folia alterna, imparipinnata, decidua; petiolus 4-6 poll. longus, teres: foliola 3-4 juga, lanceolata, acuminata, basi paullo inæqualia, 3-poll. longa, integerrima subtus pallida, petiolulo semipollicari. Flores ante foliorum evolutionem expansi majusculi, coccinei, racemosi; racemis spiciformibus densifloris 6-8 poll. longis; pedicellis lineam vel sesquilineam longis recurvis. Stamina fere pollicem longa.

1. *A. fraxinifolius*, Arn. in *Wight Cat.* n. 2466.

HAB. Ad Courtallum, florens fere absque foliis mense Februario; *Wight*.

This genus is allied to *Humboldtia*, as far as regards the number of stamens, and their insertion into the mouth of the calyx, but there the relation seems to end; for that genus, with *Jonesia* and a few others, form a small group distinguished by the stipes of the ovarium cohering on one side with the tube of the calyx; here it is perfectly free. I have not seen the fruit, but the ovary in many respects resembles that of several species of *Pongamia* and *Pterocarpus*. It seems, however, to belong to the second section of Cæsalpineæ of Decandolle, or third of Vogel, and to be more allied to the genera with a diminished number of petals, (*Crudya* and *Dialium*,) than to any of the others, on account of the simply pinnated leaves with a terminal leaflet. Dr Wight remarks, that the native name is Malle-vemboo-marum, meaning Hill-margosa tree, or *Azadarachta Indica*, to which it bears no resemblance whatever, except in being also a tree with pinnatifid leaves.

Another genus of the same group, but more allied to *Macrobium*, I have received from Bahia by the kindness of M. De Lessert (No. 2567); it does not agree with any of those described by Vogel, and obviously differs from *Macrobium* by the short (not very long) style, and nearly equal petals. If not already named by M. De Lessert, it may be called

ZENKERIA.

Calycis sepala 3 in tubum turbinatum connata; laciniaë subæquales, reflexæ. *Petala* 3, subæqualia, tubi ore inserta, obovata, basi attenuata. *Stamina* 3, fertilia, erecta, petalis alternantia, sepalis opposita; filamenta libera, glabra, apice subiter subulata; antheræ oblongæ, *Ovarium* stipitatum, compressum, pubescens, binovulatum. *Stylus* brevis, crassus, glaber, stigma depresso-capitatum, obliquum. *Fructus*

Arbor? glabra. Rami teretes. Folia pinnata, foliolis 4-5, alternis, petiolatis, ovalibus, obtusis vel retusis. Stipulæ oblongæ. Flores fasciculati vel subcorymbosi secus basin ramulorum juniorum digesti, ante foliorum evolutionem expansi. Pedicelli flores æquant. Petala alba. Stamina petala æquantia. Stylus ovario semi-ovali duplo brevior.

1. *Z. dalbergioides*.

I have named this in honour of the late Professor Zenker of Jena, the genus of that name described by Trinius being the same with *Amphidonax*, N. ab E. in Lindl. Nat. Syst. p. 449 (excluding, however, *Arundo Bengalensis*, Roxb. the only species there referred

to, which appears to me neither to agree with the character given, nor to differ from *Arundo* of Kunth.)

SPHÆROCARYA, Wall.

About six years ago, Dr Wight and I, while examining some of his East Indian plants which were in an imperfect state, found specimens of a pear-shaped fruit accompanied with some detached leaves, which we considered to belong to *Sphærocarya*. These we soon afterwards noticed in Jameson's Edinburgh Journal (for July 1832.) under the name of *S. Wallichiana*; we had seen no flowers, but from the remains of them on the top of the fruit, we were induced to alter considerably the character of the genus, in so far as we conceived it to have no petals, but that the bodies so called by Dr Wallich were an exterior petaloid row of glands. Whether we were correct in ascribing this structure to the Nepal plant, the type of the genus, I have never been able to determine, not having been so fortunate as possess or even see specimens of it, but having now obtained flowers belonging to the peninsular species, I find that it must be separated from Dr Wallich's genus. In the Nepal plant there are said to be five persistent petals and alternating scales, (or perhaps a double row of scales, the outer petaloid, the inner minute,) and no disk; in Dr Wight's there is a disk, but neither petals nor scales. Dr Wallich says, that the ovule is "erect, supported by a fleshy subdiaphanous spirally twisted cord, which rises from the bottom of the ovary, and is conducted into the oblong cell by means of a proper tube or canal;" on which account *Sphærocarya* would be a doubtful member of Santalaceæ, (if the supposed erect ovule and fleshy cord be not in reality a mere central column,) while the peninsular plant belongs, I should suppose, unquestionably to that order. I propose to call it

SCLEROPYRUM, (Santalaceæ.)

Flores abortu dioici? MASC. *Perianthium* ebracteolatum, 5-fidum, laciniis patentibus: tubus turbinatus, intus disco cupulato 5-lobo tectus. *Petala* nulla. *Stamina* 5, sepalis opposita, inter disci marginem perianthiumque inserta. *Filamenta* planiuscula, sepalis paullo breviora, apice bifida, segmento utroque antheræ loculum antice ferente. *Ovarium* (abortivum?) disco immersum, uniloculare, (nunc fere solidum,) columella centrali carnosa cylindrica e basi loculi orta apice libera instructum. *Stylus* conicus crassus. *Stigma* 3-4-lobum, lobis erectis inæqualibus, duobus majoribus. FEM. *Flores* (fide Rheidei) ut in mare at tubo pyriformi.

Fructus drupaceus, pyriformis, monospermus, laciniis perianthii marcescentibus et disco coronatus. *Semen* sphaericum, hilo prope basin. *Albumen* carnosum. *Embryo* axilis, gracilis, semine dimidio brevior. *Radicula* supera.

Arbor (*Rheedeo teste*) spinosa. Ramuli teretes, glabri. Folia glabra, alterna, exstipulata, breve petiolata, $3\frac{1}{2}$ -6 poll. longa, $1\frac{1}{2}$ - $2\frac{1}{2}$ lata, supra lucida, ex ovatis obtusis in ovalia lanceolata, penninervia, nervis paucis subtus prominulis secus costam decurrentibus, ad axillas nervorum eporosa, integerrima. Flores subsessiles, dense spicati, spicis in axillis foliorum (saepius delapsorum) subsessilibus, florentibus folio 3-4-plo brevioribus, rachi dense pubescenti, bractea minute lanceolata pubescente persistente sub quoque flore. Flores masculi illis Pomaderridis haud absimiles. Filamenta apice infra fissuram dorso, perianthiique lacinae ad medium, villis albis paucis instructa. Drupa basi in pedicellum brevem crassum attenuata.

1. S. *Wallichiana*, Arn.—*Sphaerocarya Wallichiana*, *Wight et Arn. in Ed. Phil. Journ.* (1832) xv. p. 180; *Wight, Cat. n.* 948.—*Idu-mulli*, *Rheed. H. Mal.* iv. t. 18, (fem.)—*Tiri-itti-Canni*, *Rheed. H. Mal.* vii. t. 30, (mas.)

HAB.—In Malabar.

In all the flowers I have examined the stigmas appeared imperfect, and although the central column of the ovarium was slightly incrassated at the apex, I could perceive no trace whatever of ovules. I therefore consider them as unisexual, in which I am confirmed by *Rheede*, who says of his *Tiri-itti-Canni*, “fructus nulli:” in his *Idu-mulli*, or the fructiferous plant, no stamens are figured, but they are described; probably they are abortive. *Rheede* figures the female with thorns on the branches, but not the male, although he describes them. On my specimen there are none whatever, but it is the mere termination of a young branch. *Rheede* says of the male that it is a parasitical plant, of the female that it is a lofty tree: the former appears to me quite a misconception on his part. The figures he has given, the one of the male flower, the other of the fruit, are faithful.

MACKAYA, Arn.

Calyx ebracteolatus, brevis, late campanulatus, limbo brevissimo 5-denticulato. *Corolla* subgamopetala, rotata, 5-partita, decidua, lobis oblongis calycis denticulis alternantibus; aestivatio valvata. *Stamina* 5, inter glandulas duas inserta prope basin corollae laciniarum ac iis opposita. *Antherae* sessiles, incurvae, ovatae, biloculares, longitudinaliter versus latera dehiscentes, connectivo crassiusculo.

Ovarium semiadhærens, uniloculare absque axi columellare centrali, partie libera conico-ovata in stylum brevem crassum sensim acuminata: *ovula* 3 ex apice loculi pendula. *Stigma* 3-lobum. *Fructus* omnino cohærens, oblongus, apice calycis denticulis styloque persistente coronatus, unilocularis, crustaceus, indehiscens, cortice (seu calyce) per maturitatem in valvas 3-4-5 ab apice ad basin subirregulariter delacerato. *Semen* unicum, pendulum. *Albumen* oleagineo-carnosum. *Embryo* minutus, in basi albuminis (sc. prope hilum) situs.

Frutex glaber, scandens. Folia alterna, longiuscule petiolata, subpellata, triplinervia, integerrima, ovata, apice attenuata, basi rotundata vel retusa, sublus glauca. Pedunculi graciles, dichotomi, pauciflori, axillares aggregati vel secus ramulum brevem axillarem aphyllum aut apicem versus oligo-phyllum alternatim dispositi, nunc in ramis junioribus axillares solitarii vel in axillis superioribus in cirrhos mutati! Flores longe pedicellati, magnitudine ac quodammodo facie eorum. *Myosotidis palustris colore forsan albo.*

1. *M. populifolia*, Arn.—*Wight, Cat. n. 2465.*

HAB.—Ad Courtallum; *Wight.*

Of this genus I cannot indicate the natural order, nor even the place in the linear series which it ought to occupy. In the structure of the ovarium it approaches Combretaceæ, but in that of the seed is very different from them. I hesitate whether or not the petals be not really distinct: they certainly do cohere by their margins at the very base, forming a kind of short tube, but when they fall off, they leave, not a continuous circular mark, but five distinct scars on the top of the fruit alternating with the teeth of the calyx: I can perceive no epigynous disk. One might suppose it a species of Olacineæ with inferior fruit, but it differs from the true genera of that order, as well as of Santalaceæ, by the want of a central columella to the ovarium: at the same time it is more related to these than to any other order at present characterized, and has as much right to be placed near them as some others usually referred there, but differing widely in their ovaria and fruit. In many respects it bears a relation to *Schæpfia*, a genus referred by Decandolle to Loranthaceæ, having a cup-shaped bractea under its ovarium, and said to have a trilocular ovary; whereas here the calyx is naked at the base, and there is no trace of a central axis. In *Schæpfia arborescens*, however, the only species which I possess or have had an opportunity of dissecting, the ovary is unilocular, with three ovules suspended from the apex of a thick angular, but free central column, as in Olacineæ and Santalaceæ; nor does it ap-

pear distinct from the latter except by the presence of a true corolla, or from the former except by the cohering calyx. Perhaps, then, notwithstanding the difference of structure of the ovary, *Schappia* and *Mackaya* may be linked together, and form a small (artificial?) group among the Calycifloræ, connecting Santalaceæ with them, as *Olax* does with the Thalamifloræ; a view which would be strengthened, if we were to consider with Dr Lindley, while speaking of Anthoboleæ, Nysseæ,* and Santalaceæ, that the superior or inferior fruit was a character of more importance than the position of the ovules. Without, however, granting this, for which I am not prepared, the two may be placed near each other, till other and better affinities be discovered.

I may here add with regard to *Schappia*, that although Vahl, (under *Codonium*,) and some other botanists, describe the ovarium as half-superior, that portion which is elevated above the margin of the calyx is perfectly solid and fleshy, and appears to me to be more an epigynous disk, similar to what is observed in many Rubiaceæ, than a part of the ovarium itself: the ovary is thus truly inferior, and this constitutes the principal objection to uniting the genus to Olacineæ. The ovules are narrow oblong, attenuated at their point of attachment, and reach from the apex of the columella nearly to its base, with the angles of which they alternate. In *S. arborescens* the style is cylindrical without any trace of furrows, and reaches to about the middle of the corolla; the stigma is capitate, and not at all lobed; it is, however, slightly flattened: the lobes of the corolla are recurved and acute, nor do I see how *S. flexuosa* is to be distinguished except by its rather narrower leaves. Vahl mentions that there is a small tuft of hairs on the corolla at the back of the anthers, which I perceive also in my specimen (from Bahia:) there thus seems to be no distinction in this respect between the American and Indian species; but in one of those from India, and probably in both, the stigma is clavate and 3-lobed, and the corolla infundibuliform, by which Decandolle's two sections may be characterized.

* The genus *Nyssa* differs from Santalaceæ not only in habit, but by the very large embryo nearly as long as the albumen, which is thin; the whole structure of the seed is not very unlike that of *Fagonia cretica*, and some other genera of the class Rutaceæ, as also of Euphorbiaceæ: In those species I have examined I have found only one ovule in the ovarium

REVIEWS AND CRITICAL ANALYSIS.

Dr Lardner's Cabinet Cyclopædia. Natural History. Natural History and Classification of Birds. By W. SWAINSON, Esq. A. C. G., F. R. S. L., &c. Vol. II. London, Longman and Co. 1837. (Continued from p. 461.)

WE now pass to the tribe *Scansores* or climbing birds, "comprising all those families whose feet are more particularly organized for climbing trees, and whose modification of structure have been already so fully explained" in a previous volume. With the exception of the *creepers* (*Certhiadæ*), the whole tribe have their toes placed in pairs. The primary divisions are naturally arranged under the families *Certhiadæ*, *Picidæ*, *Psittacidæ*, *Ramphastidæ*, and *Cuculidæ*; and these, he observes, "collectively form a complete circle, the junction of the last with the *Ramphastidæ* being effected by the great hollow-billed genus *Phœnicophaus*, and by *Scythrops*, the Australian genus of toucans." The *certhiadæ*, which show the closest affinity to the *Tenuirostres* or suctorial tribe, are generally of a small size, with a bill of slender proportions as compared with other *Scansores*, but the hinder toe greatly developed. The subfamilies of this division are the *Anabatinae*, with the tail slightly rigid, but never acute, the outer toes free; *Certhianæ*, having the tail terminating in sharp and often horny points; *Buphaginae* with the bill thicker, and tail as in the first group, *Troglodytinae*, the wrens, and *Sittinae*, with a short and partially wedge-shaped bill, the toes greatly developed in proportion to the size of the body. From this family he has rejected the genus *Upupa*, Linn. which he now places among the *Promeropidæ*, as the tenuirostral form; as well as *Orthotomus*, which we have seen him introduce as a scansorial type among the *Sylvianæ*; and *Mniotilta*, which holds the same station among the American *Sylvicolæ*. The *Picidæ* which, from their structure, he considers to be the most perfect of the climbers, constitute the typical division of the tribe. Of its minor groups, the subfamily *Picianaæ*, or true woodpecker, has been investigated with great suc-

cess, and its circle down to the subgeneric groups wonderfully worked out. The *Buccoinæ*, containing the genera *Asthenurus*, Sw. *Picumus*, Temm. *Bucco*, Linn. and *Pogonias*, Ill. is another section, and it is probable the genera *Yunx*, Linn. and *Oxyrynchus*, Temm. may prove representatives of others. The *Psittacidæ*, or parrot form the third family, and subtypical division. Of these curious and beautiful birds, he justly remarks, that, if any group in nature be isolated, it is this. Possessing in themselves the strongest characteristics, there is no bird yet discovered which presents any point of connection to them. Approximations, indeed, are certainly made towards them by the tooth-billed barbuts, (*Pogonias*), but there is still a gap which no genus yet discovered is calculated to fill up.

The subfamilies, as indicated by the genera, appear to be the *Macrocercinæ*, *Psittacinæ*, *Plyctolophinæ*, *Lorianæ*, and *Platycercinæ*, under each of which he has in the Synopsis given the genera and subgenera, which do not essentially differ from the arrangements contained in the history of parrots, forming the sixth volume of the "Naturalist's Library." The *Ramphastidæ*, or toucans, represent the fourth family, a group remarkable for the enormous size and comparative lightness of their bills, a provision beautifully adapted for that excessive development of the olfactory organs which gives them the most exquisite powers of smell. The genera recognized are four, viz. *Ramphastos*, Linn. *Pteroglossus*, Ill., *Aulacorynchus*, Gould, and *Scythrops*, Lath. The cuckoos or *Cuculidæ* form the fifth and last family of the *Scansores*. This he divides into the subfamilies *Cucullinæ*, *Corryziinæ*, *Crotophaginæ*, *Leptosominæ*, and *Indicatorinæ*; but as our limits will not permit us to enter into further details, we refer our readers to the author's elaborate papers on this group, contained in the third and fifth numbers of this Magazine. We may, however, remark, that he conceives the necessary union between the scansorial tribe and the rasorial order of birds, is effected by certain species of the genus *Leptosoma*. The tenuirostral tribe or honey-suckers, which he considers the most aberrant division of the inessorial order, are principally distinguished by the structure of their tongue, which is always retractile and long, sometimes simply forked, but more frequently with the tip brush-like or filamentous; the feet and legs are generally small and slender, and the bill in the typical groups is so delicate, as to appear to be formed rather for the purpose of sheathing or defending the tongue, than for seizing or grasping food. The primary divisions are thus named from the generic types, *Trochilidæ*, *Cinnyridæ*, *Præmeropidæ*, *P'a-*

radisidæ, and *Melliphagidæ*. Of these the two first are considered the typical and sub-typical divisions. In the *Melliphagidæ* we have a curious and highly interesting group, containing within itself, as he observes, types of every order and tribe throughout ornithology. By the *Ptiloris paradiseus*, or rifle-bird of Australia, it seems brought in connection with the *Promeropidæ*, while its smaller forms lead to the sun-birds or family *Cinnyridæ*, the typical groups of which are natives of the tropical regions of the old world. In these birds the margins of the bill are minutely dentated, the tongue forming a bifid tube, but the tip without the filaments or brush-like appendage of the *Melliphagidæ*.

In the *Trochilidæ* or true humming-birds he remarks, "we have the full development of the suctorial perfection belonging to this tribe." As a group they still remain in a degree isolated, no immediate connecting link with the other families having yet been discovered, though there is obviously a strong affinity between them and the *Cinnyridæ*; and in the large species lately discovered, we are inclined to think a close approximation to the *Promeropidæ* will be found to exist. He determines the five principal forms under the generic heads of *Trochilus*, *Cyananthus*, *Lampornis*, *Campylopterus*, and *Pæthornis*. We now arrive at the last tribe of the *Insectores*, which, from the great width of the gape of its members, has been named the tribe of *Fissirostres*. As a whole, Mr Swainson observes, "they are distinguished by having the powers of flight developed in the highest degree; all energies of their nature seem concentrated in this one perfection; for their feet are always very short, weak, and generally so imperfect as to be of no further use than to rest the body after flight. Their food is insects captured upon the wing." The primary divisions are supposed to be the families *Caprimulgidæ*, *Hirundinidæ*, *Meropidæ*, *Halcyonidæ*, and *Trogonidæ*.—Among the *Bee-eaters*, *Meropidæ*, we find the Rollers, genus *Coracias*, which by former systematists used to be placed among or near to the crows. That the present is their natural station, no one, we think, who has investigated their structure and economy, as well as their immediate affinity to the genus *Eurystomus* will be prepared to doubt. Among the *Halcyonidæ* he properly places the puff-birds or members of *Tamania*, and its sub-genera, an extensive group, which, in systems where natural affinities and economy were either little understood, or not attended to, used to figure among the *Cuculidæ*. The jacamars, also, (*Galbula*), which at one period were placed close to the hornbills, he has transferred to their proper station in this family. That the *Trogons*, whose situation hitherto has

been a subject of much doubt and discussion, actually form a portion of the fissirostral tribe, an examination of the species, as well as what we know of their habits and economy, has satisfied us, although some links may be wanting to render their connection with the other groups of a closer nature than it is at present. With the Trogons he associates the Motmots, (*Prionites*, Ill.,) which also possess a serrated bill; by some of the species such as *P. platyrhynchus*, and a beautiful recent introduction *P. superciliaris*, a decided affinity to the Meropidæ and Halcyonidæ is indicated.

The gallinaceous birds, or order *Rasores*, next claim attention; but as our analysis has already extended to an inconvenient length, we must confine our remarks to a mere notification of the primary groups of which it and the two remaining orders seem to be composed. The rasorial families are the *Pavonidæ*, *Tetraonidæ*, *Struthionidæ*, *Columbidæ*, and *Cracidæ*, or as he afterwards names it in the synopsis *Mcgapodidæ*. Of these five the two first are the typical and subtypical divisions. The analogies of the rasorial birds with the unguledated quadrupeds, respecting which we have already stated our opinion, are given in the following table.

Pavonidæ.....	Solipedes
Tetraonidæ.....	Ruminantes
Cracidæ.....	Anoplotheres
Columbidæ.....	Edentates
Struthionidæ.....	Pachydermes

The connection of this order with the Insessores through the medium of the Scansores, its analogue, he endeavours to prove, and we think successfully, to be effected by certain birds of the family Cuculidæ, such as *G. Crotophaga*, *Leptosoma*, and the *Coccyzus Geoffroyii*, and not by *Musophaga* or *Corythaix*, as supposed by Cuvier and other writers; the affinities of the last mentioned genera clearly indicating them to belong to the Conirostral, and not to the Scansorial tribe. A few additional observations on the affinities of the gallinaceous birds closes this chapter.

The Grallatorial order, or wading-birds, comprises, in Mr Swainson's words, "all such families as live both on land and sea, and to whom one element is as essential as the other." The families or primary divisions of the waders are supposed to be comprehended under the following heads; *Ardeadæ*, *Charadriadæ*, *Scolopacidæ*, *Rallidæ*, and *Tantalidæ*. Among the *Ardeudæ*, he places the Cranes, which we were inclined to consider as a distinct family, and that his family *Tantalidæ* entered within the circle of the *Ardeadæ*; our views, however, we confess, may have been errone-

ous, as our investigation of the contents of this order has not been of that minute character to enable us to speak confidently of its affinities and analogical relations. The order *Natatores*, or swimming birds, closes the great ornithological circle, and is composed of such families as habitually live upon the waters. They are characterized as having feet short in proportion to the size of the body, generally placed behind the equilibrium, with toes rather long, and more or less united by a thin membrane or web, and with the exception of the waders, are the only order which have the neck considerably longer than the legs. The five great divisions which are supposed to constitute the natural families of the order, are the *Anatidæ*, *Laridæ*, *Pelicanidæ*, *Alcadæ*, and *Colymbidæ*; of these he considers the two last, from the great development of the natatorial powers, to be the primary types, but adds, that further investigation is required, before the analogies of its primary groups can be satisfactorily determined; at present, he supposes them to stand thus.

<i>Families of Natatores.</i>	<i>Tribes of Insessores.</i>	<i>Orders of Birds.</i>
Colymbidæ,	Conirostres,	Insessores,
Alcadæ,	Dentirostres,	Raptores,
Pelicanidæ,	Fissirostres,	Natatores,
Laridæ,	Tenuirostres,	Grallatores,
Anatidæ,	Scansores,	Rasores;

and though not fully convinced of the truth of his positions, we must confess, his arguments in their favour are ingenious, and of considerable weight. Among the *Anatidæ*, whose circle, in some of its minor divisions, as that of the *Anatinaæ*, has been successfully worked out, he places those singular birds, the flamingoes, *G. Phœnicopterus*, a transportation from the grallatorial order in which they were left by other writers, but for which change, judging from what we have seen of these birds, both as to structure and habits, he has good grounds for doing. It thus, as an aberrant form, becomes the grallatorial type of the *Anatidæ*, and forms that link by which the *Natatores* are united to the *Grallatores*. Of the families *Colymbidæ*, *Alcadæ*, and *Pelicanidæ*, much remains for further examination, and he merely points out the known genera of each. The *Laridæ* or gull family, including the terns, gulls, albatrosses, skuas, and petrels, is the fifth and last; the circle being closed by the subgenus *Pachyptila*, Forst., which, in the form of the bill, indicates a near approach to the family of the *Anatidæ*. Among the *Laridæ* he has also placed the genus *Dromas*, Payk., the representative of which is figured and described in the "Illustrations of Ornithology," under the title of *Erodiæ Amphilensis*; but we cannot think Mr

Swainson's views in regard to this curious bird are correct, its form and structure apparently bringing it much closer to some of the gallatorial families, and we can only attribute its present station to the circumstance of the author never having seen or examined a specimen.

The concluding half of the volume is occupied with "a Synopsis of the Natural Arrangement of Birds," in which the whole of the orders, families, and other minor divisions are arranged in that series, which the latest researches of the author indicate to be most in consonance with their direct affinities, and consequently with that order which they occupy in nature. Upon an inspection of this synopsis, it will be observed, that the distribution of the groups in some cases is different from what they appear in the text, but this, he observes, "has resulted from further analysis, and by incorporating his researches up to the latest time." These changes, indeed, are mostly of minor importance, that is, they do not interfere, or are at variance with the principle of his arrangement, being mostly confined to such forms or groups as had not previously undergone a searching analysis, or which, as osculant species, and showing a double affinity, it was difficult, without additional information, to locate in the groups to which they are in reality most nearly allied. The nomenclatural department, it will be seen, has undergone considerable change; several new genera have been added, and many generic and specific names introduced by other writers have been altered. With the first class we find no fault, so long as the forms present characters of sufficient importance to warrant generic distinction. With the other, though we do not approve of all the innovations introduced, we nevertheless think the names are generally, as being more classic in their derivation, preferable to those for which they are substituted; and further, that an author is justified in making such changes whenever the rules of nomenclature, as laid down by the 'fathers of science,' have been palpably violated or neglected, otherwise it is impossible a system of classic nomenclature can ever be established or insured. Upon quitting this part of the volume, we shall just glance at one or two forms, whose situation, if not inappropriate, we at least deem doubtful, with the limited information at present possessed of their habits and economy. The first is that of his *Catheturus Australis*, (the *Alectura* or New Holland vulture of Dr Latham,) which he places among the *Vulturidæ*, of which family he considers it the rasorial type, though he had previously assigned that station to the *Dodo* of authors,—a bird of whose existence at any period, under the form generally represented, we have always been very sceptical. Our own impression, from a mi-

nute examination of skins of *Cathetus*, is, that it belongs to the rasorial order, and will enter the family named *Cracidae*, or now by Mr Swainson, *Megapodidae*. Its exterior characters certainly appear more nearly allied to the rasorial than the raptorial forms—the bill, though strong, being in shape essentially that of a gallinaceous bird, with nostrils partially protected by a superincumbent scale. The tail, as the generic name first given it clearly imparts, is strictly rasorial, and the legs in structure closely approach those of some of the birds with which we would associate it. Of its habits and mode of living, upon which much depends, we unfortunately know little or nothing. A second is that of the genus *Chionis* or sheathbill, which he has placed as a form in the family *Columbidae*, but whose affinities require to be better understood before its real station can possibly be determined. The cranes, genus *Grus*, &c. we still think entitled to a rank of higher value than that of a subfamily of *Ardeada*. It will be observed that the genus and its subgenera have been altogether omitted or forgotten in the synopsis. Of the present situation of the genus *Hæmatopus*, we also have considerable doubts, and believe that it will be found to belong to a different division of the *Grallatores*. Of the affinity of *Dromus*, the last genus of the synopsis, we have already stated our opinion.

Having at length brought our observations to a conclusion, we take our leave of Mr Swainson, with feelings of gratitude for the lasting benefit he has conferred upon science. He has in the volumes now published given us a system or arrangement of two of the great classes of vertebrate animals, which, if not yet perfect in all its details, has, nevertheless, its great outlines and demarcations based upon fixed and important principles, proving it to be infinitely superior to any that has before been attempted, and more in accordance with, or more nearly approaching, the natural system. He has, we think, successfully carried out the views and principles of that eminent naturalist, which were first disclosed in the pages of the *Horæ Entomologicae*, and, in addition, has announced, and we think gone far to prove, the existence of other important natural and general laws. That much remains to be done to render the arrangement perfect in all its parts and minor details, we freely allow; it is indeed a matter of time, and must occupy years to accomplish. Day after day, however, new objects in every department of natural history are being brought to light. These, so far from increasing our difficulties, must essentially diminish them, as we may naturally expect to find, among the variety discovered, forms which we wanted to fill up those links of the chain which at present are imperfect or disjointed.

BIBLIOGRAPHICAL NOTICES.

Tentamen Pteridographia, seu Genera Filicacearum, presertim juxta venarum decursum et distributionem exposita. Auctore CAROLO BOR. PRESL. Pragæ, 1836, 8vo. pp. 290.

ALTHOUGH published in 1836, this very interesting work has only just come in our way, and we hasten to bring it under the notice of our readers. As the title indicates, it is an attempt to determine the genera of Filices, according to characters mainly derived from the venation of the frond.

“Dignitas vasorum seu nervorum venarumve,” observes the author, “in dignoscendis plantis jam eo usque cognita est, quod ex contemplatione illarum in foliis diversissimis plantæ monocotyledonæ a dicotyledoneis facile discerni possunt. Dispositio nervorum vel venarum in laminis foliaceis indicat compagem organorum, in quibus obvenit, et cum dispositione vasorum in truncis et petiolis contentorum arctissimo cohæret vinculo. Hæc vasa in organis foliaceis Filicacearum tamquam costæ, venæ et venulæ palam fiunt et ex supra allatis causis maximum in describendis dividendisque Filicibus possident argumentum. Filicæ compage venarum anatomica ab omnibus aliis vegetabilibus phanerogamis quam maxime differunt; hac ex causa venæ Filicacearum characterem essentialem et validissimum ex interna structura harum plantarum desunt præbent.”

The work is illustrated by twelve folding plates filled with a great number of accurately drawn and beautifully executed figures, exhibiting the venation and fructification of the genera. Perhaps M. Presl has in some cases pushed his principle a little too far, and formed genera of groups which might have been retained with advantage as sections. The number of new genera amount nearly to fifty! There is no doubt that venation has been too much neglected, and that henceforth it will be held of primary importance in defining the genera of this large and beautiful family.

Bryologia Europæa seu Genera Muscorum Europæorum Monographice illustrata. Auctoribus BRUCH et W. P. SCHIMPER. Fasc. I. cum. Tab. xi. Stuttgartiæ, 1837. 4to.

This is the first part of an entirely new work upon the Mosses of Europe, and, if completed according to the plan proposed, will form a valuable addition to our botanical libraries. The generic and specific characters are in Latin; the observations in French and German. Every species is figured, and the well-executed plates abound

with those minute details (drawn by the authors themselves,) for which the German naturalists are celebrated. The present fasciculus contains the PHASCACEÆ and BUXBAUMIACEÆ. The second and third fasciculi, containing the ORTHOTRICHACEÆ, illustrated with twenty plates, are probably already published. Each monograph is perfect in itself, and may be purchased separately. We recommend the work to the attention of all muscologists.

Encyclopædia Britannica. Edited by Professor NAPIER. 4to. Black and Co. Edinburgh. *Article Mammalia, &c.*

THOUGH an Encyclopædia scarcely comes under the range of a Magazine devoted to Zoology and Botany, yet works of this kind often contain so much information on physical science, and have held such an important station in the literature of almost all countries, that we think ourselves bound to direct attention to the articles devoted to natural history, and more particularly as these can now be obtained bound up apart from the great work itself. The Encyclopædia Britannica is now in the course of publication by an enterprising Edinburgh bookseller, having the various departments, independent of the superintendence of an enlightened general editor, placed under the charge of men whose names are a guarantee for the accuracy and merit of the essays which fall under their review. The zoological department has been entrusted to Mr James Wilson, author of the "Illustrations of Zoology;" and there has already appeared, in addition to shorter and less important articles, *Entomology*, *Ichthyology*, and *Mammalia*. The first, being the favourite pursuit of its author, has perhaps had the most pains bestowed upon it, and forms an excellent introductory treatise on this branch, occupying a complete half volume. *Ichthyology* runs through nearly a hundred pages; and the last article, *Mammalia*, occupying a hundred and twenty pages, forms a good and concise exposition of the Cuvierian system, which has been adopted in both the latter branches, "rather than that of any more modern, or it may be amended classification," which from "critical asperities have scarcely in themselves subsided into a lucid or tranquil element of science."* Most of the latest discoveries have been introduced in their proper places, and the treatise will be found to contain a summary of what was known up to the date of publication. The engravings, generally copies from the standard illustrated works, both British and foreign, are well executed, and in the three departments, amount to forty-eight in number.†

* *Mammalia*, pages 84 and 88.

† *Mammalia* 17, *Ichthyology* 11, *Entomology* 20.

INTELLIGENCE.

MISCELLANEOUS.

BOTANICAL SOCIETY.—1837, November 9th.—Professor Graham, President, in the Chair.—The following members were elected: *Resident*, Mr A. H. Balfour; Mr James Crossfield; Mr Alexander Dempster. *Non-resident*, Mr C. E. Broome of Rudloe; Mr Samuel Holker Haslam, of Chesham; Mr John Sheer, Aberdeen. *Foreign*, M. S. Bischoff, Berne; M. George Dolliner, Vienna; M. F. Glocker, Berne; Dr Oswald Heer, Professor of Botany in the University of Zurich; M. Albert Kolliker, Zurich; Dr Francis Lagger, Fribourg; Rev. Christian Münch, Basle; M. Charles Naegeli, Zurich; M. Phil. Max. Opitz, Prague; M. L. Rabenhorst, Luckau; M. J. L. Schaller, Fribourg; M. R. Schartow, Berne; M. C. Sinz, Berne; Professor John Bernh. Wilbrand, Giessen.

Specimens were presented from Sir William Jardine and twenty-four members of the Society, received since 13th July last, along with various donations to the library from Professor Wilbrand, Mr J. T. Mackay, Professor Heer, Mr R. J. Shuttleworth, Mr P. J. Brown, M. P. M. Opitz, and Mr R. W. Falconer, &c. &c. The thanks of the Society were given to Dr Greville, Dr Balfour, and Mr Brand, for their exertions and trouble in collecting for the Society, a large stock of Alpine duplicates, chiefly from the mountains of Forfarshire and Aberdeenshire.

Mr R. W. Falconer exhibited a specimen of *Celosia cristata* raised from seed, in the open air, in a garden near Bath, which by frequent transplantation had attained to a great size. This plant is a native of Japan, where Thunberg says the crests or heads of flowers are often one foot in length and breadth, but that when removed from their native soil they rapidly degenerate. The flower in the specimen shown measured 2 feet $4\frac{1}{2}$ inches from side to side, and 1 foot $2\frac{1}{2}$ inches across, and was one of twenty equally large.

Dr Balfour read an extract from a letter which he had recently received from Mr W. B. Carpenter of Bristol, wherein Mr Carpenter mentioned that, on tracing up the reproductive system, from its simplest appearance in the lowest cryptogamic to its most specialized form in the highest flowering plants, he was inclined to think

that there is no essential change in its character throughout the vegetable kingdoms, although the organs become progressively more complicated, the lowest and simplest, however, possessing all that is essential in the highest. Mr Carpenter intimated his intention of making these views ere long the subject of a paper to be sent to the Society.

Dr Graham exhibited drawings, and gave an account of several remarkable forms of trees which he had recently seen and examined. 1. In the M'Nab burying-ground at Killin, a small Scotch fir (*Pinus sylvestris*) is suspended from one much larger, by adhesion to its side. The suspended tree is alive both above and below the point of union, and is of considerably greater diameter below that point than above it. Notwithstanding a legend regarding it, that thirty years ago, in a gale in February, a branch was broken from a neighbouring tree, and stuck in a cleft in the one here alluded to, Dr Graham thinks it quite certain that the suspended tree had grown on the steep bank adjoining, and, lying against its neighbour, had formed a union with it, whilst its own roots were yet in the ground, and then, having been detached from the soil, remained suspended, and lived by the fluids obtained through the point of union. 2. The apparent union of a horse-chestnut and beech at Cambusmore near Callander. A branch from the horse-chestnut lies across the stem of the beech, and is pinched tightly in the acute angle formed by the stem, and a large branch proceeding upwards from it, so as to be completely imbedded and covered, with the exception of a narrow strip of the bark along the upper side of the branch, which remains exposed. Dr Graham is satisfied that there is no transfusion of fluids from the beech to the horse chestnut, not even organic adhesion between them, and he feels assured that the branch will die as soon as it is completely enveloped by the beech. 3. At Gargunnoch House, Stirlingshire, two elm trees, (*Ulmus montana*) grow near to each other, so near that they might be supposed to arise from the opposite sides of a considerable stem, felled many years before. Between these, and a little to one side, is the stem of an ash tree, less than half the diameter of either of the elms; and in the centre are three stems of holly, two of which are certainly portions of one tree, but whether the third is a distinct tree or not, it was found difficult to determine. At their bases, all these are so intermingled and so imbedded in each other, that it is scarcely possible to believe that no organic union subsists between them. One of the holly stems has died; and another appears to be fast going to decay,—for having become wholly imbedded in the

elm, its bark must be destroyed, and no power left of transmitting its elaborated fluids to the roots. All the other trees are perfectly healthy, and together form a top which at a distance seems one well-shaped handsome tree.

December 14th.—Professor Graham, President, in the chair. The following members were elected :—*Resident*, Mr Herbert Giraud, Mr David Graham, Mr John Thomas Syme, Mr Emanuel Young. *Non-Resident*, Dr Robert Hibbert Taylor, Dumfries. Mr Robert Graham was appointed Local Secretary at Liverpool, and Dr Gilbert M'Nab in Jamaica.

The Chevalier Giovanni Gussone of Naples was proposed by the Council, and elected a *Foreign Honorary Member*.

Specimens were presented from Dr Greville, Mr Percy, Rev. A. Rutherford, Mr Edwin Lees, Dr Tyacke, Rev. W. S. Hore, Mr J. Cruickshank, Mr William Reid.

Dr Greville presented a beautiful design for a diploma, for which the thanks of the Society were unanimously given to him.

Dr Greville then read a " Notice of a Botanical excursion to the Highlands of Forfarshire and Aberdeenshire." Dr Greville left Edinburgh on the 16th of August, accompanied by Dr Balfour and Mr Brand,—one of the principal objects of the party being to collect specimens of the rarest Scottish plants for the Botanical Society. The party proceeded by Dundee to Airlie, and from thence to the head of Glen Isla, which forms a part of the richest botanical mountain district in Scotland. About three miles from Dundee the true *Rumex aquaticus* of Linnæus was observed to be not unfrequent, the only station for which plant in the British islands, hitherto recorded, being near Ayr, where it was discovered by Mr Goldie. In Canlochen, one of the glens which terminate the head of Glen Isla, were found *Thlaspi alpestre*, *Gentiana nivalis*, *Alopecurus alpinus*, *Phleum alpinum*, *Poa alpina*, *Erigeron alpinus*, *Dryas octopetala*, *Veronica alpina*, *V. saxatilis*, *Epilobium alsinifolium*, *Saussurea alpina*, *Sonchus alpinus*, *Juncus castaneus*, *Carex atrata*, *Salix lanata*, besides numerous other rare species in which this glen abounds, and which so remarkably characterize and distinguish it from Caness, the other terminal branch of Glen Isla,—the latter being as unproductive in the scarcer alpine plants, as the former has been shown to be the reverse. From 19th to 25th August, the head-quarters of the party were fixed at the hamlet or Kirktown of Clova, near the head of the valley of the South Esk, from whence excursions were made to Glen Dole, Glen Phee, Loch Brandy, &c. and a large accession of plants made to those already

collected,—including *Lychnis alpina*, *Astragalus alpinus*, *Linnæa borealis*, *Sonchus alpinus*, *Pyrola rotundifolia*, *Carex rariflora*, *C. Vahlîi*, *Salix arenaria*, *S. reticulata*, *Hieracium alpinum*, *Lycopodium annotinum*, *Azalea procumbens*, *Isoetes lacustris*, *Cerastium alpinum*, *Oxytropis campestris*, *Woodsia hyperborea*, *Weissia latifolia*, *Didymodon glaucescens*, &c. From Clova the party removed on the 25th, proceeding by Glen Dole, the White Water, and Glen Callader to Castleton in Braemar, where they remained till 1st September, making excursions in the interval to Glen Callader, Loch-na-gar, Ben-y-bourd, &c. Specimens were obtained of *Carex rupestris*, discovered in Glen Callader in August 1836 by Mr Dickie; also *Carex Vahlîi*, *C. pauciflora*, *Juncus castaneus*, *Alopecurus alpinus*, *Saxifraga rivularis*, *Stellaria cerastoides*, *Arabis petraea*, *Cornus Suecica*, &c. Dr Balfour found a new station for the rare *Saxifraga rivularis* on Ben-y-bourd. On 1st September the party separated, Dr Greville and Dr Balfour recrossing the mountains to Airlie, on their way to Edinburgh, Mr Brand proceeding by the summit of Benmuickdhui, the highest ground in Scotland, (in order to gather *Luzula arcuata*) to Inverness. It is worthy of remark, that *Rumex aquaticus*, which was one of the first plants met with, was observed to prevail throughout the whole of the district traversed, and even to be found in abundance by Mr Brand in Morayshire, about Peterhead, &c. During the excursion the party suffered occasionally from severe cold, attended with storms of wind, rain, and snow; but, in the conclusion of his narrative, Dr Greville observes, that it “was probably, taking all things into consideration, the most productive one ever made in the Highlands of Scotland. The number of specimens procured cannot, I think, fall short of 15,000, and it only remains for me to express a hope, that, as far as the Botanical Society is interested in the result of our labours, its expectations will not be disappointed.”

Dr Balfour exhibited a *Carex* transmitted to him by Dr Murray of Aberdeen, which had been found by Mr Dickie in August 1836, on rocks near the summit of Loch-na-gar. Dr Balfour stated that, on careful examination, it appears to him to be *Carex leporina*, Linn, Willd. and Flor. Dan., *C. lagopina*, Wahl., and *C. Lachenalii*, Schk. a species never before found in Britain. The *Carex leporina* of Huds., Leers, Lightf., Ehrh., and Wahl., is merely a synonym of *C. ovalis*, Gooden.

Dr Pollexfen exhibited specimens of *Delesseria ruscifolia*, *Rhodoménia Palmetta*, and *Bonnemaisonia asparagoides*, found by him last summer in Orkney, and all new to the Scottish Flora. Also

Nemalion lubricum, Duby, (*Chordaria nemalion*, Agardh,) found by Miss Watt at Skail, Orkney, being a new genus to Britain. Lastly, a new species of *Striaria*, found by Dr Pollexfen in Kirkwall Bay, Orkney, which he proposes naming *S. Grevilliana*. It is chiefly distinguished by its irregular ramification.

Dr Graham read some remarks on a paper published by Dr Wight, in the Madras Journal, (No. 13, p. 300,) which paper contained a commentary on a letter from him to Dr Wight, regarding the gamboge tree of Ceylon. In this paper Dr Wight mentions that Dr Graham differs from him by having made the following statements: 1st, That the plant sent to him from Ceylon, and which he (Dr G.) has since named *Hebradendron gambogioides*, is the *only one which produces gamboge fit to be used in the arts*; 2d, That the *Hebradendron gambogioides* is the plant which yields the *true Ceylon gamboge*; 3d, That Drs Wight and Arnott were mistaken when they asserted that the *Xanthochymus ovalifolius* is the *only indigenous plant in Ceylon that produces gamboge fit to be used in the arts*; and 4th, That *Hebradendron gambogioides* is a *native of Ceylon*.

Dr Graham showed, by reading the extract from his letter which Dr Wight himself had published, that he never made one of these statements, except the second, the accuracy of which he is quite prepared to maintain, having proved, by his own experiments and those of others, that the concrete juice of *Hebradendron gambogioides* is excellent gamboge, chemically, medicinally, and as a pigment,—and knowing from the perfectly unexceptionable authority of Mrs Walker that it is collected in large quantity in Ceylon. The first statement Dr Graham not only never made, but it is opposed to the opinion which he actually holds; although information, he thinks, is still required on the subject. On the third point there is a threefold error. Dr Graham never maintained that Drs Wight and Arnott had asserted that *Xanthochymus ovalifolius* is the *only indigenous plant in Ceylon which produces good gamboge*. They asserted that it is the *only plant in Ceylon which does so*; but Mrs Walker has enabled Dr Graham to prove that there is *another*. He is now farther able to assert that the concrete juice of *Xanthochymus ovalifolius* *cannot* be employed advantageously as a substitute for gamboge. The fourth statement Dr Graham never made, and indeed, until lately, he had no information upon the subject; but recent letters from Mrs Walker, he thinks, now entitle him to say that the *Hebradendron gambogioides* is *indigenous* in Ceylon,—at any rate certainly enable him to disprove the assertion upon which was founded Dr Wight's opinion that it is not.—W. H. C. Sec.



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ERRATA.

- Page 107, line 7, *for sea, read lea.*
— 166, — 22, *for country, read county.*
— 167, — 17, *for do. read do.*
— 169, at Table 8, *for 681 genera, 286 species, read the reverse.*
— 328, line 24, *for Fig. 1, read Fig. 2.*
— — — 26, *for Fig. 2, read Fig. 1.*
— 384, — 12 and 18, *for Mr Bald, read Mr BALL.*
— 429, — 27, *for jerkins, read perking.*
— 433, — 7, *for Toomavarat, read Toomavara.*
— 488, — 10, *for Tridactylites, read Trifurcata.*

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PLATE 1.



I. *Sorex Araneus* of DuRoi. II. *S. Araneus* of English Authors.
 III. *S. Fodiens* of DuRoi. IV. *S. Fodiens* of English Authors.



PLATE II.

Fig. 1.



Fig. 11.



Fig. 2.

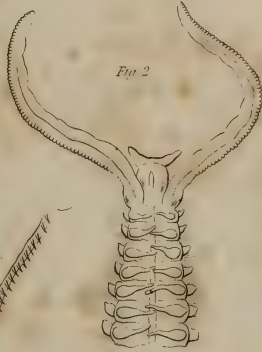


Fig. 7.



Fig. 6.



Fig. 3.

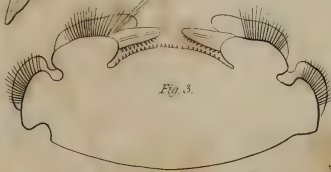


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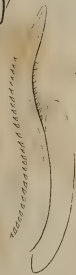


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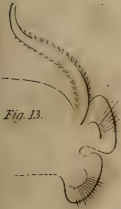


Fig. 8.



Fig. 4.



Fig. 9.

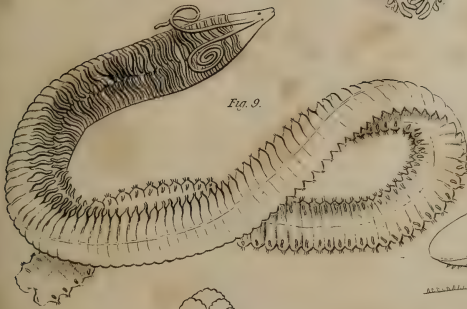


Fig. 10.



Fig. 12.

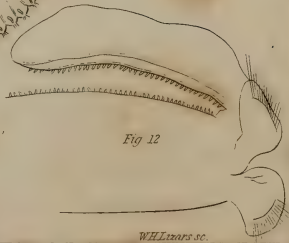




Fig 12

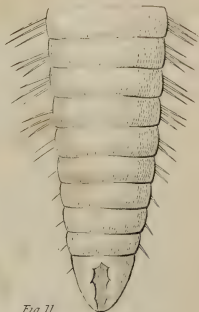


Fig 11

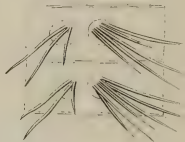


Fig. 3

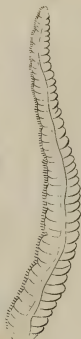


Fig 6



Fig 4



Fig 5



Fig 2



Fig 1



Fig 8

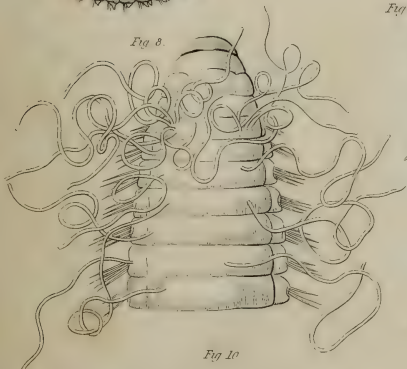


Fig 7



Fig 10



Fig 9





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Fig 1

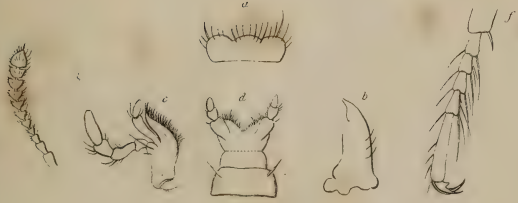


Fig 2

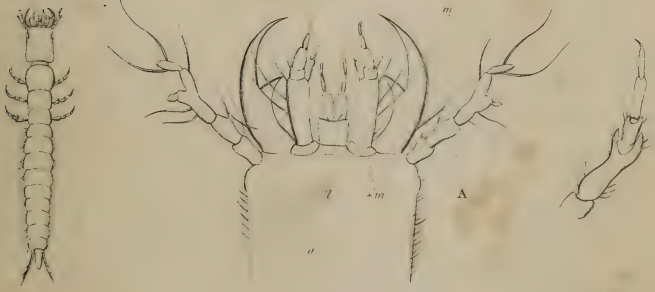
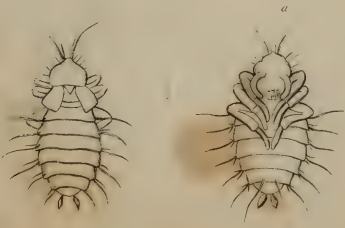
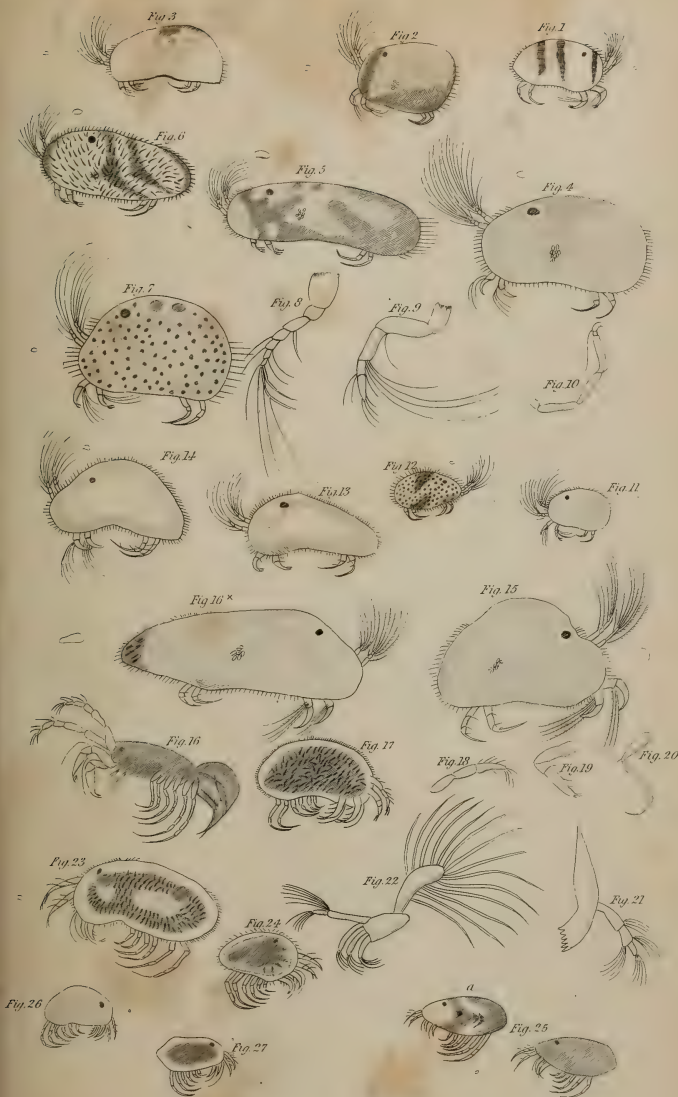


Fig 3







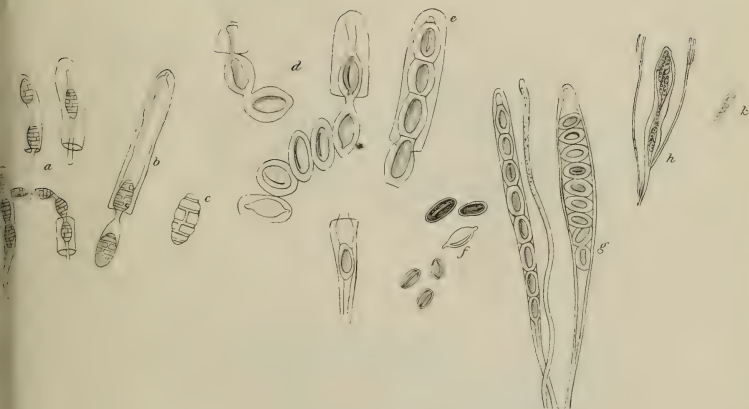
British Entomostraca





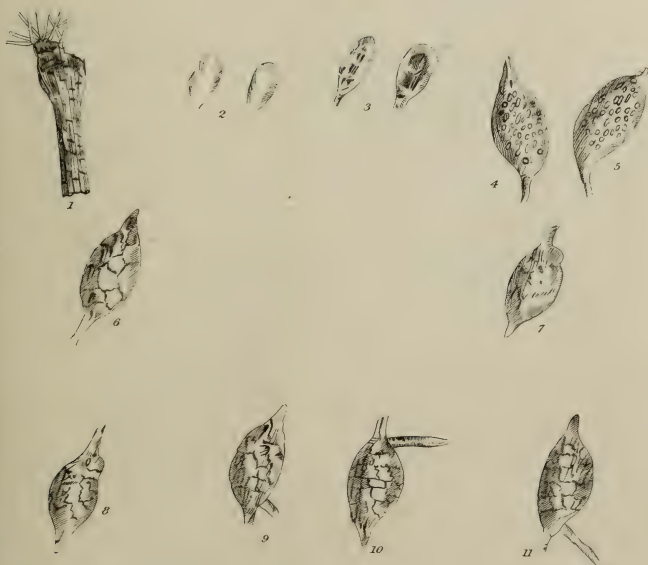
Cerastium pedunculatum





Asci of Sphaeria.

M.J. Perky Del.

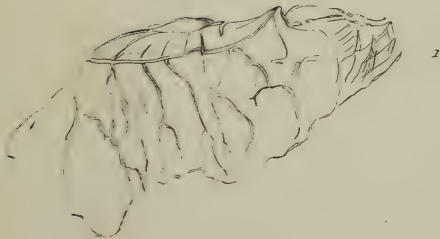
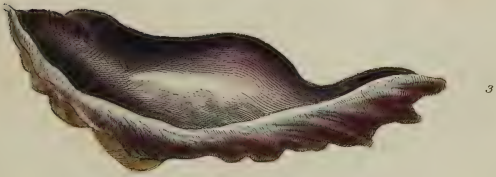
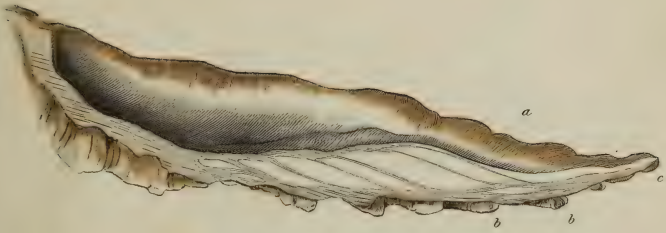


Germs of Bryum Androgynum.

Mag. of Zool. & Bot.

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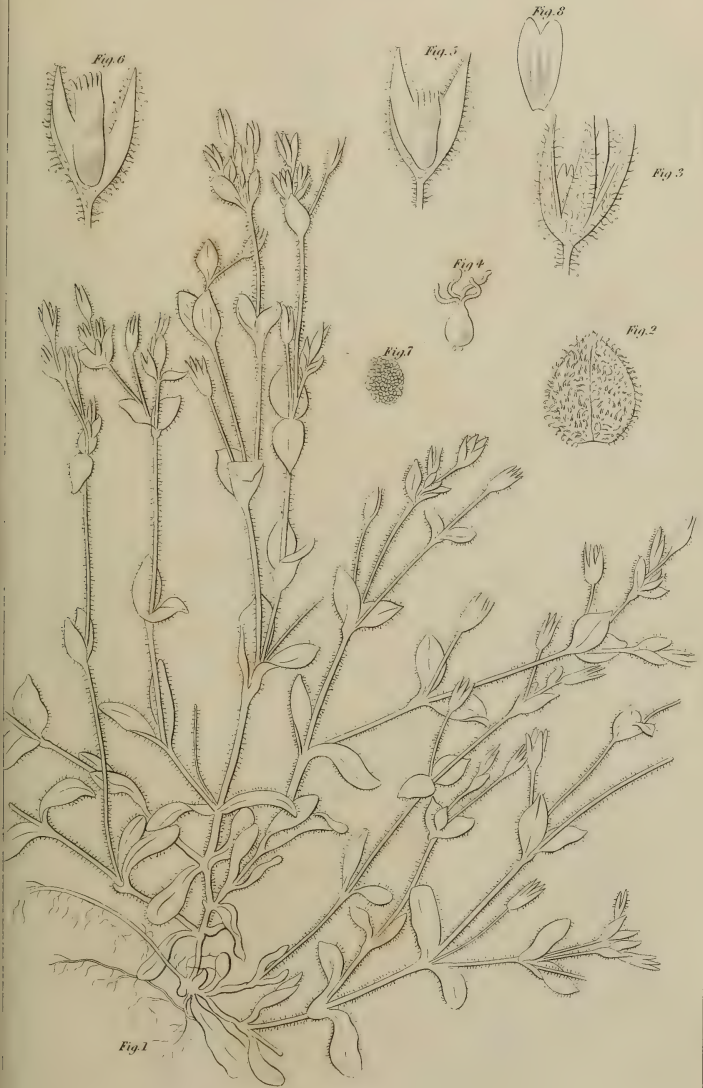


Fig. 1

Geranium atrovirens.

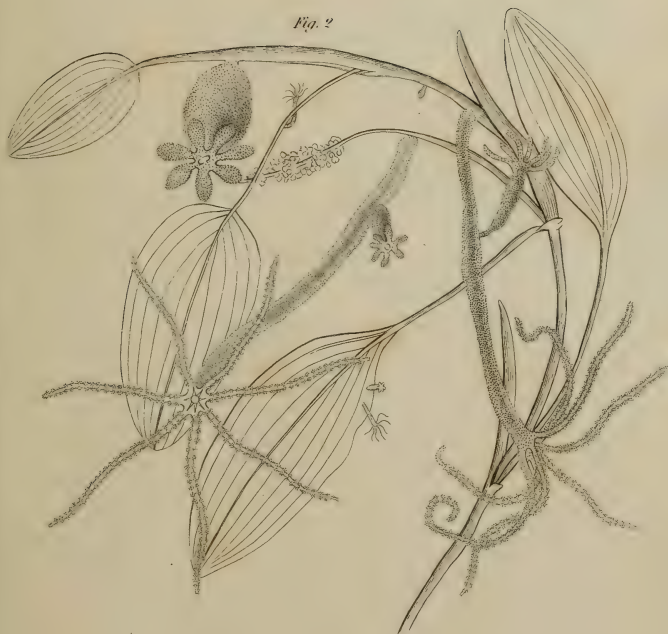
Zool. & Bot. Mag.



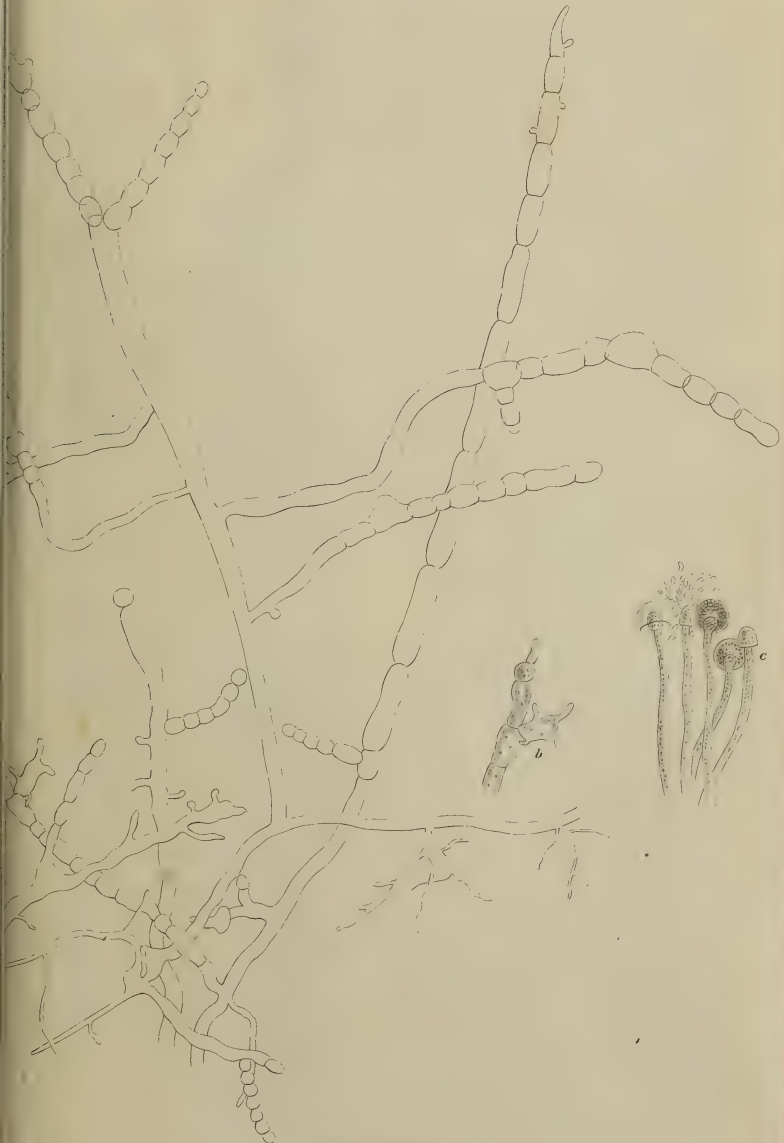
Fig. 1



Fig. 2







Mucor clavatus.





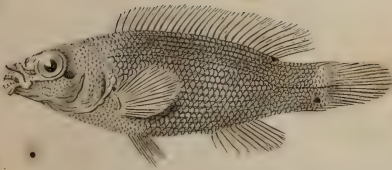
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Crnilabrus multidentatus.

$\frac{1}{2}$ Black Box





